Predictors and Outcomes Associated with Trajectories of Revenge Goals from Fourth Grade through Seventh Grade

Kristina L. McDonald · John E. Lochman

Abstract The present study identified longitudinal trajectories of revenge goals in a sample of at-risk youth ($N=240$; 63.3% male) followed from fourth grade through seventh grade. Three revenge goal trajectory groups were identified: a low-stable group, an increasing group, and a decreasing group. The increasing and decreasing groups were initially more behaviorally and affectively dysregulated and believed that aggression would gain them more rewards relative to the low-stable group. The increasing group was also more fearfully reactive compared to the decreasing group. Revenge goal trajectory groups also predicted trajectories of reactive and proactive aggression from 4th through 7th grade. The increasing group was more reactively aggressive and depressed and had poorer social skills in 8th grade compared to the other groups. Together, results highlight the importance of considering revenge motivations as an indicator of risk and a potential focus for intervention.

Keywords Revenge goals · Aggression · Temperament · Regulation · Outcome expectations

An understanding of how behavioral aggression changes during childhood and adolescence has greatly added to our understanding about the developmental risks and precursors for sustained or increasing aggressive behavior (e.g., Brame et al. 2001; Maughan et al. 2000). Research in this arena has focused on family relationships, peer relationships, and executive functioning problems that characterize children in different aggressive trajectory groups, as well as information about outcomes, like delinquency and psychopathology, for these subgroups later in development.

Although much has been learned about trajectories of aggressive behavior over time, there have been no longitudinal examinations of the underlying goals that may motivate interpersonally aggressive behavior. The current study complements the extant literature about trajectories of aggressive behavior by examining one motivation behind aggressive interpersonal behavior: revenge goals. The current study examines the trajectories of revenge goals over a four year period, from fourth through seventh grade. In addition to identifying different longitudinal trajectories of revenge goals, the study also examines how temperamental and social cognitive factors characterize youth whose revenge motivations follow different trajectories. We also examine how revenge goal trajectories are related to trajectories of reactive and proactive aggression during the same time period and the adjustment outcomes of revenge goal trajectory groups a year later, in eighth grade.

Revenge Goals and Adjustment

One of the reasons that children may have trouble with peers is that their social goals are inappropriate or maladaptive for social situations. The study of goals seems particularly relevant to understanding aggressive behavior and as a means to intervene with children who are having social difficulties. A focus on social goals is also compatible with revisions of the Social Information Processing Model (SIP; Crick and Dodge 1994; revised from McFall and Dodge 1982). The SIP model

K. L. McDonald (✉) · J. E. Lochman
The Center for the Prevention of Youth Behavior Problems,
Department of Psychology, University of Alabama,
Box 870348, Tuscaloosa, AL 35487-0348, USA
e-mail: klmcdonald2@ua.edu

J. E. Lochman
e-mail: jlochman@as.ua.edu

attempts to explain online processing and decision-making that happens in all social interactions. The model describes a series of steps through which social information is processed and social behaviors enacted (Crick and Dodge 1994). In the first and second steps of the model, individuals encode and interpret cues in the social interaction. In the third, fourth, and fifth steps, individuals select and clarify goals for interaction and then select behavioral responses based on possible consequences and perceptions of efficacy in enacting their chosen responses. All of these steps are also affected by individuals' past social interaction histories, manifest as beliefs, biases, and schema, as well as by temperament (or personality) characteristics.

Revenge goals have been examined as part of understanding the social information processing of aggressive or rejected children (e.g., Lochman et al. 1993; Slaby and Guerra 1988). Goals are normally studied by presenting children with vignettes depicting various social situations (e.g., conflicts, ambiguous provocation situations, or other social interactions). Children are then asked to either describe the goals that they would pursue or to indicate through ratings the likelihood they would pursue certain goals.

Research in this area has found that children who endorse revenge goals in ambiguous situations and minor conflicts are more likely to be aggressive and have problematic relationships with peers. For example, Lochman et al. (1993) found boys, who were rated by peers as aggressive, rated revenge and dominance goals higher in response to ambiguous provocations than boys who were not aggressive. Additionally, children who are less accepted by their peers tend to endorse revenge goals more strongly in ambiguous situations, conflicts, or in provocation situations than highly-accepted or well-liked children (Lochman et al. 1993; Rose and Asher 1999). Revenge goals have also been linked to the characteristics of a child's friendships; children who report that they would be "trying to get even" in response to a minor conflict of interest with a friend have fewer mutual friends and poorer quality friendships, even after controlling for their lower level of peer acceptance (Rose and Asher 1999).

Altogether, there is evidence to suggest that revenge motivations in minor conflicts or in response to ambiguous provocations are either a symptom or a precursor of social maladjustment. However, the extant research has been cross-sectional and has not yet examined how revenge goals are predictive of later maladjustment. Nevertheless, there have been investigations of how other types of goals are predictive of later behavior or changes in behavior over time. Generally, this research finds that goals (e.g., instrumental, prosocial) are predictive of later behavior or may mediate how peer experiences (e.g., rejection) are predictive of later behavior (e.g., Dodge et al. 2003; Wentzel 2003). Thus, although there is not existing evidence that revenge goals, specifically, predict later

maladjustment, theoretical and empirical work suggests this is likely the case.

Further, little is known about the course of revenge motivations over time. It is unclear if revenge motivations are relatively stable or if, for some youth at least, revenge motivations may increase or decrease over time. However, drawing from research about externalizing behavior trajectories (e.g., Brame et al. 2001; Maughan et al. 2000), we hypothesize that revenge goals may follow a similar pattern, with some youth staying relatively low on the endorsement of revenge goals over time, others staying high, and others decreasing or increasing in their revenge motivations over time. The current study examines trajectories of revenge goal endorsement in response to ambiguous provocation in an at-risk sample between 4th and 7th grade, spanning the middle school transition. In addition, we examine how revenge trajectories are related to concurrent aggressive behavior trajectories during the same time period as well as to later adjustment outcomes. We hypothesize that youth who are consistently high or increase in their revenge motivations over time will be more reactively and proactively aggressive and will be more poorly adjusted, a year later, in 8th grade.

Predictors of Revenge Trajectories

The present study also examines two factors hypothesized to predict revenge goal trajectory group membership: characteristics of temperament, including fearful reactivity and regulatory abilities, and outcome expectancies of aggression. These factors are important influences on how social information is processed and how goals are chosen (Crick and Dodge 1994; Lemerise and Arsenio 2000). As temperament is considered a basic motivational system and expectations about outcomes of one's behavior influence desires and decisions to enact those behaviors, both of these constructs were expected to affect motivations for revenge.

Temperament

Temperament is a term used to describe individual differences in reactivity and self-regulation. It is theorized to be the initial state from which personality develops and relates individual differences in behavior to underlying neural networks. Temperament includes individual differences in emotional, motor, and attentional reactivity and self-regulation processes such as effortful control (EC) that modulate reactivity (Rothbart and Bates 2006). The current study explores how temperamental differences in fearful reactivity and regulatory abilities are associated with revenge goal trajectories.

Fearful Reactivity Most evidence suggests that fearful reactivity, defined as negative affect related to the anticipation

of distress, may play a role in constraining aggressive behavior. Longitudinal studies find that fear in early infancy negatively predicts to aggression later in elementary school (see Rothbart and Bates 2006 for a review). Based on this research, we explore the possibility that youth who consistently endorse revenge goals at low levels over time would be more fearful than youth who more highly endorse revenge goals or increase in revenge goal endorsement over time.

However, this may not be the case in an at-risk community sample selected for initially high levels of aggressive behavior (as in the present study). Nigg (2006) suggested that the tendency towards anger, which may activate revenge motivations and aggression (e.g., Averill 1982), could, at times, reflect a general tendency towards negative affect, which is also responsive to fear, panic, and alarm. If this is so, then aggressive youth who are also fearfully reactive, may be more likely to retaliate when they are threatened (i.e., defensive retaliation) then aggressive children who are not as fearfully reactive. Nigg (2006) calls this angry, aggressive reaction "rage related to fear and panic" (p. 401). Therefore, we also explored the possibility that aggressive children who were fearfully reactive would be more likely to endorse revenge goals at high levels or increase in their revenge goal endorsement over time compared to youth who were aggressive but were not fearfully reactive as well.

Regulatory Abilities Children's capability to regulate their behavior and emotions are important predictors in understanding their behavior under stressful circumstances. Regulation allows approach in the face of fear and avoidance in the face of perceived reward. Children unable to regulate their negative affect and behavioral impulses may be more likely to have externalizing problems and participate in more risk-taking behaviors (see Mezzich et al. 2001; Pardini et al. 2003). For example, reactively aggressive children may have difficultly regulating negative emotions (e.g., Marsee and Frick 2007), inhibiting impulses, and restraining from aggressive behaviors during interpersonal interactions (Cole et al. 1994).

Although, not all revenge-seeking children are dysregulated, we hypothesized that youth who endorse revenge goals in response to ambiguous provocation situations, as examined in this study, would have difficulty regulating their behaviors and emotions. Accordingly, we hypothesized that children who initially endorsed revenge goals at high levels or who increased in their revenge goals over time would be more dysregulated compared to youth who endorsed revenge at low levels consistently over the four year time period.

Outcome Expectations

According to social information processing theories (e.g., Crick and Dodge 1994), beliefs and expectations about the outcomes of aggression are likely to influence strategy evaluation and selection. For example, aggressive children favor aggressive behaviors because they believe that aggression will yield positive outcomes, either through tangible rewards or by terminating others' aversive behaviors (Boldizar et al. 1989; Perry et al. 1986). Aggressive children are also more likely to believe that aggression increases self-esteem and respect from peers and are less likely to believe that victims of their aggression suffer (Hall et al. 1998; Slaby & Guerra, 1988).

Similarly, we suggest that youths' expectations about the outcomes of aggression are also likely to affect whether they choose to pursue revenge goals in response to ambiguous provocations and whether they increase or decrease in their revenge goal endorsement over time. It is likely that children who initially believe that they can reduce aversive treatment and gain rewards through aggression are more likely to choose to get even when they perceive provocation from peers. As these beliefs may motivate revenge goals and aggression initially, children may subsequently receive even more negative treatment from peers (e.g., Asher and McDonald 2009) and may continue to pursue revenge for their received poor treatment. Consequently, we may find that children who highly endorsed positive outcomes for aggression stay high or become even more revenge motivated over time (i.e., are in the stable-high or increasing revenge goal groups). Alternatively, children with high positive outcome expectations may initially be highly revenge-motivated, but may subsequently decrease in their revenge motivations if they realize that their beliefs were inaccurate, finding that revenge did not reduce aversive peer treatment or gain them rewards but yielded more peer problems for themselves over time (i.e., the decreasing revenge goal group). To investigate these possibilities, the current study explored how outcome expectations about aggression predicted children's membership in revenge goal trajectory groups over a four year period.

The Present Study

To review, the present study had three main goals:

1. To investigate trajectories of revenge goal endorsement in ambiguous provocation scenarios in an at-risk community sample of youth from 4th grade through 7th grade.
2. To investigate how fearful temperament, dysregulation, and outcome expectancies of aggression in 4th grade were related to revenge goal trajectory group membership.
3. To examine how revenge goal trajectory groups are related to trajectories of aggression from 4th through 7th grade and predict to other forms of adjustment in 8th grade.

Method

Participants

Participants come from a larger intervention study designed to evaluate the effectiveness of the Coping Power (CP) intervention. Participants were recruited based on fourth-grade teacher reports on the Teacher Report of Reactive and Proactive Behaviors Scale (Hendrickx et al. 2003). A total of 1,289 children in 4th grade were screened and students with teacher ratings in the top 25–30% on aggressive behavior (N=387) were targeted for recruitment. Families whose child fell within the cut-off range were contacted at random from this eligible pool for participation in the larger intervention study until the target number of participants was recruited.

Three cohorts of participants (Total N=240; 63.3% male) entered the study at the end of 4th grade. On average, participants were 10.85 years old when the study began. A majority of the participants were African-American (67.1%), 31.3% were White, and the remaining participants identified with another ethnic minority group. Participants came from predominantly working class or low middle class families (Hollingshead Index M=27.98; SD=13.61). Once they consented for the study, participants were randomly assigned to either an intervention (N=120) or control group (N=120). CP is based on cognitive behavioral principles and teaches skills to address key social-cognitive deficits and risk factors for substance use and delinquency (for additional information, see Lochman et al. 2006). Child participants in the intervention group participated in 24 sessions in 5th grade and parents were invited to 10 parent group sessions (Lochman et al. 2006).

Procedure

Relevant to the present study, data were collected from two sources: the child and their teachers. Data were collected annually over 5 years (from 4th–8th grades). Retention rates were satisfactory, with 93.33% of children participating in assessments at year 2, 87.08% in year 3, 81.66% in year 4, and 74.17% in year 5. In the current study, we use child-report data from years 1–4 and teacher-report data from years 1–5. Following informed consent, child measures were completed each year in an interview format in the participants' homes or the researchers' offices, depending on parent preference. The interviewers read each question aloud to the child and recorded the child's responses. Demographic information (e.g., child's ethnicity, gender, and age) was obtained from a form administered to the parents. Every year children were given $10 in cash on completion of the interview. Each year teacher reports were obtained from the teacher who knew the child best.

Measures

Revenge Goals From 4th through 7th grade, participants' revenge goals were assessed with the *Social Goals Measure* (Lochman et al. 1993). Past research using this measure has found that revenge goal endorsement is related to delinquency and drug use, aggressive behavior, depression, and peer rejection (Lochman et al. 1993). In the current study, participants read two vignettes depicting ambiguous provocation by peers and rated how important it would be to the story's protagonist to "get back" at the provocateur on a scale from 1 (*not at all important*) to 4 (*very important*). Correlations among the two vignette's revenge ratings were moderate to high, ranging from 0.54–0.65 (in 4th grade r=0.65; in 7th grade r=0.58), therefore revenge goal ratings were averaged across the two vignettes to yield one revenge goal score per year. Correlations among revenge goals assessed a year apart ranged from 0.33–0.47.

Fearful Reactivity In the 4th grade, participants completed a shortened version of the *Early Adolescent Temperament Questionnaire* (Capaldi and Rothbart 1992), a self-report instrument of temperament in early adolescence. The *EATQ* was developed to assess temperament in children between the ages of 9 and 15 and subscales have shown good internal reliability (Capaldi and Rothbart 1992). Fearful reactivity, as measured by the EATQ, has been found to relate to self-reports of anxiety (Capaldi and Rothbart 1992) and internalizing symptoms (e.g., Muris et al. 2007). Seven items comprise the subscale for fearful temperament (e.g., "I am nervous of some kids at school who push people into lockers and throw your books around"; "I am afraid of getting into trouble"). Participants rate each statement on a 5-point Likert scale asking how true each statement is for them (1="*very false*" to 5="*very true*"). Items are averaged together, with higher scores indicating increased levels of temperamental fear. The internal consistency of the Fearful Temperament subscale in the current sample was acceptable (4th grade α=0.62).

Dysregulation In the 4th grade, participants completed the *Abbreviated Dysregulation Inventory* (Mezzich et al. 2001), a self-report measure designed to assess types of dysregulation. We used two subscales from this measure to evaluate behavioral and affective dysregulation. As assessed with this measure, behavioral dysregulation has been associated with other measures of impulsivity and aggression and affective dysregulation has been linked to anxiety, aggression, and temperamental reactivity (e.g., Mezzich et al. 2001; Pardini et

al. 2003). Ten items assess Behavioral Dysregulation, defined as behavioral impulsivity and hyperactivity (in the current sample, 4th grade $\alpha=0.76$; "I can't seem to stop moving"; "I get fidgety after a few minutes if I am supposed to sit still"), and ten items assess Affective Dysregulation, defined as the susceptibility to emotional arousal, negative affect, and anxiety (in the current sample, 4th grade $\alpha=0.77$; e.g., "I have trouble controlling my temper"; "I lose sleep because I worry"). Participants rated each item on a 4-point scale (0="*never true*" to 3="*always true*"), and scale items were averaged so that higher scores represented more dysregulation.

Outcome Expectancies of Aggression Also in 4th grade, participants completed a short version of the *Outcome Expectations Questionnaire* (Perry et al. 1986), consisting of eight brief vignettes designed to measure expectations that aggressive behavior against a same-sex peer would: a) stop the peer from treating him/her badly (Reduce Negative Treatment) and b) gain the participant desired objects or outcomes (Attain Tangible Rewards). Past research with this measure has found that outcome expectations are related to aggressive behavior, especially forms of proactive aggression (e.g., Marsee and Frick 2007; Perry et al. 1986). For half of the vignettes, participants imagine using aggressive behavior to obtain tangible rewards from a same-sex peer (e.g., physically threatening a peer to get his/ her money), and in the other vignettes participants are asked to imagine using aggression to retaliate against aversive treatment (e.g., kicking a peer in the leg because he/she tripped you). After hearing each vignette, participants rate the likelihood that outcomes would occur on a 4-point Likert scale (1="*very sure the outcome would not occur*" to 4="*very sure the outcome would occur*"). For vignettes depicting the use of aggression to obtain a tangible reward, participants rate the likelihood that aggression would help them to obtain the desired object. For vignettes depicting the use of aggression in retaliation against aversive behavior, participants rate the likelihood that aggression would successfully reduce the aversive treatment from a peer. Items on the scales are averaged, with higher scores indicating increased expectations that a particular outcome would occur. The reliability of the subscales, Attaining Tangible Rewards (4th grade $\alpha=0.55$) and Reducing Negative Treatment (4th grade $\alpha=0.69$), were acceptable in the present sample.

Socio-Emotional Adjustment Every year, teachers reported on child reactive and proactive aggression by completing the *Questionnaire for Instrumental and Reactive Aggression* (VIRA-R; Hendrickx et al. 2003). Eleven items measure reactive aggression (e.g., Gets angry and strikes back, reacts immediately and impulsively when challenged or pestered) and eleven items measure proactive aggression (e.g., bully,

cheats, threatens to get own way, uses force to dominate). Past studies using this measure, or abbreviated versions, find reactive aggression is related to reported anger in response to ambiguous provocation while proactive aggression is related to greater approval of aggressive responses (Orobio de Castro et al. 2005). In the current study, for each item, children were rated by teachers on a scale ranging from 1 ("*never true*") to 5 ("*almost always true*"). Items on each subscale were averaged to create subscale scores. Internal reliability in the current sample was high for reactive (4th grade $\alpha=0.97$; 8th grade $\alpha=0.98$) and proactive aggression (4th grade $\alpha=0.96$; 8th grade $\alpha=0.97$). Correlations from one year to the next ranged from 0.34–0.64 for reactive aggression and from 0.22–0.66 for proactive aggression.

Also in eighth grade, the teachers who knew participants best completed the *Behavior Assessment System for Children-Teacher Rating Scale* (BASC-TRS; Reynolds and Kamphaus 1992). The BASC is an omnibus rating scale designed to broadly sample a child's behavior. Test-retest scores on the BASC-TRS are relatively high (Reynolds and Kamphaus 1992). Scales on the externalizing dimension have been related to other teacher rating scales of externalizing problems and BASC internalizing scales have moderate relations with other teacher reports of similar problems (Reynolds and Kamphaus 1992). Teachers completed the measure by rating how often they observed the child engaging in various behaviors on a 4-point scale, ranging from 0 ("*never*") to 3 ("*almost always*"). For the present study, four subscales were examined, including: a) Conduct Problems (10 items; 8th grade $\alpha=0.88$; e.g., cheats, steals, uses foul language), b) Depression (10 items; 8th grade $\alpha=0.76$; e.g., child says "nobody likes me"; complains about being teased; cries easily), c) Anxiety (8 items; 8th grade $\alpha=0.73$; e.g., worries, nervous, afraid to make mistakes), and d) Social Skills (12 items; 8th grade $\alpha=0.93$; e.g., volunteers to help, compliments others, polite). Items on each subscale were averaged to create subscale scores.

Data Analytic Strategy

First, Latent Class Growth Modeling (LCGM) was employed to identify trajectories of revenge goals. Following classification into groups, fourth-grade covariates were used to predict class membership using multinomial logistic regression. Latent Class Growth Models were also used to classify children into trajectory groups based on reactive and proactive aggression and multinomial regressions were conducted to examine how revenge goal groups predicted aggressive behavior groups. In the last step, revenge goal trajectory groups were compared on adjustment outcomes in eighth grade.

Results

Trajectories of Revenge Goals

LCGM was conducted using Mplus Version 5 (Muthén and Muthén 1998–2007). Missing data were handled with a full-information maximum-likelihood (FIML) estimation with the assumption that data were missing at random (MAR). Partial data on the trajectory variable (i.e., revenge goals), but not missing data on predictor variables was allowed. Model testing was used to determine growth patterns of revenge goals and the number of distinct class trajectories (Jung and Wickrama 2008). To evaluate the model that best fit the growth pattern for the whole sample, intercept-only, intercept+linear, and intercept+linear+nonlinear growth models were fit to the data. The intercept+linear growth model was selected as the baseline model given that it appeared to provide the most parsimonious fit to the data. During the estimation of mixture models, 500 different random start values were initiated to ensure that maximum likelihood (ML) estimation searched for a global maximum solution. Based on the intercept+linear growth model, models with different numbers of latent classes were compared to evaluate which model provided the best fit to the data. Following the procedure suggested by Muthén and Muthén (2000) to find the optimal number of trajectories, the intercept and slope residuals were fixed at zero and the variances of the continuous growth factors and the covariance between the growth factors were initially set to zero. We began by estimating models with one and two classes and kept adding classes until the fit indices indicated that there was no longer significant improvement with additional classes (see Table 1). Because a model with k different numbers of classes is not nested within a $k+1$ group model, it is not appropriate to use the likelihood ratio test for model selection. Instead, the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and the sample size adjusted BIC (SABIC), which corrects for overly large or small samples (Yang 2006), are used as a basis for selecting the optimal model because they can be used for comparison of nested and un-nested models. For these indices, smaller values are preferred. As shown in Table 1, the model fit improved when more classes were included (AIC, BIC & SABIC). The Lo-Mendell-Rubin (LMR) likelihood ratio test of model fit indicated that the increment of estimate from a model with two classes to a model with three classes was close to significant ($p=0.08$) but from three to four classes was not significant ($p=0.30$). Further, entropy values that approach 1 indicate clear delineation of classes. The three class model, with an entropy value of 0.92, had the clearest differentiation of classes. Thus, the model with three developmental trajectories was chosen as optimal in that it best balanced goodness-of-fit and parsimony.

Figure 1 depicts the trajectories of the three-group model. The model identifies three distinct developmental trajectories for revenge goals across four years, from fourth grade through seventh grade. The first group of children (80.42%, $n=193$), labeled as the *low-stable group,* endorsed revenge goals at relatively low-levels consistently over time (intercept=1.43, $p<0.001$; slope=0.04, $p=0.09$). The second group (7.92%, $n=19$), labeled as the *increasing group,* showed increases in revenge goal endorsement over time (intercept=2.34, $p<0.001$; slope=0.33, $p<0.001$). The third group (11.67%, $n=28$), labeled as the *decreasing group,* decreased in their revenge goal endorsement over time (intercept=3.49, $p<0.001$; slope=−0.76, $p<0.001$).

## Links Between Covariates and Revenge Goal Trajectory Group Membership

The gender, race, and intervention group composition of the trajectory groups are displayed in Table 2. Chi-square analyses were conducted to examine gender, ethnicity, and intervention group differences among the groups. Boys were more likely to be in increasing (80.0%) and decreasing groups (78.6%) compared to the low-stable group (59.9%), $\chi^2 (2)=6.18$, $p<0.05$. Chi-square analyses also indicated that groups were similar in ethnicity [$\chi^2 (2)=1.88$, $p=0.39$] and intervention group composition [$\chi^2 (2)=0.20$, $p=0.90$]. Also, as a preliminary analysis, we

Table 1 Model fit of LCGM for revenge goal trajectories

Number of classes	Loglikelihood	BIC	SABIC	AIC	Entropy	LMR LRT
1	−1063.872	2160.628	2141.610	2141.620	–	–
2	−986.263	2021.852	1993.324	1990.530	0.90	0.00
3	−952.852	1971.471	1933.434	1929.704	0.92	0.08
4	−936.534	1955.277	1907.731	1903.068	0.79	0.34

Smaller loglikelihood values indicate better model fit. AIC=Akaike Information Criterion. BIC=Bayesian Information Criterion. SABIC=Sample size adjusted Bayesian Information Criterion. The AIC, BIC, and SSA BIC are indices used to compare the fit of two or more models estimated from the same data set and smaller values are preferred. Entropy values close to 1 indicate clear delineation of classes. LMR=Lo-Mendell-Rubin. The Lo-Mendell-Rubin adjusted likelihood ratio test compares the model to a model with 1 less class. P-values less than 0.05 indicate that the model is significantly better than a model with 1 fewer classes

Fig. 1 Estimated means for low-stable, increasing, and decreasing revenge goal trajectory groups
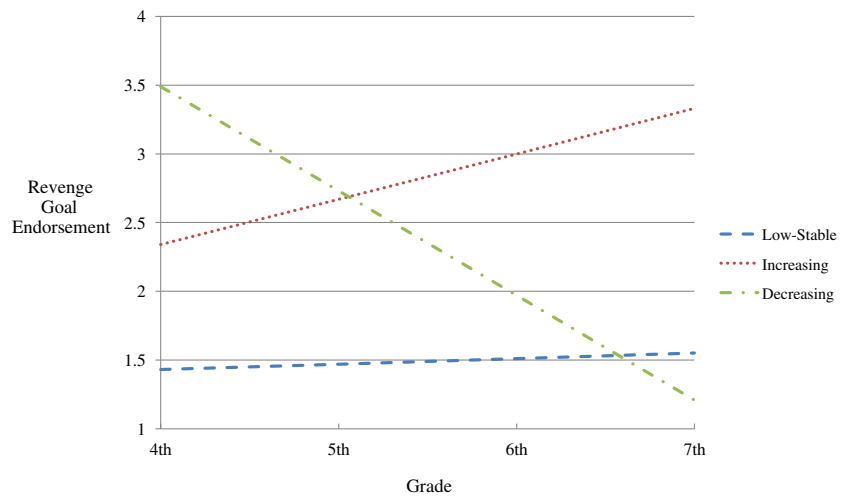
examined if groups differed on teacher-reported reactive or proactive aggression in fourth grade (the means for this analysis are shown in Table 2). ANCOVAS controlling for gender and intervention group show that groups did not differ on proactive, $F(2,239)=2.49$, $p=0.09$, or reactive aggression, $F(2,239)=1.12$, $p=0.33$, in fourth grade.

In the second analysis stage, a series of multinomial logistic regression analyses was conducted to examine the prediction of revenge goal trajectory group membership by each covariate as measured in fourth grade. In other words, multinomial logistic regression models were used to examine whether children with elevated scores on a covariate were overrepresented in specific trajectory groups. For every analysis, sex and intervention group were controlled. The descriptive statistics of the covariates as measured in fourth grade for the three trajectory groups are displayed in Table 2.

Because the dependent categorical variable consisted of three categories, the log odds of membership were calculated relative to the low-stable aggressive group first. Contrasts of the low stable group with the decreasing and increasing groups are shown in Table 3. First, comparing the low-stable group with the increasing and decreasing groups, fearful temperament in fourth grade did not distinguish the low-stable group from either the increasing or decreasing groups. However, forms of dysregulation in fourth grade did significantly contribute to the prediction of revenge goal trajectory group membership. Both affective dysregulation and behavioral dysregulation increased the likelihood of being in the increasing and decreasing groups relative to being in the low-stable group. Next, we examined how outcome expectations in fourth grade predicted group membership. Beliefs that aggression would help to attain tangible rewards predicted membership in the decreasing and increasing classes relative to the low-stable class, meaning that the more children believed that aggression would help get desired objects and things from peers the more likely they would be in the increasing and decreasing groups compared to the low-stable group. There was not a significant effect for expectations that aggression would reduce aversive treatment.

Table 2 Group composition and descriptive statistics for covariates in fourth grade across the three trajectory classes

	Whole Sample			Low Stable Group (N=193)		Increasing Group (N=19)		Decreasing Group (N=28)	
Sex (% Male)	63.8			59.9		80.0		78.6	
Ethnicity (% African-American)	67.5			65.8		80.0		71.4	
Group (% Intervention Group)	50.2			49.7		55.0		50.0	
	M	SD	Observed Range	M	SD	M	SD	M	SD
Reactive Aggression	2.71	1.20	1.00–5.00	2.67	1.16	3.19	1.51	2.68	1.21
Proactive Aggression	2.21	1.06	1.00–5.00	2.18	0.98	2.70	1.50	2.03	1.10
Fearful Reactivity	3.44	0.82	1.00–5.00	3.46	0.80	3.68	0.76	3.13	0.93
Affective Dysregulation	1.31	0.62	0–3.00	1.24	0.63	1.57	0.47	1.61	0.55
Behavioral Dysregulation	1.48	0.61	0.20–3.00	1.41	0.59	1.86	0.62	1.71	0.58
Reducing Aversive Treatment	2.43	0.67	1.00–4.00	2.40	0.66	2.54	0.81	2.54	0.63
Attaining Tangible Rewards	2.23	0.56	1.00–4.00	2.17	0.52	2.43	0.82	2.46	0.57

Table 3 Effect estimates and odds ratios for covariates in fourth grade predicting membership in trajectory groups

	Compared to the Low-Stable Group						Compared to the Increasing Group			χ^2
	Increasing			Decreasing			Decreasing			
	B	OR	95% CI for OR	B	OR	95% CI for OR	B	OR	95% CI for OR	
Fearful Reactivity	0.43	1.54	0.84–2.84	−0.43	0.65	0.40–1.06	−0.86[*]	0.42[*]	0.20–0.89	5.62[†]
Affective Dysregulation	0.89[*]	2.45[*]	1.12–5.36	0.99[**]	2.70[**]	1.36–5.36	0.10	1.11	0.42–2.88	12.15[**]
Behavioral Dysregulation	1.34[**]	3.83[**]	1.61–9.10	0.88[*]	2.42[*]	1.18–4.95	−0.46	0.63	0.23–1.78	14.58[***]
Reducing Aversive Treatment	0.38	1.46	0.73–2.91	0.37	1.45	0.80–2.64	−0.01	0.99	0.42–2.32	2.35
Attaining Tangible Rewards	0.85[*]	2.34[*]	1.06–5.20	0.94[**]	2.55[**]	1.28–5.11	0.09	1.09	0.42–2.81	9.88[**]

All analyses controlled for gender and intervention group. [†] $p<0.10$; [*] $p<0.05$; [**] $p<0.01$; [***] $p<0.001$

Finally, we compared the increasing and decreasing revenge goal trajectory groups as also shown in Table 3. The only significant effect was for fearful reactivity. The more that a child was fearfully reactive the less likely they were to be in the decreasing revenge goal trajectory group relative to the increasing revenge goal group.

Predicting Reactive and Proactive Aggression Trajectory Group Membership

To examine how revenge goal trajectories were related to concurrent aggressive behavior trajectories, similar LCGM analyses were conducted using 4th grade through 7th grade teacher-reports of reactive and proactive aggression from the VIRA. Methods were similar to those used to model trajectories of revenge goals. Models with different numbers of classes were compared, and comparisons revealed that models with 3 trajectory groups for reactive (Loglikelihood=−1173.98, AIC=2371.97, BIC=2413.69, SSA BIC=2375.65, Entropy=0.76, LMR LRT $p<0.001$) and proactive aggression (Loglikelihood=−1107.58, AIC= 2339.16, BIC=2280.88, SSA BIC=2242.84, Entropy=0.83, LMR LRT p=0.01) were the best-fitting and most parsimonious. For reactive aggression, there was a group that slightly increased over 4 years but remained relatively low on reactive aggression compared to the other groups (*Low-Reactive;* 47.50%, *n*=114; intercept=1.69; slope=0.20 $p<0.001$), a group that slightly decreased over time, but remained, comparatively in the middle (*Mid-Reactive;* 33.50%, *n*=78; intercept=3.24; slope=−0.21, p=0.01), and a group that slightly decreased but remained comparatively high on reactive aggression over time (*High-Reactive;* 20.00%, *n*= 48; intercept=4.33; slope=−0.36, $p<0.001$). For proactive aggression we found similar groups: a group that slightly increased, yet remained low in proactive aggression over time (*Low-Proactive;* 57.08%, *n*=137; intercept=1.47, slope= 0.18, $p<0.001$), a group that slightly decreased, but remained near the middle of the distribution over time (*Mid-Proactive;*

29.58%, *n*=71; intercept=2.75; slope=−0.14, p=0.02), and a group who decreased over time, but remained relatively high on proactive aggression over time (*High-Proactive*; 13.33%, *n*=32; intercept=4.11; slope=−0.48 $p<0.001$).

To compare how revenge goal trajectory groups overlapped with aggressive behavior trajectory group membership, multinomial regression analyses were conducted, controlling for intervention group and gender. For the analysis predicting reactive aggression trajectory from revenge goal trajectory, the multinomial regression did not reveal a significant overall effect for revenge goal trajectory group (χ^2=5.35, p=0.25) but there was a significant group effect between the increasing revenge goal group and low-stable group (B= 1.35, p=0.04; OR=3.84) indicating that children in the increasing revenge goal group (40.0%) were more likely to be in the high-reactive aggression group than were children in the low-stable revenge goal group (17.7%). For the analysis predicting proactive aggression trajectory from revenge goal trajectory, there was a significant overall effect for revenge goal group (χ^2=10.75, p=0.03). Group comparisons revealed that the children in the increasing revenge goal group (40.0%) were more likely to be in the high-proactive group (B=1.33, p=0.05; OR=3.79) than were children in the low-stable revenge goal group (11.5%). Children in the increasing revenge goal group (40.0%) were also more likely to be in the high-proactive group (B=2.00, p=0.03; OR=7.38) than were children in the decreasing revenge goal group (7.4%).

Adjustment Outcomes Associated with Revenge Goal Trajectory Group Membership

For the last set of analyses, trajectory groups were compared on teacher-rated eighth-grade adjustment outcomes. For 34.4% of the original sample, eighth-grade teacher report data were missing. T-tests were used to compare individuals with teacher data to those who were missing teacher data in eighth

grade. Groups did not significantly differ on demographic variables (gender, ethnicity, or SES), intervention group status, or on reports of revenge goals from T1-T4, thus multiple imputation procedures were used to account for the missing data. The Multiple Imputation function in SPSS 17.0 was used to impute 20 datasets. The standard errors and parameter estimates for each dataset were combined for final inferences.

ANCOVAs were conducted, controlling for gender and intervention group, to compare how the trajectory groups fared on teacher-rated adjustment in eighth grade. Pairwise group comparisons were conducted using a Bonferroni correction. Descriptive statistics and group differences on eighth-grade teacher-reported outcomes are shown in Table 4. Significant group effects were found for eighth-grade reactive aggression, anxiety, depression, and social skills. Youth in the increasing trajectory group were significantly more reactively aggressive in the 8th grade compared to youth in the low-stable or decreasing revenge goals groups. Analyses also revealed that adolescents in the increasing group were significantly more depressed than both the low-stable and decreasing groups. The increasing group was also rated lower on social skills compared to the low-stable group. Although there was a group effect for anxiety, pairwise comparisons with a Bonferroni correction did not yield significant group differences.

Discussion

Although the longitudinal course of aggressive behavior has been extensively studied, to-date no investigations have longitudinally examined goals or motivations that may underlie aggression. The current study sought to investigate whether there was stability or change in at-risk children's revenge motivations from fourth through seventh grade. Contingent on whether there were different patterns in revenge motivations over time, the study also examined how temperamental features, like fearfulness and regula-

tion, and outcome expectancies for aggression predicted children's trajectory group membership. Finally, revenge goal groups were also used to predict trajectories in aggressive behavior and eighth-grade adjustment outcomes.

For most children, there was stability in revenge motivations over time; a majority of children endorsed revenge motivations consistently at low levels, with smaller groups either increasing (8%) or decreasing (12%) from fourth through seventh grade. Previous research with community samples found that a majority of youth endorse revenge motivations at low levels (e.g., Rose and Asher 1999). That most children in our at-risk community sample were consistently low on revenge motivations or decreased in their revenge motivation over time, suggests that continually high or increasing revenge motivations is quite unusual.

The present study also examined two factors hypothesized to affect goals (e.g. Crick and Dodge 1994), one of which was the outcome expectations that youth had for aggression toward peers. We explored the possibility that youth who believed that aggression would help them to gain rewards or would decrease negative treatment by peers would also be likely to desire revenge, perhaps because they perceive revenge to have similar benefits. Comparing membership in revenge goal trajectory groups revealed that as children increased in their beliefs that aggression would gain them tangible rewards, the probability that their revenge goals increased or decreased over time, relative to being consistently low, increased as well. However, expectations that aggression would reduce aversive treatment by peers did not differentiate between the groups.

As our sample was selected based on their high aggressive behavior, we expect that beliefs that aggression would reduce aversive peer treatment were higher than would be observed in a normative community sample. Thus, it may not be surprising that these beliefs do not differentiate between revenge-seekers and non-revenge-seekers in an aggressive sample. However, beliefs that

Table 4 Means, standard deviations, observed range, and between group effects for teacher-reported adjustment in eighth grade

	Overall			Low-Stable		Increasing		Decreasing		$F\ (2, 236)$
	M	SD	Range	M	SD	M	SD	M	SD	
VIRA Reactive Aggression	2.39	1.12	1–5.00	2.36[a]	1.12	3.02[b]	1.15	2.17[a]	0.87	4.47[*]
VIRA Proactive Aggression	1.98	0.97	1–5.00	1.96	0.98	2.36	0.98	1.81	0.81	2.34
BASC Conduct Problems	0.62	0.49	0–2.60	0.61	0.51	0.70	0.45	0.62	0.33	0.82
BASC Anxiety	0.36	0.35	0–1.38	0.35	0.34	0.52	0.39	0.33	0.34	3.14[*]
BASC Depression	0.36	0.31	0–1.50	0.34[a]	0.29	0.58[b]	0.43	.32[a]	0.31	6.84[**]
BASC Social Skills	1.01	0.60	0–2.58	1.05[a]	0.61	0.63[b]	0.34	1.02[ab]	0.55	4.89[**]

[*] $p<0.05$; [**] $p<0.01$; [***] $p<0.001$. All analyses controlled for gender and intervention group. Group comparisons used a Bonferroni correction. Means within a row with different superscripts are significantly different from one another. For example, the low-stable group, was significantly greater than the increasing group on social skills, but the decreasing group did not significantly differ from either group

aggression gains additional rewards (e.g., helps the aggressor to meet goals or gain objects) did differentiate aggressive children who desired revenge at higher levels from aggressive youth whose revenge goals were comparatively lower. Perhaps the combination of expecting rewards and reducing negative treatment may justify getting even for these children. However, as these beliefs did not differentiate between the increasing and decreasing groups, these expectations only seem to have utility in predicting high endorsement of revenge goals over the short-term but may not have implications for longer-term trajectories.

Another factor examined in this sample was children's ability to regulate their behaviors and emotions. Behavioral and affective dysregulation increased the probability that children would be in the increasing or decreasing trajectory groups relative to the low-stable group. In other words, among aggressive children, those who found it more difficult to regulate their angry and anxious emotions and inhibit their behaviors endorsed revenge goals at initially higher levels and continued to endorse revenge at higher levels for at least two more years (i.e., from 4th through 6th grade). This aligns with research finding that high levels of effortful control and regulatory abilities are related to low levels of externalizing difficulties in youth (e.g., Cole et al. 1994; Pardini et al. 2003). However, and again, these regulatory abilities did not differentiate between children in the increasing and decreasing groups.

The covariate that did differentiate between increasing and decreasing revenge goal groups was whether children were fearfully reactive. Children with fearful temperaments do not typically have externalizing problems (Rothbart and Bates 2006). However, we explored the possibility that, within a sample of aggressive youth, fearful reactivity would be associated with increased revenge motivations. For aggressive children, also being fearfully reactive may reflect a general tendency towards negative affect and may increase tendencies toward retaliatory or defensive aggression, similar to how Nigg (2006) described angry reactions spurred by fear or panic. This conceptualization is consistent with how reactive aggression operates and is defined (Dodge et al. 1997). As threats can generate anxious and angry emotional responses (Lang 1995), aggressive children who more often perceive threats in their environment, as with fearful reactivity, may be more likely to aggress than those who are less likely to perceive these threats. Indeed, analyses revealed that aggressive children who were also more fearfully reactive were more likely to increase in revenge goal endorsement over time.

Increasing in revenge motivations over time seems to be cause for concern. Children who increased in their revenge motivations from 4th to 7th grade were observed as having poorer social functioning in the 8th grade. For example, the increasing group was rated by teachers as being more

reactively aggressive than the other two groups, supporting the characterization that these youth are more reactive generally. The increasing group was perceived by teachers to be more depressed than the decreasing and low-stable groups. Further, the increasing group was rated as having poorer social skills than youth in the low-stable group. Perhaps increasing desires for revenge negatively affect the frequency of positive peer interactions and the formation of quality relationships with their peers. This, in turn, may lead to depressive symptoms and the lack of positive social interactions may negatively impact opportunities to develop more competent social skills. Of note, we did not find that groups differed in teachers' ratings of conduct problems, suggesting that revenge goal endorsement may not predict as well to rule-breaking, property-violations, or even oppositional forms of externalizing behavior (Frick et al. 1993). Instead, revenge goals seem to more strongly predict personal forms of aggression.

Of interest, the motivational trajectories found herein are similar to developmental patterns found in aggressive behavior over time (e.g., Brame et al. 2001; Maughan et al. 2000). Also, we found that revenge goal trajectories were also predictive of trajectories of reactive and proactive behavior during the same time period. Children in the increasing revenge goal group were more likely to fall into groups of children that were the highest on reactive and proactive aggression over time. Altogether, these results seem to support the conjecture that revenge motivations underlie stability or change in aggressive behaviors.

There are some limitations regarding validity and generalizability that should be acknowledged. First, the internal reliabilities for the outcome expectation scales were low, and thus these results should be interpreted cautiously. Second, because this was the first study to examine trajectories of revenge goals, it will be important to replicate the groups in other samples of children to learn if similar groups of low-stable, increasing, and decreasing groups emerge. Additionally, the current sample of children was selected because they were high on aggressive behavior in fourth grade. One advantage of this sample is that it helps to identify individual differences within an at-risk sample and suggests that more nuanced preventive programming may needed. However, findings should be generalized carefully as they may be limited to children who are aggressive in late elementary school. A similar examination of revenge goals in a normative sample would clarify if the findings are only applicable to highly aggressive children.

In addition, half of the sample participated in an intervention designed to address key social-cognitive deficits and risk factors for substance use and delinquency. In the sample used for this study, Coping Power has produced lower levels of teacher-rated aggression at post-intervention than did a control condition (Lochman et al. 2006). Although results from the present study did not

indicate that participants in the intervention program were any more or less likely to be in a particular revenge goal trajectory group, it is feasible that the program influenced other social-cognitive processes that affect aggressive behavior. We attempted to control for these effects by controlling for intervention group status in all of the analyses. Future investigations about the natural course of motivations underlying aggressive behavior would do best to examine the question with a sample free from possible intervention effects.

It may also be helpful for future investigations to extend the examination of revenge goal trajectories earlier into childhood. For instance, knowledge of how early childhood experiences with family and peers are precursors to the endorsement of revenge goals in middle childhood is warranted. Additionally, accounting for other socio-cultural influences, like neighborhood and school characteristics, may also help to explain why some children are more likely to be revenge-motivated in the face of perceived provocation. For example, sociologists have observed norms within communities that provide unspoken rules for interaction and support violence as a means of handling disputes (e.g., Anderson 1999). These community-wide norms may foster motivations for revenge in response to even slight indications of perceived harm (e.g., ambiguous provocation).

In summary, children who increase in revenge motivations over time are more affectively and behaviorally dysregulated and are more likely to expect that aggression will gain them rewards compared to children who consistently endorse revenge at lower levels. They also are more temperamentally fearful than children who are initially vengeful yet decrease in these motivations over time. Additionally, desires for revenge in peer interaction seem to not only be associated with social maladjustment concurrently (Lochman et al. 1993; McDonald and Asher in press; Rose and Asher 1999), but our findings also suggest that if these desires increase over time, they are also predictive of poorer adjustment later. Thus, knowledge about children who are at risk for increasing revenge motivations will be beneficial to prevention programs designed to help children at risk for sustained aggressive problems with peers. By identifying revenge motivations in children, clinicians may be better able to target the motivational influences behind aggressive behavior.

References

Anderson, E. (1999). *Code of the street*. New York: WW Norton.

Asher, S. R., & McDonald, K. L. (2009). The behavioral basis of acceptance, rejection, and perceived popularity. In K. H. Rubin, W. Bukowski, & B. Laursen (Eds.), *The handbook of peer interactions, relationships, and groups* (pp. 232–248). New York: Guilford.

Averill, J. R. (1982). *Anger and aggression: An essay on emotion*. New York: Springer.

Boldizar, J. P., Perry, D. G., & Perry, L. C. (1989). Outcome values and aggression. *Child Development, 60*, 571–579.

Brame, B., Nagin, D. S., & Tremblay, R. E. (2001). Developmental trajectories of physical aggression from school entry to late adolescence. *Journal of Child Psychology and Psychiatry, 42*, 503–512.

Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an early adolescent temperament measure. *The Journal of Early Adolescence, 12*, 153–173.

Cole, P. M., Michel, M. K., & Teti, L. O. (1994). The development of emotion regulation and dysregulation: A clinical perspective. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations. Monographs of the Society for Research in Child Development, 59*, 73–100.

Crick, N., & Dodge, K. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin, 115*, 74–101.

Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology, 106*, 37–51.

Dodge, K. A., Lansford, J. E., Burks, V. S., Bates, J. E., Pettit, G. S., Fontaine, R., et al. (2003). Peer rejection and social information processing factors in the development of aggressive behavior problems in children. *Child Development, 74*, 374–393.

Frick, P. J., Lahey, B. B., Loeber, R., Tannenbaum, L., Vanhorn, Y., Christ, M. A. G., et al. (1993). Oppositional defiant disorder and conduct disorder: a meta-analytic review of factor-analyses and crossvalidation in a clinic sample. *Clinical Psychology Review, 13*, 319–340.

Hall, J. A., Herzberger, S. D., & Skowronski, K. J. (1998). Outcome expectancies and outcome values as predictors of children's aggression. *Aggressive Behavior, 24*, 439–454.

Hendrickx, M., Crombez, G., Roeyers, H., & DeCastro, B. O. (2003). Psychometric evaluation of the Dutch version of the aggression rating scale. *Gedragstherapie, 36*, 33–43.

Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass, 2*, 302–317.

Lang, P. J. (1995). The emotion probe: studies of motivation and attention. *American Psychologist, 50*, 372–385.

Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child Development, 71*, 107–118.

Lochman, J. E., Wayland, K. K., & White, K. J. (1993). Social goals: relationship to adolescent adjustment and to social problem solving. *Journal of Abnormal Child Psychology, 21*, 135–151.

Lochman, J. E., Boxmeyer, C., Powell, N., Roth, D. L., & Windle, M. (2006). Masked intervention effects: analytic methods for addressing low dosage of intervention. *New Directions for Evaluation, 110*, 19–32.

Marsee, M. A., & Frick, P. J. (2007). Exploring the cognitive and emotional correlates to proactive and reactive aggression in a sample of detained girls. *Journal of Abnormal Child Psychology, 35*, 969–981.

Maughan, B., Pickles, A., Rowe, R., Costello, E. J., & Angold, A. (2000). Developmental trajectories of aggressive and non-aggressive conduct problems. *Journal of Quantitative Criminology, 16*, 199–221.

McDonald, K. L., & Asher, S. R. (in press). College students' revenge goals across friend, romantic partner, and roommate contexts: The role of interpretations and emotions.

McFall, R. M., & Dodge, K. A. (1982). Self-management and interpersonal skills learning. In P. Karoly & F. H. Kanfer (Eds.), *Self-management and behavior change: From theory to practice* (pp. 353–392). New York: Pergamon.

Mezzich, A. C., Tarter, R. E., Giancola, P. R., Lu, S., & Kirisci, L. (2001). The dysregulation inventory: a new scale to assess the risk for substance use disorder. *Journal of Child and Adolescent Substance Abuse, 10,* 35–43.

Muris, P., Meesters, C., & Blijlevens, P. (2007). Self-reported reactive and regulative temperament in early adolescence: relations to internalizing and externalizing problem behavior and "Big Three" personality factors. *Journal of Adolescence, 30,* 1035–1049.

Muthen, L. K., & Muthen, B. O. (1998–2007). *Mplus user's guide.* Fifth Edition. Los Angeles: Muthen & Muthen.

Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: growth mixture modeling with latent trajectory classes. *Alcoholism, Clinical and Experimental Research, 24,* 882–891.

Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry, 47,* 395–422.

Orobio de Castro, B., Merk, W., Koops, W., Veerman, J. W., & Bosch, J. D. (2005). Emotions in social information processing and their relations with reactive and proactive aggression in referred aggressive boys. *Journal of Clinical Child and Adolescent Psychology, 34,* 105–116.

Pardini, D. A., Lochman, J. E., & Frick, P. J. (2003). Callous/ unemotional traits and social cognitive processes in adjudicated

youth. *Journal of the American Academic of Child and Adolescent Psychiatry, 42,* 364–371.

Perry, D. G., Perry, L. C., & Rasmussen, P. (1986). Cognitive social learning mediators of aggression. *Child Development, 57,* 700–711.

Reynolds, C. R., & Kamphaus, R. W. (1992). *Behavior Assessment System for Children (BASC).* Circle Pines, MN: American Guidance Service.

Rose, A. J., & Asher, S. R. (1999). Children's goals and strategies in response to conflicts within a friendship. *Developmental Psychology, 35,* 69–79.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology, Sixth edition: Social, emotional, and personality development* (Vol. 3, pp. 99–106). New York: Wiley.

Slaby, R. G., & Guerra, N. G. (1988). Cognitive mediators of aggression in adolescent offenders: 1. Assessment. *Developmental Psychology, 24,* 580–588.

Wentzel, K. R. (2003). Sociometric status and adjustment in middle school: a longitudinal study. *The Journal of Early Adolescence, 23,* 5–28.

Yang, C. C. (2006). Evaluating latent class analysis models in qualitative phenotype identification. *Computational Statistics & Data Analysis, 50,* 1090–1104.