Articles

Social Goals and Youth Aggression: Meta-analysis of Prosocial and Antisocial Goals

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Abstract

To advance research evaluating the relationship between social information processing (Crick & Dodge) and youth aggression, this meta-analytic study examined associations between social goals and aggression in children in 21 separate research reports. Eligible studies provided descriptive or preintervention measurement of children's aggression and social goals, and were reported in English by March 1, 2010. Findings from two random-effects meta-analyses utilizing clustered data analysis techniques (i.e., effect sizes nested within samples) supported an expected (1) negative association between prosocial goals and aggression, and (2) positive association between antisocial goals and aggression. Little heterogeneity in these associations was observed across studies, and no moderating variables were revealed. The findings extend existing meta-analytic research on social information processing and aggression to include social goals as meaningful correlates of youth aggression.

Keywords: social goals; aggression; meta-analysis; social information processing

Introduction

Childhood aggression is associated with a host of personal, social, and academic adjustment difficulties, including depression and anxiety (Coie, Lochman, Terry, & Hyman, 1992), peer rejection (Dodge, Coie, & Brakke, 1982; Newcomb, Bukowski, & Pattee, 1993), loneliness (Asher & Paquette, 2003; Coie et al., 1992), and school dropout (Ollendick, Weist, Borden, & Greene, 1992). Children who display aggression early in life are also at risk for continued aggression throughout adolescence (Kupersmidt & Coie, 1990) and adulthood (Huesmann, Eron, Lefkowitz, & Walder, 1984). The stability of aggression and the severity of associated adjustment difficulties underline the importance of understanding psychological processes involved in childhood aggression.

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Social information processing (SIP) theory provides one explanation for the development and maintenance of aggressive behaviors. In the SIP model (Crick & Dodge, 1994; Dodge, 1986), children are hypothesized to process social situations through consecutive steps: encoding and interpretation of situational cues, selection of social goals, generation and evaluation of behavioral strategies, and enactment of chosen strategies as observable social behaviors. Accordingly, existing meta-analytic syntheses (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Yoon, Hughes, Gaur, & Thompson, 1999) have indicated that, compared with their nonaggressive peers, aggressive children are more likely to recall hostile social cues and dismiss benign or prosocial cues, overattribute hostility in social situations, generate aggressive behavioral strategies, and expect such strategies to be successful in social interactions.

At the third step of the SIP model, children are hypothesized to endorse goals for peer interaction based on their interpretation of situational cues. The content of these goals is then thought to affect the selection of behavioral strategies and subsequent observed behavioral outcomes (Crick & Dodge, 1994). Individual studies have found that goal endorsement is directly related to subsequent strategy choice (Erdley & Asher, 1996; Harper, Lemerise, & Caverly, 2010), and children who are more aggressive than their peers reject prosocial goals while endorsing antisocial goals in hypothetical peer situations (Boldizar, Perry, & Perry, 1989; Crick & Dodge, 1996; Heidgerken, Hughes, Cavell, & Willson, 2004). In other words, aggression reflects low motivation to establish and maintain relationships with others, and high desire for dominance and other antisocial motives.

Although many primary studies have indicated associations between social goals and aggression, to the best of our knowledge, the field lacks a meta-analytic synthesis of this literature. The current study was undertaken to fill this gap. A significant meta-level effect would indicate that, like the other parts of the SIP model, social goal-setting is meaningfully related to youth aggression across studies. By augmenting existing meta-analytic literature, a significant meta-level relationship between goal-setting and aggression would strengthen the theoretical merits of the SIP model (Crick & Dodge, 1994). Specifically, confirmatory factor analyses suggest that, although processing at each step of the SIP model is positively correlated with processing in the other steps (Kupersmidt, Stelter, & Dodge, 2011), items measuring encoding and interpreting situational cues, goal-setting, and the selection of behavioral strategies load on distinct factors (Dodge, Laird, Lochman, Zelli, & Conduct Problems Prevention Research Group, 2002; Kupersmidt et al., 2011). Thus, although the way children process social information at different steps of the model are partially intertwined, cognitive processes at each step also may provide unique information about social behavior (see Dodge & Price, 1994), and therefore each should be examined for predictive validity in terms of behavioral outcomes.

The primary purpose of the current study was to synthesize the literature examining associations between social goal-setting and aggression. To accommodate the broad range of potential social goals, our study incorporated two separate meta-analyses. The first, hereafter referred to as the *prosocial analysis*, examined the association between prosocial goals and aggression. The second, hereafter referred to as *antisocial analysis*, examined the association between antisocial goals and aggression. Based on conceptualizations of childhood social competence (Rose-Krasnor, 1997; Yeates & Selman, 1989), we defined prosocial goals as those that place value on creating successful relationships, including goals for developing or maintaining friendships or encouraging fairness. Antisocial goals were defined as promoting personal interest over creating

or maintaining social relationships, including dominance, hostile, and instrumental goals targeted at gaining resources by using others as a means to an end. We expected that aggression would be negatively associated with prosocial goals and positively associated with antisocial goals, in accordance with extant literature (Boldizar et al., 1989; Crick & Dodge, 1996; Heidgerken et al., 2004).

Potential Moderators of Goal–Aggression Associations

In existing meta-analytic work in childhood SIP and aggression (Orobio de Castro et al., 2002), various methodological characteristics of individual studies have been found to moderate the strength of the associations among the SIP constructs and aggression. Thus, we tested similar methodological variables as potential moderators. Firstly, we examined the heterogeneity of participants' gender and age. We hypothesized that mixed-gender or mixed-age studies might encounter more 'noise', and therefore report smaller goal–aggression associations than those including more heterogeneous samples.

A second potential moderator of goal–aggression associations may be whether analyses were variable-centered (correlations between goals and aggression along a continuum of aggression) or person-centered (comparisons between goals of aggressive and nonaggressive participants). In an existing meta-analysis of hostile attribution and aggression (Orobio de Castro et al., 2002), studies comparing clinically aggressive vs. typical samples reported a larger mean association ($r = .23$) than the mean in the overall analysis of all studies ($r = .17$). Because group-based comparisons likely miss participants in the 'middle' of the spectrum, we hypothesized that person-centered analyses would tend to yield larger associations among the examined variables than variable-centered analyses.

Thirdly, we were interested in the potential moderating role of instrument characteristics in goal–aggression associations. These characteristics included the reporter of aggression (teacher, parent, peer, or self), format for identifying goals (forced-choice or Likert scales), and specific goal content (e.g., dominance vs. revenge goals within the antisocial analysis). Aggressive behaviors reported by various reporters are often only moderately correlated (De Los Reyes & Kazdin, 2005), likely due to the unique perspectives of each reporter on the child's behavior. Because social goal-setting was measured in the context of peer social situations, and we expected associations to be strongest when context was most similar, we hypothesized that social goals would be more strongly associated with peer- than self-, teacher-, or parent-reported aggression.

We also explored the possibility that the answer format (Likert rating scales vs. forced-choice format) may moderate the strength of goal–aggression associations. Likert rating scales require a participant to rate his or her endorsement of each goal separately. In doing so, they assume that goal endorsement exists along dual continua, or that endorsement of prosocial and antisocial goals can be considered separate factors. In contrast, forced-choice formats require participants to choose whether they endorse a prosocial or antisocial goal, and thus assume a single continuum of goals in which prosocial goals reside on one end and antisocial goals on the other. In a recent factor analytic assessment of the SIP constructs, Kupersmidt et al. (2011) reported that prosocial biases in the processing of social information may load onto a factor that is separate from antisocial biases, thus supporting the dual over the single continuum conceptualization. However, the factors in this study were comprised of all parts of the SIP model, and thus were not specific to social goals. Because it remains an empirical

question whether goal–aggression associations generalize across the Likert and forced-choice ratings of goals, we examined the rating format as a potential moderator of goal–aggression associations in the present analyses as an exploratory analysis without an *a priori* hypothesis.

Finally, we explored whether the content of the goals about which participants were asked to reason would moderate goal–aggression associations. Although we categorized social goals broadly as either prosocial or antisocial, it may be that children reason differently about specific goals within these categories. For instance, dominance vs. revenge goals might represent differing types of antisocial goals, and therefore produce differential associations with aggression. To gain the most detailed information on goal–aggression associations, we planned analyses of the two broad categories prosocial and antisocial, as well as subcategories relationship, fairness, and problem-solving within prosocial goals and dominance, revenge, and instrumental subcategories within antisocial goals. No *a priori* hypotheses were established for this exploratory analysis.

Present Hypotheses

In summary, the present study included two separate random-effects meta-analyses: one examining the relationship between endorsement of prosocial goals and aggression, and the other examining antisocial goals and aggression. Our primary hypothesis was that endorsement of prosocial goals would be associated with lower levels of aggression and the endorsement of antisocial goals with higher levels of aggression.

We also expected that (1) studies using mixed-gender or mixed-age samples would report smaller effect sizes than studies with less participant heterogeneity; (2) studies using variable-centered analyses (reporting correlations between variables) would report smaller effect sizes than those using person-centered or group-based analyses; and (3) studies using peer-reported aggression would report larger effect sizes than those using self-, teacher-, or parent-reports. Finally, we explored (4) whether there would be differences between studies using Likert vs. forced-choice rating scales of goals in goal–aggression associations, and (5) whether the content of pro- or antisocial goals would moderate the magnitude of goal–aggression associations.

Method

Literature Search

The literature search for the current study included two searches of electronic databases, a review of citations in strategically chosen existing articles, and contacting scholars directly. All electronic searches were conducted using PsycInfo and ERIC, including dissertation abstracts and conference proceedings. One general search was for studies examining children's social cognition, social information processing, or social goals and aggression;[1] another was for reports citing either of two SIP models (Crick & Dodge, 1994; Lemerise & Arsenio, 2000).[2] Secondly, we conducted archival searches for articles cited in (1) either Crick and Dodge (1994) or Lemerise and Arsenio (2000) and (2) four existing, related meta-analyses (Orobio de Castro et al., 2002; Wilson & Lipsey, 2006a, 2006b; Yoon et al., 1999). Thirdly, we contacted scholars publishing relevant research. After duplicate hits were deleted, the entire literature search process produced a list of 1216 unique and potentially relevant reports.
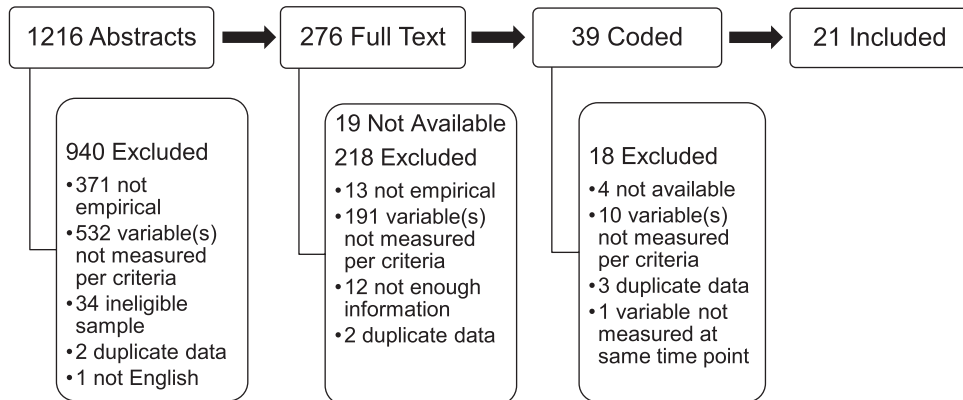
| 1216 Abstracts | → | 276 Full Text | → | 39 Coded | → | 21 Included |

| 940 Excluded | 19 Not Available |
| | 218 Excluded |

940 Excluded
- 371 not empirical
- 532 variable(s) not measured per criteria
- 34 ineligible sample
- 2 duplicate data
- 1 not English

19 Not Available
218 Excluded
- 13 not empirical
- 191 variable(s) not measured per criteria
- 12 not enough information
- 2 duplicate data

18 Excluded
- 4 not available
- 10 variable(s) not measured per criteria
- 3 duplicate data
- 1 variable not measured at same time point

Figure 1. Literature Search.[3]

Study Eligibility and Selection

Eligibility was determined by the first author through a two-step process. Firstly, abstracts were screened, and studies that clearly did not meet criteria were excluded. Secondly, full texts were retrieved and examined for studies that appeared eligible, studies where eligibility could not be determined from the abstract, and studies where no abstract was available.

Eligible studies measured aggression and goal-setting within the context of specific definitions. For the purpose of this analysis, aggression was defined as any act intended to harm another person. The current analyses included studies that measured any type of aggression (e.g., relational/physical, proactive/reactive), using any reporter (e.g., self, peer). Studies measuring bullying rather than generalized aggression were excluded. Goal-setting was defined as participants' endorsement of specific prosocial or antisocial goals for a hypothetical social interaction. Eligible goal-setting instruments included those in which participants responded with Likert ratings to a variety of goals per situation or answered forced-choice questions about their goals.

In addition, inclusion criteria required that studies must (1) be reported in English (but did not have to take place in English-speaking countries) on or before March 1, 2010; (2) present a unique, descriptive (or preintervention), empirical report of a relationship between aggression and social goals in school-aged (age of 18 or younger) children; and (3) provide adequate information for effect size calculation—either a correlation between aggression and goal endorsement, or goal endorsement scores for two groups varying in aggression. Of the 1216 potentially relevant abstracts, 276 full text reports were retrieved, 39 were coded, and 21 were ultimately determined to be eligible (see Figure 1).

Coding

All studies were double-coded by the first and third authors based on full-text copies of the relevant reports. (Copies of the coding manual and spreadsheet are available from the first author.) Agreement on a 20 percent reliability sample ranged from 86 percent to 100 percent (mean 94 percent) by variable. Where disagreement occurred, consensus was reached by discussion. Variables coded included numerical results used to create

effect sizes, as well as data to be used in moderator analyses. Study publication status was also recorded to examine the possibility of publication bias.

Effect Sizes.   Effect sizes reported as correlations between aggression and endorsement of a particular goal were recorded as written. In studies that reported aggressive and nonaggressive group means for goal endorsement, each group's mean and standard deviation were recorded, and groups were matched as closely as possible to create group difference effect sizes (Cohen's *d*). Data with no matching comparison group were not utilized. For example, if a study reported results from an aggressive-rejected, a nonaggressive-rejected, and a nonaggressive-nonrejected group, the effect size was created from the aggressive-rejected and nonaggressive-rejected groups' data. One study reported only the number of participants in each group who endorsed a particular goal, requiring calculation of odds ratios.

   Most reports yielded multiple effect sizes. Some reported statistics separately for different participant samples (e.g., males and females). Many reported multiple effect sizes for each sample (e.g., participants rated several types of goals). All possible effect sizes for each report were recorded. These procedures produced a list of 46 effect sizes for the prosocial analysis, and 67 effect sizes for the antisocial analysis.

   Because correlation coefficients, group mean differences, and odds ratios cannot be combined into one analysis (Lipsey & Wilson, 2001), it was necessary to convert approximately half of the effect sizes to a common metric to pool effect size estimates. To increase interpretability, the current analyses were conducted using correlation effect sizes. All effect sizes were transformed into correlation coefficients, *r*, using standard formulas suggested by Lipsey and Wilson (2001). For purpose of analysis, all correlations were then Fisher-transformed into *z*. Also following Lipsey and Wilson, standard errors of the effect sizes were calculated as $\frac{1}{\sqrt{(n-3)}}$.

Moderator Variables.   Participant age was categorized as either (1) elementary school (younger than fifth grade and/or less than 11 years old); (2) middle/high school (fifth to twelfth grade and/or age of 11–18); or (3) mixed. Similarly, gender was characterized as (1) all female, (2) all male, or (3) mixed. Analysis type was recorded as variable-centered or person-centered. Aggression instruments were coded by reporter (e.g., peer, teacher), but ultimately combined into the bivariate peer reporter/non-peer reporter because the majority were peer reports. Goal-setting instruments were coded as either forced-choice or Likert. The specific goals participants reasoned about were coded as either dominance, instrumental, revenge, other antisocial, relationship, fairness, problem-solving, other prosocial, or other (e.g., avoidance, not included in the current analyses). Finally, publication status was coded as published (e.g., journal articles) or unpublished (e.g., dissertation reports).

Analysis

As noted above, all possible effect sizes for each study were calculated, and many reports contributed multiple effect sizes. This would not be problematic if all effect sizes were based on independent samples (e.g., separate for males and females); however, including multiple effect sizes for the same participants in traditional meta-analyses violates assumptions of independence (Lipsey & Wilson, 2001). To utilize all available data, the current analyses used Hedges, Tipton, and Johnson's (2010)

technique for analyzing dependent effect sizes. This analysis allowed for the clustered data (i.e., effect sizes nested within samples) by correcting the study standard errors to take into account the correlations between effect sizes from the same sample.

Because we hypothesized that the research body is reporting a distribution of effect sizes with significant between-studies variance, as opposed to a group of studies attempting to estimate one true effect size, a random-effects model was appropriate for the current study (Lipsey & Wilson, 2001). Weighted, random-effects meta-regression models using Hedges et al.'s (2010) corrections were run with ROBUMETA (Hedberg, 2011) to summarize effect sizes and examine potential moderators. For each analysis (prosocial and antisocial), the first model was a null meta-regression model estimating only the intercept B_0, which can be interpreted as the overall weighted mean effect size (z). The second model examined demographic heterogeneity moderators by including the dummy variables *elementary school* or *middle/high school* (compared with the referent mixed-age), and *all male* or *all female* (compared with the referent mixed gender). The third model examined the effect of person-centered (group differences) as opposed to variable-centered analyses (correlations). The fourth model examined the effect of the aggression reporter (peer vs. other). The fifth model tested for effects of a forced-choice goal-setting instrument as opposed to a Likert format. Finally, effects of reasoning about specific types of goals (e.g., fairness, revenge) were examined in a series of exploratory models.

Although moderator effects can be examined both between and within samples (independent groups of participants), participant age, gender, analysis strategy, aggression instrument, and goal-setting instrument varied only between samples (i.e., all effect sizes within a particular sample were identical on these variables) in our data. Accordingly, these moderator analyses were conducted only between samples. The specific goal rated did vary within samples (i.e., the same sample of participants often rated more than one specific goal), which enabled us to examine these effects both between and within samples.

Results

Study Characteristics

For ease of interpretability, study characteristics will be reported as if all effect sizes were independent (ignoring, for a moment, the clustered nature of the data). See Table 1 for an overview of study characteristics by analysis, and Tables 2 and 3 for details about each included effect size.

In both analyses, about half of the included effect sizes reported on children from both elementary and middle/high school, and a large majority (especially in the prosocial analysis) reported on a mixed-gender group of participants. Just under half of the effect sizes were obtained from variable-centered rather than person-centered analyses.

Approximately two thirds of effect sizes used peer-report aggression instruments, and roughly one third use forced-choice goal instruments. In the prosocial analysis, a majority of effect sizes was based on participants' endorsement of goals about creating or maintaining relationships. The specific goals included in the antisocial analysis were somewhat more evenly distributed, with dominance, instrumental, and revenge goals each accounting for roughly one third of the included effect sizes.

Table 1. Study Characteristics Summary by Analysis

	Prosocial (%)	Antisocial (%)
Participant age		
Elementary only	33	24
Middle/high only	17	18
Mixed age	50	58
Participant gender		
Male only	2	10
Female only	7	13
Mixed gender	91	76
Analysis Strategy		
Variable-centered	41	48
Person-centered	59	52
Aggression instrument (not mutually exclusive)		
Peer	65	67
Teacher	26	22
Self	7	3
Parent	13	12
Goal-setting instrument		
Forced choice	41	28
Likert	59	72
Specific goal rated		
Relationship	61	
Solve problem	11	
Fairness	13	
Other prosocial	15	
Dominance		30
Instrumental		37
Revenge		22
Other antisocial		10

Mean Effect Sizes and Moderators

Prosocial Analysis. Examination of 46 effect sizes from 17 samples reporting the relationship between the endorsement of prosocial goals and aggression revealed a close to normal distribution with no obvious outliers. The weighted mean effect size z equaled $-.14$, $p < .001$, 95 percent confidence interval (CI) $(-.17, -.11)$, which back-transformed to Pearson's r equals $-.14$, 95 percent CI $(-.16, -.11)$. Thus, the average study of prosocial goal-setting and aggression reported that endorsement of prosocial goals was significantly associated with decreased levels of aggressive behavior.

Heterogeneity statistics (Lipsey & Wilson, 2001) suggested there was very little between-study variance in this analysis, $Q_{16} = 18.52$, $p = .2943$, $\tau^2 = .007$. However, because Q can be underpowered with smaller meta-analyses (Lipsey & Wilson, 2001), and because I^2 revealed that 19 percent of the variance was true between-study variance, moderator analyses were conducted. Models (see Table 4) examining

Table 2. Individual Effect Size Characteristics—Prosocial Analysis

Sample (N)	Publication	Analysis	Age	Gender	GS instrument	Aggression reporter	Specific goal	Effect size (z)
Choy, 2002 female (100)	Dissertation	Person	M/H	F	Forced-choice	T	Fairness	−0.22
Choy, 2002 male (116)	Dissertation	Person	M/H	M	Forced-choice	T	Fairness	−0.12
Crain, 2002 (130)	Dissertation	Variable	Mix	F	Likert	P	Other	0.04
						P	Other	0.00
Crick, 1992 (35)	Dissertation	Person	E	Mix	Likert	PE/T/S	Relate	−0.26
						PE/T/S	Other	−0.20
Crick & Dodge, 1996 (624)	Journal	Person	Mix	Mix	Forced-choice	T	Relate	−0.21
						T	Relate	−0.12
Dodge et al., 2002 (332)	Journal	Variable	E	Mix	Forced-choice	T	Relate	−0.20
						T	Relate	−0.23
						T	Relate	−0.16
						T	Relate	−0.22
						PA	Relate	−0.06
						PA	Relate	−0.03
						PA	Relate	−0.07
						PA	Relate	−0.06
						PA	Relate	0.06
						PA	Relate	0.06
Heidgerken et al., 2004 (239)	Journal	Variable	E	Mix	Likert	T/PE	Relate	−0.21
Hopmeyer, 1997 (168)	Dissertation	Person	Mix	Mix	Likert	PE	Relate	−0.12
						PE	Relate	−0.17
						PE	Fairness	−0.13
						PE	Fairness	−0.15
						PE	Fairness	−0.17
						PE	Fairness	−0.09

Table 2. *Continued*

Sample (N)	Publication	Analysis	Age	Gender	GS instrument	Aggression reporter	Specific goal	Effect size (z)
Lemerise et al., 2006 (72)	Journal	Person	Mix	Mix	Likert	PE	Relate	−0.06
							Relate	−0.02
							Relate	−0.09
							Solve	0.13
							Solve	−0.06
							Solve	0.04
Martens, 2008 (156)	Dissertation	Variable	M/H	Mix	Likert	PE	Relate	0.00
							Relate	−0.04
							Relate	−0.04
							Relate	−0.01
Nelson & Crick, 1999 (675)	Journal	Person	Mix	Mix	Forced-choice	PE	Relate	−0.21
						PE	Relate	−0.11
Pietrucha, 1998 (56)	Dissertation	Person	Mix	Mix	Likert	PE	Other	−0.27
Rudolph, 2009 (206)	Journal	Variable	Mix	Mix	Likert	S	Relate	−0.12
Terzian, 2007 (480)	Dissertation	Variable	E	Mix	forced-choice	T	Other	−0.15
Troop-Gordon & Asher, 2005 (54)	Journal	Person	Mix	Mix	Likert	PE	Relate	−0.18
Wichman et al., 2004 (259)	Journal	Person	Mix	Mix	Likert	PE	Relate	−0.13
						PE	Solve	−0.13
						PE	Solve	−0.16
Williams, 1999 (86)	Dissertation	Person	M/H	Mix	Open-ended	PE	Other	−0.08
						PE	Other	−0.13

Note: E = elementary school; M/H = middle/high school; PE = peer; PA = parent; T = teacher; S = self.

Table 3. Individual Effect Size Characteristics—Antisocial Analysis

Sample (N)	Publication	Analysis	Age	Gender	GS Instrument	Aggression reporter	Specific goal	Effect size (z)
Boldizar et al., 1989 females (22)	Journal	Person	Mix	F	Likert	PE	inst	0.26
						PE	inst	−0.36
						PE	dom	0.18
						PE	dom	0.07
Boldizar et al., 1989 males (22)	Journal	Person	Mix	M	Likert	PE	inst	−0.19
						PE	inst	0.11
						PE	dom	0.41
						PE	dom	0.50
Choy, 2002 female (100)	Dissertation	Person	M/H	F	Forced-choice	T	dom	0.22
Choy, 2002 male (116)	Dissertation	Person	M/H	M	Forced-choice	T	dom	0.12
Crain, 2002 (130)	Dissertation	Variable	mix	F	Likert	PE	rev	0.07
						PE	Other	0.06
						PE	rev	0.02
						PE	Other	0.06
Crick, 1992 (35)	Dissertation	Person	Mix	Mix	Likert	PE/T/S	inst	0.00
Crick & Dodge, 1996 (624)	Journal	Person	Mix	Mix	Forced-choice	T	inst	0.21
						T	inst	0.12

Table 3. *Continued*

Sample (N)	Publication	Analysis	Age	Gender	GS Instrument	Aggression reporter	Specific goal	Effect size (z)
Dodge et al., 2002 (332)	Journal	Variable	E	Mix	Forced-choice	T	inst	0.20
						T	inst	0.23
						T	inst	0.16
						T	inst	0.22
						PA	inst	0.06
						PA	inst	0.03
						PA	inst	0.07
						PA	inst	0.06
						PA	inst	−0.06
						PA	inst	−0.06
Egan et al., 1998 fall (189)	Journal	Variable	Mix	Mix	Likert	PE	inst	0.14
Egan et al., 1998 spring (189)	Journal	Variable	Mix	Mix	Likert	PE	inst	0.18
Heidgerken et al., 2004 (239)	Journal	Variable	E	Mix	Likert	T/PE	dom/rev	0.17
Holmes, 2008 (157)	Dissertation	Variable	Mix	Mix	Likert	T	dom	0.06
						PA	dom	0.01
						T	rev	0.04
						PA	rev	0.06
Hopmeyer, 1997 (168)	Dissertation	Person	Mix	Mix	Likert	PE	rev	0.18
						PE	inst	0.04
						PE	dom	0.02
						PE	rev	0.19
						PE	inst	0.04
						PE	dom	−0.02

Study	Source	Design	Grade	Gender	Measure	Reporter	Goal	
Lemerise et al., 2006 (72)	Journal	Person	Mix	Mix	Likert	PE	dom	0.18
						PE	rev	0.04
						PE	dom	0.17
						PE	rev	0.19
						PE	dom	0.26
						PE	rev	0.18
Martens, 2008 (156)	Dissertation	Variable	M/H	Mix	Likert	PE	dom	0.09
						PE	rev	0.26
						PE	dom	0.02
						PE	rev	0.25
						PE	dom	0.11
						PE	rev	0.23
						PE	dom	0.07
						PE	rev	0.19
Nelson & Crick, 1999 (675)	Journal	Person	Mix	Mix	Forced-choice	PE	inst	0.21
						PE	inst	0.11
Pietrucha, 1998 (56)	Dissertation	Person	Mix	Mix	Likert	PE	Other	0.23
Rooney, 2008 (386)	Dissertation	Variable	Mix	Mix	Likert	PE	rev	0.30
Rudolph, 2009 (206)	Journal	Variable	Mix	Mix	Likert	S	dom	0.14
Terzian, 2007 (480)	Dissertation	Variable	E	Mix	Forced-choice	T	inst/rev	0.15
Troop-Gordon & Asher, 2005 (54)	Journal	Person	Mix	Mix	Likert	PE	inst	0.14
						PE	dom	−0.16
						PE	rev	0.00
Vazzana, 2001 (215)	Dissertation	Person	E	M	Likert	T	inst	0.18
						T	dom	0.15
Williams, 1999 (86)	Dissertation	Person	M/H	Mix	Forced-choice	PE	Other	0.08
						PE	Other	0.13

Note: E = elementary school; M/H = middle/high school; PE = peer; PA = parent; T = teacher; S = self; inst = instrumental; dom = dominance; rev = revenge.

Table 4. Prosocial Meta-regression Models

	Beta	t (df)	τ^2	Percent $\Delta \tau^2$
Null model			.0007	
Intercept	−.14	−10.46* (16)		
Demographics			.0020	0
Intercept	−.14	−8.08* (12)		
Elementary (vs. mixed ages)	−.01	−.21		
Middle/high (vs. mixed ages)	.02	.31		
Male (vs. mixed gender)	−.01	−.08		
Female (vs. mixed gender)	.04	.37		
Analysis strategy			.0007	0
Intercept	−.11	−4.23* (15)		
Person-centered (vs. variable-centered)	−.04	−1.40		
Aggression instrument			.0011	0
Intercept	−.13	−5.64* (15)		
Not peer rated (vs. peer rated)	−.01	−.42		
Goal-setting instrument			.0009	0
Intercept	−.12	−4.42* (15)		
Forced-choice (vs. Likert)	−.02	−.83		
Specific goals				
Relationship goals			.0011	0
Intercept	−.13	−5.04* (14)		
Relationship w/i sample (vs. all other goals)	−.02	−.83		
Relationship b/t sample (vs. all other goals)	−.01	−.22		
Solve problem goals			.0010	0
Intercept	−.14	−9.07* (14)		
Solve problem w/i sample (vs. all other goals)	.04	.66		
Solve problem b/t sample (vs. all other goals)	.01	.44		
Fairness goals			.0010	0
Intercept	−.13	−8.33* (14)		
Fairness w/i sample (vs. all other goals)	−.03	−.82		
Fairness b/t sample (vs. all other goals)	n/a	n/a		

* $p < .05$.

demographic heterogeneity, analysis strategy, aggression reporter, goal-setting instrument type, and specific goals did not reveal any significant moderators and did not reduce τ^2 (the amount of unexplained variance).

Antisocial Analysis. Examination of 67 effect sizes from 22 samples reporting the relationship between the endorsement of antisocial goals and aggression revealed a mostly normal distribution with one potential negative outlier. It was determined that this outlier was a legitimate value (and, if anything, artificially reduced rather than

Table 5. Antisocial Meta-regression Models

	Beta	t (df)	τ^2	Percent $\Delta \tau^2$
Null model			.0020	
Intercept	.15	9.64* (21)		
Demographics			.0033	0
Intercept	.15	5.03* (17)		
Elementary (vs. mixed ages)	−.02	−.50		
Middle/high (vs. mixed ages)	.00	.11		
Male (vs. mixed gender)	.01	.28		
Female (vs. mixed gender)	−.03	−.56		
Analysis strategy			.0024	0
Intercept	.15	5.56* (20)		
Person-centered (vs. variable-centered)	−.01	−.25		
Aggression instrument			.0023	0
Intercept	.16	6.07* (20)		
Not peer rated (vs. peer rated)	−.02	−.59		
Goal-setting instrument			.0024	0
Intercept	.15	5.56* (20)		
Forced-choice (vs. Likert)	−.00	−.04		
Specific goals				
Dominance goals			.0021	0
Intercept	−.15	7.39* (19)		
Dominance w/i sample (vs. all other goals)	−.05	−1.33		
Dominance b/t sample (vs. all other goals)	−.02	−.61		
Instrumental goals			.0024	0
Intercept	.15	6.19* (19)		
Instrumental w/i sample (vs. all other goals)	−.01	−.27		
Instrumental b/t sample (vs. all other goals)	−.02	−.59		
Revenge goals			.0015	.25
Intercept	.14	12.03* (19)		
Revenge w/i sample (vs. all other goals)	.06	1.54		
Revenge b/t sample (vs. all other goals)	.07	.89		

* $p < .05$.

increased the mean effect size), so it was retained in the analysis. The weighted mean Fisher-transformed $z = .15$, $p < .001$, 95 percent CI (.12, .18), which is equal to Pearson's $r = .15$, 95 percent CI (.12, .18). That is, across reports of antisocial goal-setting and aggression, there was a significant correlation between the endorsement of antisocial goals and increased aggressive behavior.

As in the prosocial analysis, heterogeneity statistics (Lipsey & Wilson, 2001) suggested there was very little between-study variance, $Q_{21} = 29.25$, $p = .1081$, $\tau^2 = .002$. However, because I^2 revealed that approximately 28 percent of that was true variance, moderator analyses were conducted. Models (see Table 5) examining demographic heterogeneity, analysis strategy, aggression reporter, and goal-setting instrument type
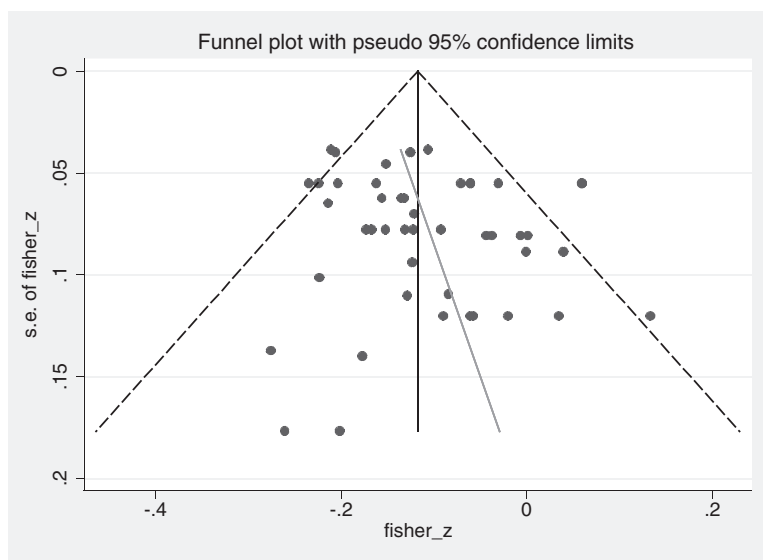
Figure 2. Funnel Plot of Prosocial Effect Sizes × Standard Error (with Egger's Regression Line).

did not reveal any significant moderators and did not reduce τ^2 (the amount of unexplained variance). Models examining the between- and within-sample effects of rating specific goals did not reveal any significant moderators. The model testing the effect of rating revenge goals, as opposed to all other goals, revealed a percent change in τ^2 of .25 (explained 25 percent of the previously unexplained variance). Still, because τ^2 was so low to begin with, and because revenge goals was not a statistically significant predictor at either the between- or the within-sample level, we are hesitant to interpret this finding as more than a suggestion that more research is needed in this area.

Publication Bias

Empirical literature can suffer from reporting bias, where studies that find interesting or significant results, or results supporting a prominent theoretical paradigm, are more likely to be published than those that do not (Shadish, Cook, & Campbell, 2002). This bias can skew the results of meta-analyses. We addressed this issue in two ways. Firstly, the literature search included successful efforts to find unpublished research. Secondly, both analyses were examined for possible publication bias using funnel plots with Egger's regression lines (see Figures 2 and 3). In both analyses, the distribution of effect sizes was relatively symmetrical across the mean effect size, implying the expected relatively normal distribution of errors and few 'missing' studies. The slope of Egger's regression line was statistically significant in both cases (prosocial = −.21, $p < .001$; antisocial = .19, $p < .001$), with less precise studies tending to reduce the absolute value of the overall mean effect size. Because these are relatively small slopes and seem to be driven by a shortage of less precise studies (i.e., toward the lower half of the graph), these analyses did not raise significant concerns for the validity of the current meta-analysis.
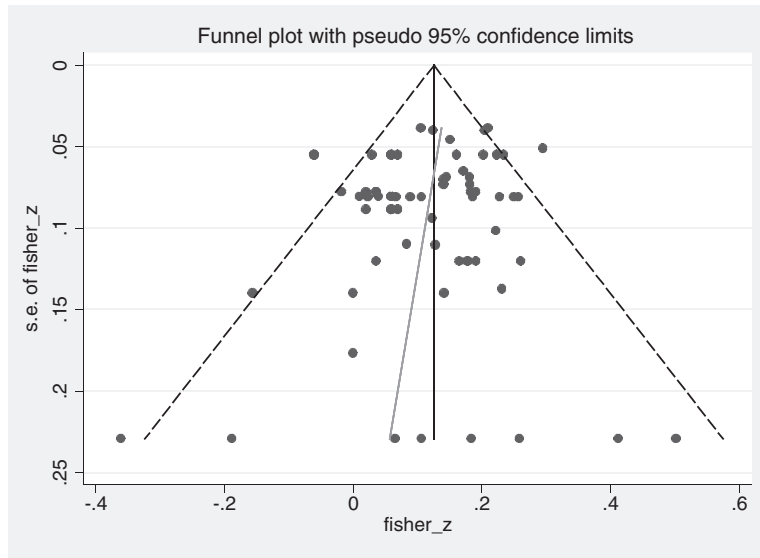
Figure 3. Funnel Plot of Antisocial Effect Sizes × Standard Error (with Egger's Regression Line).

Discussion

The purpose of this study was to augment existing research on child and adolescent SIP (Crick & Dodge, 1994) and aggression by providing meta-analytic evidence for the associations between social goal-setting and aggression. Findings from two random-effects meta-analyses supported an expected negative association between prosocial goals and aggression, and positive association between antisocial goals and aggression. Little heterogeneity in these associations was observed across studies. More-over, methodological characteristics were not found to moderate goal–aggression associations.

Comparisons to Existing Research on Social Cognition and Aggression

The average strength of the goal–aggression associations observed in this study was consistent with existing meta-analytic findings on average correlations between other SIP constructs and aggression (Orobio de Castro et al., 2002; Yoon et al., 1999). Specifically, the observed mean correlations of −.14 between prosocial goals and aggression, and .15 between antisocial goals and aggression were comparable to mean correlations between aggression and hostile attribution ($r = .17$) reported by Orobio de Castro and colleagues, as well as the mean correlations between aggression and social cue encoding ($r = .24$), interpretation ($r = .19$), strategy generation ($r = .21$), and strategy evaluation ($r = .19$) reported by Yoon and colleagues.[4]

In contrast to previous meta-analytic work (Orobio de Castro et al., 2002), we observed little variability in the goal–aggression associations across studies. Moreover, the hypothesized moderating effects of heterogeneity of participant age or gender, data analytic approach (variable- vs. person-centered analysis), or the reporter of aggression (self-, peer-, or parent-reports) were not supported. On the whole, our findings suggest

that associations among youths' pro- and antisocial goals and aggression were robust across methodological aspects of the original research reports.

The present findings extend empirical evidence for meaningful associations among the SIP constructs and aggression to include goal–aggression associations. As such, they also augment the theoretical merits of the SIP model (Crick & Dodge, 1994), as well as empirical evidence for the cognitive processes underlying youths' self- and other reported aggression. The findings also have practical implications. For instance, although social goals are assumed to be affected in interventions targeting proactive aggression (e.g., Lochman & Wells, 2002, 2004), interventions directly assessing social goals are still rare (for an exception, see Frey, Nolen, Van Schoiack Edstrom, & Hirschstein, 2005). Our findings suggest that, like the other SIP constructs, goals for social interaction should be targeted as a potential avenue to reduce aggression.

Limitations and Future Directions

A meta-analysis is only as complete as the research body it synthesizes (Lipsey & Wilson, 2001). Therefore, we wish to acknowledge the following limitations of this study. Firstly, certain information related to participant demographics could not be validly coded in this study. Specifically, if the original reports provided information about the socioeconomic status (SES) and/or the ethnic composition of their samples, it was reported in different ways, which made it impossible for us to code this information across studies. For instance, reports of SES ranged from percent of children receiving free lunch, to general SES of the community, to income level of participants' families. Through manual inspection of reported information, we inferred that most of this work had either been done with middle-class, White participants, or specifically targeted lower-class and minority participants; very few studies have included children from diverse backgrounds. As a result, we were not able to test SES or ethnicity as moderators, and our results may not be generalizable to all populations. Once more research on social goals and aggression accumulates, it would be important to evaluate goal–aggression associations separately for participants representing specific SES and ethnic backgrounds.

Secondly, it should be noted that more variation in the goal–aggression associations might have been observed if studies with both normative and clinical samples had been available for inclusion. Specifically, a related meta-analysis by Orobio de Castro et al. (2002) on hostile attribution bias and aggression reported a strong moderating effect of the sample composition, such that hostile attribution was related to aggressive behaviors more strongly when the study included both clinically referred and normative samples. However, at this time, primary studies did not allow us to examine variability in the sample as a potential moderating variable. The current meta-analysis suggests that it may be worthwhile to compare the prevalence of specific social goals and their associations with aggression in normative vs. clinical samples to understand goals and youth aggression in more detail.

Thirdly, further details on the instruments measuring aggression in the original research reports would have been valuable. For instance, social goal-setting is theoretically and empirically (Crick & Dodge, 1996; Dodge & Coie, 1987; Dodge, Lochman, Harnish, Bates, & Pettit, 1997) associated with strategic proactive aggression (targeted at obtaining goals for oneself without provocation) rather than reactive aggression (emotionally heated reactions to perceived provocation). However, aggression purpose could not be quantified in the present analyses because most reports did

not specify the type of aggression and/or used instruments that included aspects of both. In light of existing theory and research on proactive vs. reactive aggression, future meta-analytic research synthesizing these associations separately would be crucial for the study of social goals as well as of aggression.

Moreover, it should be noted that the present study included original research reports assessing generalized aggression rather than aggression conceptualized specifically as bullying. This decision was made because the distinction among bullies, victims, and bystanders is not necessarily one of aggression level; victims especially are often described as aggressive (e.g., Camodeca & Goossens, 2005). Therefore, a study that classifies participants as *bully*, *bystander*, or *victim* does not necessarily create groups that differ on aggression. Meta-analytic synthesis of research reports examining social goal endorsement among bullies, victims, and bystanders is needed to evaluate the extent to which the presently observed data patterns generalize into bullying aggression.

Finally, it should also be noted that the present study addressed only goals that children endorse in specific hypothetical peer situations (for a review, see Erdley & Asher, 1999). This perspective excluded globalized or trait-like social goals, increasingly examined in the study of social development (e.g., Kiefer & Ryan, 2008; Ojanen, Gronroos, & Salmivalli, 2005). Unlike goals that children select or endorse in particular peer situations, globalized goals reflect generalized motivational dispositions stored in long-term memory, which may be activated by social contextual cues to affect SIP and behaviors (Ojanen et al., 2005; see also Crick & Dodge, 1994). Research utilizing multilevel modeling (Ojanen, Aunola, & Salmivalli, 2007) has supported the idea that global goal orientations are partially reflected in goals that adolescents endorse in particular peer situations (see Crick & Dodge, 1994); however, at this time, research on global goals was too rare to be included in this meta-analysis. In the future, it would be interesting to compare the strength of goal–aggression associations across the two methods of goal assessment. This would inform research on social goals and provide methodological insights into the ability of these goal constructs to explain individual variation in aggression.

Despite the limitations, the present findings augment existing meta-analytic research on child and adolescent SIP and aggression by providing the first meta-analytic evidence for the associations among social goals and aggression. Our findings suggest that increased likelihood of aggression is associated with a low propensity to endorse prosocial goals and a high propensity to endorse antisocial goals for social interaction. The findings add to the conceptual merits of the SIP model (Crick & Dodge, 1994), and may also have practical implications for intervention design.

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Notes

1. Exact search terms were 'aggress* in ABSTRACT and [(goal* and set*) or (outcome value*) or SIP or social cognit* or (social and problem and solv*) or social information processing or (social goal*) in ABSTRACT] and (child* or teen* or adolescen* or young or youth) in ABSTRACT and not (sport* or football or rugby or soccer) in ABSTRACT'.

2. Exact search was for reports that cite either of these papers, and also include the search terms 'aggress* and [child* or teen or adolescen* or young or youth] in KEYWORDS'.

3. Note—a study may have been ineligible for more than one reason, but only one reason per study is given here.

4. Yoon et al. (1999) reported effect sizes as Cohen's *d*; they are converted to correlations (*r*) here for purposes of comparison.

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