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## The Relation of Moral Emotion Attributions to Prosocial and Antisocial Behavior: A Meta-Analysis

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This meta-analytic review of 42 studies covering 8,009 participants (ages 4–20) examines the relation of moral emotion attributions to prosocial and antisocial behavior. A significant association is found between moral emotion attributions and prosocial and antisocial behaviors ( $d = .26$ , 95% CI [.15, .38];  $d = .39$ , 95% CI [.29, .49]). Effect sizes differ considerably across studies and this heterogeneity is attributed to moderator variables. Specifically, effect sizes for predicted antisocial behavior are larger for self-attributed moral emotions than for emotions attributed to hypothetical story characters. Effect sizes for prosocial and antisocial behaviors are associated with several other study characteristics. Results are discussed with respect to the potential significance of moral emotion attributions for the social behavior of children and adolescents.

A central developmental approach to the study of moral emotions has been to focus on moral emotion attributions (Arsenio, Gold, & Adams, 2006). Moral emotion attributions are defined as emotions that children and adolescents attribute to an actor as a consequence of a morally relevant action. Theoretically, moral emotion attributions can be both negative and positive depending on the type of action (e.g., guilt over a moral transgression, pride over prosocial actions, respectively). Previous research on moral emotion attributions has focused mostly on negatively charged moral emotions (e.g., guilt and shame) at the expense of positive emotions (e.g., pride; for exceptions, see Krettenauer & Johnston, 2011; Malti, Killen, & Gasser, 2012). Moral emotion attributions have a strong cognitive component, as children need to consider the perspectives of both the self and others in the context of a morally relevant action (Malti, Gummerum, Keller, & Buchmann, 2009). These attributions help children anticipate the outcomes of sociomoral events and adjust their moral behavior accordingly (Arsenio et al., 2006). Thus, moral emotion attributions are considered important to the development of (im)moral action tendencies (Hoffman, 2000; Malti & Latzko, 2010).

As first documented by Nunner-Winkler and Sodian (1988), young children around the age of 4–5 years have no difficulties understanding acts of victimization as morally wrong from a cognitive point of view. Nonetheless, they often fail to attribute moral emotions of guilt or remorse following a moral transgression. Instead, children at this age focus on the positive emotional outcomes of moral infractions, such as happiness over having achieved a desired object (the so-called *happy-victimizer* response pattern). It is typically not before the age of 7–8 years that children anticipate negatively charged self-evaluative emotions as a consequence of moral transgressions. The occurrence of the happy-victimizer response pattern has been replicated many times (for overviews, see Arsenio et al., 2006; Krettenauer, Malti, & Sokol, 2008). Despite these important findings and a significant increase in the number of relevant studies during the last decade, the reasons as to why the happy-victimizer phenomenon occurs and its relation to morally relevant behavior remain largely unexplored.

In the present study, morally relevant behavior was considered to be either prosocial or antisocial. Prosocial behavior was defined as behavior through which a child benefits others (Eisenberg, 1982). Similarly, antisocial behavior was defined as behavior through which a child causes physical or psychological harm to others, including, but not limited to,

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behavior evaluated at the syndrome or symptom level (i.e., broadband externalizing behavior problems vs. specific expressions of externalizing behavior such as proactive aggression, respectively; Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Although prosocial and antisocial behaviors seem to be at opposite ends of a single dimension, they are conceptually distinct and have unique correlates (Krueger, Hicks, & McGue, 2001). Whether or not moral emotion attributions impede antisocial behavior and facilitate prosocial behavior are therefore distinct research questions. Thus, the present meta-analysis considered prosocial and antisocial behaviors as separate outcomes.

Theoretically, the happy-victimizer paradigm constitutes a key theoretical approach to investigating the affective antecedents of morally relevant behavior. According to Arsenio et al. (2006), different types of events have different emotional outcomes, and children become increasingly able to fully understand and apply these affect–event links. This might help children coordinate their own negative emotional experiences with their observations and might help lay a foundation for emerging principles of fairness and care, as well as guide action tendencies. The view that happy emotion attributions are linked to aggression, challenges the assumption that aggression is exclusively linked with anger (but see Hubbard, Morrow, Romano, & McAuliffe, 2010). There is increasing evidence that unprovoked aggression is problematic when it is associated with children's expectation that it will make them feel positive. Thus, happy victimization is one of the two most problematic emotion attributions that contribute to externalizing psychopathology (Arsenio, 2010). Vice versa, negative emotion attributions indicate guilt feelings and are, as such, similar to empathy, key antecedents of prosocial behavior (Malti, Gummerman, et al., 2009).

### *Theoretical Links Between Moral Emotion Attributions and Prosocial and Antisocial Behavior*

From the perspective of cognitive development, the decline of the happy-victimizer response pattern in childhood and the corresponding increase in negative or ambivalent emotion attributions seem to be hardly surprising. It has been well documented that young children's understanding of mixed emotions is limited (e.g., Harter & Buddin, 1987). The understanding that a moral transgression may cause positive and negative emotions at the same time requires cognitive mapping skills that typically develop around the age of 7 years (Mascolo &

Fischer, 2010). In a similar vein, it has been argued that happy-victimizer responses reflect limitations in young children's perspective-taking skills (Krettenauer et al., 2008). Hence, from a cognitive perspective, the development of children's moral emotion attributions is an epiphenomenon of cognitive development.

However, this interpretation falls short of the important finding that moral emotion attributions, as studied in happy-victimizer research, have been repeatedly found to predict children's prosocial and antisocial behavior. Many theorists consider the manifestation of self-evaluative emotions (particularly guilt) to be an important indicator of a person's readiness to comply with standards and rules (Hoffman, 2000). These emotions indicate that a moral norm has been internalized (Kochanska & Thompson, 1997). From this perspective, the happy-victimizer response pattern indicates a lack of moral motivation in young children (Nunner-Winkler, 2007). Correspondingly, the increase in moral emotion attributions in childhood reflects a developmental process in which moral judgments are increasingly experienced as personally binding (Nunner-Winkler, 2007).

This motivational interpretation of the happy-victimizer response pattern is contradicted by the well-documented finding that children, at a very young age, spontaneously engage in the prosocial actions of sharing, helping, and consoling others (e.g., Warneken & Tomasello, 2009). The notion of a general lack of moral motivation in early childhood is implausible. Moreover, a motivational interpretation does not take into account that moral emotion attributions predict behavior even when the happy-victimizer response pattern has long disappeared. As documented by Johnston and Krettenauer (2011) and Krettenauer and Eichler (2006), it appears that adolescents very rarely anticipate plain positive emotions when transgressing a moral rule; nonetheless, the strength of moral emotion attributions predicts everyday prosocial and antisocial behavior in this age group. Similar findings were obtained with adolescents scoring high on aggressive behavior in comparison with non-aggressive peers (e.g., Arsenio, Adams, & Gold, 2009; Arsenio, Gold, & Adams, 2004). These findings correspond with research demonstrating that at-risk children with elevated scores of externalizing behavioral problems more often evidence happy-victimizer responses (e.g., Malti, Gasser, & Buchmann, 2009). Thus, moral emotion attributions, as assessed in happy-victimizer research, might reflect individual differences with regard to morally relevant behavioral

dispositions. In line with this view, Krettenauer, Asendorpf, and Nunner-Winkler (2011) found that the personality traits of conscientiousness and agreeableness predicted the development of moral emotion attributions from childhood to middle adolescence.

Moral emotion attributions, as studied in happy-victimizer research, thus allow for a variety of interpretations. The major goal of the present meta-analysis is to disambiguate this situation. Over the past decade, there has been a tremendous increase in the number of studies on the relation between moral emotion attributions and the prosocial and antisocial behavior of children and adolescents. This body of research provides an excellent opportunity to investigate how moral emotion attributions relate to behavior at different developmental periods and across a broad range of studies; this should reduce some of the ambiguity around moral emotion attributions. If results indicate that moral emotion attributions, overall, are unrelated to both prosocial and antisocial behavior in childhood and adolescence, a primarily cognitive interpretation might be warranted. If, on the other hand, results demonstrate that moral emotion attributions are associated with social behavior in childhood, but not in adolescence, this would support the view that moral emotion attributions rest on the emergence of a particular type of moral motivation in childhood. Finally, if results show that moral emotion attributions are similarly predictive of social behavior across various ages, this would support the view that moral emotion attributions likely reflect individual differences in morally relevant behavioral dispositions.

At this point, it is important to note that the three interpretations outlined above (i.e., cognitive, motivational, dispositional) are not mutually exclusive but, in fact, might reflect different facets of the development of moral emotion attributions. Thus, the present meta-analysis does not provide a critical test that will allow the definitive ruling out of one of these interpretations; rather, it is an attempt to disambiguate the concept of moral emotion attributions to clarify the role that moral emotion attributions play in moral development and morally relevant behavior. In a similar vein, it should be explicitly noted that the exact mechanism that links moral emotion attributions with prosocial and antisocial behavior is beyond the scope of the present study. Tangney, Stuewig, and Mashek (2007) argued that moral emotions relate to moral behavior in two ways, that is, as consequential emotions following actual behavior and as anticipatory emotions when evaluating behavioral alternatives (see

also Baumeister, DeWall, & Zhang, 2007). Thus, moral emotion attributions may, at the same time, reflect past emotional experiences and represent emotion expectations. However, moral emotion attributions may relate to behavior primarily as emotion expectations because it is the expectancy of certain emotional outcomes, rather than their post hoc experience, that can be assumed to influence decision making (Lake, Lane, & Harris, 1995).

#### *Potential Moderators of the Relation Between Moral Emotion Attributions and Social Behavior*

Age might be an important moderator of the relation between moral emotion attributions and social behavior, and it might help clarify the role that moral emotion attributions play in moral development. If the relation between moral emotion attributions and social behavior decreases with age, this would indicate that eventually all children acquire a certain type of moral motivation as they overcome the happy-victimizer response pattern. If, on the other hand, the relation between moral emotion attributions and social behavior does not change, or even increases, with age, this would suggest that moral emotion attributions primarily reflect important individual differences in morally relevant behavior; these differences emerge early in the course of development and might become increasingly stable over time.

A second potential moderator concerns the type of behavior under study. Hypothetical scenarios in happy-victimizer research commonly assess moral emotion attributions by depicting rule transgressions and actions that are harmful to others (e.g., stealing, pushing another child off a swing); thus, they reflect emotion attributions primarily in the context of antisocial behavior. Due to close thematic correspondence, moral emotion attributions, as assessed in happy-victimizer research, might be more strongly related to antisocial than to prosocial behavior.

Keller, Lourenço, Malti, and Saalbach (2003) demonstrated that it is important to distinguish between attributions of moral emotions to the self and attributions of moral emotions to others. Other-attributions refer to the protagonist's feelings in a hypothetical situation ("How would the protagonist feel?"), whereas self-attributed emotions indicate the emotions that participants would anticipate for themselves if they were in the protagonist's shoes ("How would you feel?"). Self- and other-attributions can be related to behavior in different ways. When asked about other-attributions, children may

approach the task from an informational, third-person viewpoint, based on what they know about other people and how these other people behave. Self-attributed emotions, by contrast, more likely reflect the individual's first-person experiences. This argument is supported by research on relations between children's prosocial behavior and moral judgments. For example, Eisenberg, Pasternack, Cameron, and Kelly (1984) documented stronger relations between prosocial behavior and self-attributed reasoning compared to other-attributed reasoning. Consequently, we would expect self-attributed emotions to be more strongly related than other-attributed emotions to behavior (Malti, 2007).

Similarly, the way emotion attributions are assessed may moderate the link between emotion attributions and social behavior. Studies have utilized different assessment formats; that is, some have assessed moral emotion attributions dichotomously (present vs. absent), whereas others have measured the intensity or strength of moral emotion attributions. Furthermore, some studies have combined emotion attributions with moral reasoning, yielding an assessment of reflexive moral emotions. Intensity reflects an important experiential quality of emotions that is left out in dichotomous measures of emotion attributions. From this perspective, measures of intensity can be expected to be superior to dichotomous measures, which may result in a stronger link to social behavior. The additional consideration of moral reasoning, by contrast, may not strengthen this link, as moral reasoning generally has been shown to be only weakly related to behavior (Krebs & Denton, 2005).

Another potential moderator of the relation between emotion attributions and social behavior concerns how social behavior is assessed. A study by Malti, Gummerman, et al. (2009) suggests that observed behavior is more closely related to moral emotion attributions than other-reported behavior. This might reflect the fact that observed or self-reported behavior more closely reflects the children's conceptions of sociomoral events and, therefore, might relate more closely to what children say they would feel in similar hypothetical situations than would other-reports. Thus, the assessment method of prosocial or antisocial behavior might account for some of the variability in the relevant findings.

Similarly, the domain in which social behavior is measured might serve as a potential moderator of the relation between emotion attributions and social behavior. To illustrate, prosocial behavior measured

in one specific domain, for example, sharing behavior, might be more closely related to emotion attributions about (non)sharing than are broadband measures of behavior, for example, overt trait prosocial behavior (including a variety of subdimensions such as sharing, helping, cooperating, etc.). Similarly, studies that assess physical aggression might more closely relate to moral emotion attributions about physical harm than would studies that measure overt externalizing behavior, as this includes a wide variety of problem behaviors.

Other study characteristics might also function as moderators of the relation between moral emotion attributions and behavior. Some studies have used an extreme-group design to examine the relation between emotion attributions and behavior (e.g., clinically referred children; see Arsenio & Fleiss, 1996), whereas others have relied on unselected samples of children (e.g., Krettenauer & Eichler, 2006). Studies with extreme groups may yield relatively large effect sizes because the extreme ends of antisocial and prosocial behavior might relate more closely to happy victimization or the anticipation of guilt feelings, respectively (Arsenio et al., 2006). Furthermore, studies utilizing experimental designs (e.g., Lake et al., 1995) might yield stronger effect sizes than studies with correlational designs (e.g., Dunn & Hughes, 2000). In addition, whereas some studies have been cross-sectional (Gasser & Keller, 2009), others have relied on longitudinal samples (Malti, Gummerman, et al., 2009); as a result of selective attrition, the effect sizes of longitudinal and cross-sectional studies may differ. In addition, as a result of publication bias, published studies might report higher effect sizes than those reported in unpublished studies (Rosenthal, 1995). Finally, it is plausible to assume that the relation between moral emotion attributions and social behavior is moderated by gender, although studies on the relation between emotion attributions and behavior have typically not reported separate effect sizes for boys and girls. An exception is a study by Malti, Gummerman, and Buchmann (2007), who found that moral emotion attributions predicted prosocial behavior better in boys than in girls. We therefore included tests of gender as a moderator of the relation between emotion attributions and behavior.

Our meta-analysis included a sample of 42 studies with more than 8,000 participants. The primary measures were moral emotion attributions and prosocial and antisocial behavior. We hypothesized that moral emotion attributions would be positively related to prosocial behavior as well as negatively related to antisocial behavior. Stronger effects were expected



for self-attributed moral emotions than for other-attributed moral emotions. We included age as a moderator to test whether the relation between moral emotion attributions and social behavior changes over time or remains stable. Finally, we examined the relevance of a variety of methodological factors that might contribute to systematic differences in effect size, including how moral emotion attributions and social behavior were assessed, study type, and gender of study participants.

## Method

### *Study Selection*

Our meta-analytic review included all empirical studies conducted between January 1970 and April 2011, which investigated the relation between moral emotions and social (prosocial and antisocial) behavior in children and adolescents.

Studies were selected in three steps to avoid biased retrieval of studies published in the major journals; the tendency of major journals is to only publish results with large effect sizes (Rosenthal, 1995). First, a large group of studies was retrieved by searches in PsychInfo (<http://www.psycinfo.com>) and Dissertation Abstracts Online ([www.umi.com](http://www.umi.com)). The following keywords were specified in varying combinations: moral emotion, emotion attribution, action\*, moral\*, emotion\*, action\*, behavior\*, behavior\*problem\*. The search was limited to human children and adolescents. The languages were English, French, Italian, and German. Second, additional studies were obtained by consulting authors of relevant articles, the reference lists from Arsenio et al. (2006) and from Eisenberg, Spinrad, and Sadovsky (2006), and the proceedings from the 2007 conference of the Society for Research in Child Development. Third, we perused the reference sections of reports in the databases. This search yielded several hundred studies.

### *Inclusion Criteria*

To be selected for inclusion in the meta-analysis, the reports had to meet the following criteria: (a) inclusion of empirical data on both moral emotions and social behavior in children or adolescents, (b) operationalization of moral emotions as emotion attributions to wrongdoers or to the self in the role of the wrongdoer, (c) participant ages between 4.0 and 20.0 years, and (d) no data that had already been reported in other articles included in the meta-analysis. We focused on 4- to 20-year-olds

because the attribution of emotions to protagonists in moral conflict situations typically requires theory-of-mind skills (Malti & Ongley, in press). This is the main reason why the existing studies in the happy-victimizer tradition typically do not investigate children younger than 4 years of age; in fact, most of the research on moral emotion attributions deals with children or adolescents. Thus, an age range from 4 to 20 years provides the most reliable database for investigating age as a potential moderator.

Copies of all suitable journal articles, manuscripts under submission or revision, unpublished articles, and dissertations were obtained. In the very few cases where an author failed to report sufficient statistical information to compute an effect size, attempts were made to contact the authors for additional information. In the very few cases where this was impossible, effect sizes were estimated using the reported significance level.

For antisocial behavior, we considered all behaviors through which a child intentionally caused physical or psychological harm to others. This included dispositional, broadband measures, such as the Child Behavior Checklist (CBCL) externalizing scale (e.g., Malti & Keller, 2009), as well as domain-specific measures, such as physical or proactive aggression (e.g., Arsenio et al., 2009). For prosocial behavior, we considered all behaviors through which a child benefited others. Again, this included broadband measures, such as the overt prosocial behavior scale as measured by the Strength and Difficulties Questionnaire (SDQ; e.g., Malti, Gummerman, et al., 2009), as well as domain-specific measures, such as observed sharing behavior as measured by the dictator game (e.g., Gummerum, Hanoch, Keller, Parsons, & Hummel, 2010). Higher scores indicated higher levels of antisocial behavior or prosocial behavior, respectively. Table 1 gives an overview of the final sample of studies included in the meta-analysis.

### *Coding of Study Characteristics*

To examine potential moderators of the relation between moral emotion attributions and prosocial and antisocial behavior, each study was coded for 10 characteristics in a manner similar to Orobio de Castro et al. (2002). These characteristics were the type of moral emotion attribution (self vs. other), age of participants (range = 4.0–20.0 years), coding of moral emotion attribution (positive or negative vs. intensity vs. combined emotion attribution and reasoning score), gender of participants (male and

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female vs. male only; there were no studies with female-only samples), method of assessing social behavior (self-report and observation vs. adult or peer report), measure of social behavior (broad-band-dispositional measure vs. domain-specific measures), study format (cross-sectional vs. longitudinal), study type (experiment vs. correlational),

sampling strategy (extreme group [i.e., clinical sample and criminal offenders] vs. community sample), and publication status (published vs. unpublished).

The categorization of type of moral emotion attribution in self- versus other-attributed emotions followed the conceptual distinction in the literature (Keller et al., 2003). The categorization of the age

Table 1  
*Characteristics of the Sample Studies*

Source	MEA	Behavior	<i>n</i>	<i>d</i> <sup>a</sup>
Arsenio et al. (2009)	S	A	100	0.52
Arsenio and Fleiss (1996)	O	A	48	-1.09
Arsenio et al. (2004)	S	A	100	0.56
Asendorpf and Nunner-Winkler (1992)	O	A	153	0.28
Blair (1997)	O	A	32	0.72
Cimbora (1997)	O	A	63	0.72
Dill (2008)	S	B	55	0.75/0.77
Dunn and Hughes (2000)	O	A	80	0.56
Garner (1996)	O	P	40	0.14
Gasser and Malti (2011)	O	A	237	0.30
Gasser, Malti, and Gutzwiller-Helfenfinger (2010)	O	A	139	0.14
Gasser and Keller (2009)	S	A	212	0.28
Gini (2006)	O	B	204	0.40/-0.26
Gummerum et al. (2010)	S	P	40	0.70
Haimowitz (1996)	S	A	126	1.28
Hawley (2003)	S	A	163	-0.32
Holmqvist (2008)	S	A	47	1.09
Hosser et al. (2008)	S	A	1243	0.27
Hughes and Dunn (2000)	O	A	80	0.54
Humphries (2001)	S	B	60	0.26/0.37
Johnston and Krettenauer (2011)	S	B	205	0.32/0.72
Krettenauer et al. (2011)	S	A	143	0.69
Krettenauer and Eichler (2006)	S	A	200	0.47
Lake et al. (1995)	O	A	60	1.04
Latzko (2011)	O	A	80	0.47
Liao (1998)	S	A	200	0.32
Lotze, Ravindran, and Myers (2010)	S	A	50	0.68
Lyon (2001)	O	A	79	0.45
Malti (2007)	S	A	150	0.28
Malti, Gasser, et al. (2009)	S	A	371	0.12
Malti, Gasser, and Gutzwiller-Helfenfinger (2010)	O	B	312	0.12/0.24
Malti et al. (2007)	S	P	208	0.14
Malti, Gummerum, et al. (2009), Study 1	S	P	1273	0.14
Malti, Gummerum, et al. (2009), Study 2	S	P	175	0.08
Malti and Keller (2009)	S	A	152	0.58
Manning (2004)	S	A	132	0.47
McInerney (1995)	S	B	80	0.45/0.37
Menesini and Camodeca (2008)	S	B	121	0.86/0.27
Menesini et al. (2003)	S	A	179	0.80
Perren, Gutzwiller- Helfenfinger, Malti, and Hymel (2011)	O	A	516	0.18
Van Tijen, Stegge, Meerum Terwoegt, and Panhuis (2004)	S	A	88	0.53
Woolgar, Steele, Steele, Yabsley, and Fonagy (2001)	O	B	100	0.16/-0.08

*Note.* MEA = moral emotion attribution; S = self-attributed emotions; O = other-attributed emotions; A = antisocial; P = prosocial; B = both prosocial and antisocial behavior.

<sup>a</sup>The first effect size is for prosocial behavior, the second for antisocial behavior.

groups was based on previous studies demonstrating that important changes take place in the development of moral emotions between early and middle childhood and between middle childhood and early adolescence (Krettenauer et al., 2008; Malti & Keller, 2010). The intent was to create age groups that represent early and middle childhood, as well as the differences between early, middle, and late adolescence. Moreover, the categorization of coding of moral emotion attribution followed the distinctions made in the literature; whereas some studies simply coded positive versus negative or mixed feelings (e.g., Malti, 2007), other studies assessed the intensity of negative emotion attribution (e.g., Krettenauer & Eichler, 2006). A few of these studies measured a continuum from positive to negative emotions rather than intensity of negative emotion attribution (e.g., Arsenio et al., 2009). Finally, some studies assessed a combined emotion attribution and reasoning score that takes into account the justification for the negative emotion attribution (such as moral vs. sanction-oriented justification of negative emotion attribution; e.g., Gasser & Keller, 2009). In addition, the categorization of domain of social behavior in broadband-versus domain-specific behavior was based on previous research indicating that domain-specific behavior (such as proactive aggression or sharing) might be more closely related to deficits in moral emotion attributions than broadband behavior measures (such as externalizing behaviors or broadband prosocial behavior scales) are, because domain-specific behaviors typically assess similar domains to the happy-victimizer vignettes (e.g., not sharing).

To assess reliability, two coders independently coded a randomly selected subsample of 17 studies (40% of the data). The kappa coefficients for the study variables were as follows: type of social behavior  $\kappa = 1.00$ , type of moral emotion attribution  $\kappa = .89$ , age group  $\kappa = .84$ , gender  $\kappa = 1.00$ , type of behavior report measure  $\kappa = .85$ , domain of behavior report measure  $\kappa = 1.00$ , study type  $\kappa = 1.00$ , study format  $\kappa = 1.00$ , study sample  $\kappa = 1.00$ , publication status  $\kappa = 1.00$ . The average interrater agreement across the 10 variables was  $\kappa = .96$ . The raters discussed their disagreements until a consensus was reached; the consensus then became the code.

#### Data Analyses

Data analyses were carried out on Mullen's (1989) algorithms. All outcomes were transformed to Fisher  $Z$  values, which corrected for nonlinearity

due to extreme values. The  $Z$  values were calculated from the reported statistics. In the case of studies for which only means and standard deviations were reported,  $t$  tests were conducted. When a report did not provide the statistical information necessary to calculate an effect size for a nonsignificant result, an effect size of zero was assigned based on a one-tailed  $p$  of .50 ( $Z = 0$ ). This commonly used, conservative strategy underestimates the true magnitude of effect sizes (Stams et al., 2006), but exclusion of these nonsignificant results would have resulted in an overestimation of the magnitude of the combined effect-size estimate.

One longitudinal study (Krettenauer et al., 2011) measured both other- and self-attributed emotions at different time points. Because more measurements on self-attributed emotions than on other-attributed emotions were included in data analysis, these were coded as self-attributed emotions.

In eight studies (Asendorpf & Nunner-Winkler, 1992; Cimborra, 1997; Gasser & Keller, 2009; Lake et al., 1995; Liao, 1998; Lyon, 2001; Malti, 2007; Malti & Keller, 2009),  $F$  values were given and were transformed into  $r$  values according to the formula  $\sqrt{r^2} = F/F - 2 + n$  (Cohen, 1988). In two studies (Hosser, Windzio, & Greve, 2008; Menesini et al., 2003),  $\beta$  coefficients were transformed into correlation coefficients according to the formula  $r = \beta + .05\lambda$ , where  $\lambda = 1$  if  $\beta$  is nonnegative and 0 if  $\beta$  is negative (see Peterson & Brown, 2005). Correlation coefficients were interpreted following Cohen's conventions (Cohen, 1988; Cohen & Cohen, 1983); accordingly, correlations of .20, .50, and .80 were taken to represent small, moderate, and large effect sizes, respectively. The data analyses were performed using the Comprehensive Meta-Analysis (CMA) program, version 2 (Borenstein, Hedges, Higgins, & Rothstein, 2004). To obtain a single effect size per study, multiple effect sizes from a study were averaged, and one effect size per study was calculated for each outcome variable.

The final model computes fixed and random effect sizes. Although a fixed-effects model allows greater statistical power, a random-effects model allows greater generalizability. We therefore report only the results from random-effects models.

We also computed significance tests for the effect sizes, homogeneity tests, analyses of variance, confidence intervals around the point estimate of the effect size, and  $\pi^2$ , the last being the moment-based estimate of the between-studies variance. Significant heterogeneity indicates the need for a moderator analysis that explains variability across studies. This was analyzed through the  $Q$  statistic. We calculated



unbiased  $d$  values to eliminate the effect size bias caused by small sample sizes.

Publication bias was assessed by calculating the fail-safe number, which is the number of additional hypothetical studies with an average null result required to make the overall effect nonsignificant (Rosenthal, 1995).

## Results

The meta-analysis included 42 studies with 8,009 participants. Table 2 describes the characteristics of the 42 studies. As can be observed, the studies vary considerably in sample size (32–1,273,  $M = 190.69$ ,  $SD = 260.02$ ), with 22% of the sample being 4–6 years of age, 48% being 7–10 years of age, 7% being 11–13 years of age, and 22% being 14–20 years of age. Aggressive behavior was assessed in 29 studies (69%) and prosocial behavior was assessed in the remaining 13 studies, 9 of which also assessed aggressive behavior. Self-attributed emotions were included in 26 studies (62%) and other-attributed emotions were included in the remaining 16 studies (38%). Eighteen studies (43%) coded moral emotion attributions in a binary manner (i.e., positive vs. negative or mixed), 15 studies coded the intensity of moral emotion attribution (36%), and 9 studies coded combined moral emotion attribution and reasoning scores (21%). Most studies included mixed-gender samples (90%). In regard to the method of behavioral assessment, 25 studies used adult-rated social behavior (59%), 5 used self-reported social behavior (17%), 5 used peer reports (12%), and 7 used observed behavior (12%). Twenty-six of the studies used broadband-dispositional behavior report measures (62%), and the remaining 16 studies used situation-specific measures (38%). The studies were predominantly correlational (95%) and cross-sectional (76%), and they tended to use community samples (71%). Twenty-eight of the studies were published (67%), with the remaining 14 studies being either unpublished or submitted for publication (33%). All but one of the 28 published studies appeared in peer-reviewed journals.

### Overall Effect Size

The meta-analysis (random-effects model) yielded a highly significant result for the overall relation between emotion attributions and combined prosocial and aggressive behavior ( $Z = 8.07$ ,  $p < .001$ ). The effect size was moderate (Cohen's  $d = .37$ ), with 95%

CI [.28, .45];  $r(\text{mean}) = .18$ ,  $p < .001$ , 95% CI [.14, .22]. The mean effect size should be interpreted cautiously, however, because effects sizes were heterogeneous across studies,  $Q(41) = 123.95$ ,  $p < .001$  for  $d$ .

The distribution of effect sizes was lower for prosocial than that for aggressive behavior. For prosocial behavior, the overall effect size was small,  $r = .13$ ,  $p < .001$ , 95% CI [.08, .19];  $d = .26$ , 95% CI [.15, .38];  $Q(12) = 18.22$ ,  $p < .10$  for  $d$ . The effect for prosocial behavior was in the hypothesized direction in all 13 studies for which it was assessed, and in 7 of these the effect was significant ( $p < .05$ ). For aggressive behavior, the overall effect size was moderate,  $r = .19$ ,  $p < .001$ , 95% CI [.14, .25];  $d = .39$ , 95% CI [.29, .49];  $Q(36) = 141.43$ ,  $p < .001$  for  $d$ . Of the 37 studies assessing aggressive behavior, the effect was in the hypothesized direction in 33 of them, and significantly so in 27 of them ( $p < .05$ ).

### Moderators of Effect Size

Random-effects moderator analyses were conducted in an effort to explain the significant hetero-

Table 2  
Summary of Study Characteristics Included in Meta-Analyses

	Frequencies (%) studies
Type of behavior	
Prosocial/antisocial/both	5 (12)/29 (69)/8 (19)
Type of moral emotion attribution	
Other/self	16 (38)/26 (62)
Age group	
0/1/2/3	9 (22)/20 (48)/3 (7)/9 (22)
Coding of moral emotion attribution	
Binary score/intensity score/combined emotion-reasoning score	18 (43)/15 (36)/9 (21)
Gender	
Mixed/boys only	38 (90)/4 (10)
Type of behavior report measure	
Self-report/observation/adult-report/peer-report	5 (17)/7(12)/25 (59)/5 (12)
Domain of behavior report measures	
Broadband-dispositional/situation-specific	26 (62)/16 (38)
Study type	
Experimental/correlational	2 (5)/40 (95)
Study format	
Cross-sectional/longitudinal	32 (76)/10 (24)
Study sample	
Extreme group/community	12 (29)/30 (71)
Publication status	
Published/unpublished	28 (67)/14 (33)

generality of the effect sizes (Mullen, 1989). Table 3 summarizes the moderators for prosocial and antisocial behavior. First, we examined our hypothesis about the role of self- versus other-attributed emotions in prosocial and antisocial behavior. For pro-

social behavior, there was no significant difference in effect size between self- and other-attributed emotions,  $Q(1) = .73$ . For antisocial behavior, however, the effect size was higher for self- than for other-attributed emotions,  $d = .47$ ,  $p < .001$  versus

Table 3  
Summary of Meta-Analytic Results on the Effects of Moderators on Prosocial and Antisocial Behavior

		Outcome					
		Prosocial		Antisocial			
Heterogeneity $Q$ ( $df$ )		18.22 <sup>a</sup> (12)			113.43*** (36)		
Random-effects mean $r$		.13***			.20***		
95% CI		.08, .19			.15, .25		
Equivalent $d$		.26***			.40***		
95% CI		.15, .38			.30, .50		
Moderators	$r$ ( $k$ )	$Q$ (between)	$Z$	$r$ ( $k$ )	$Q$ (between)	$Z$	
Moral emotion attribution							
Other	.11** (4)	0.73	2.72**	.13** (15)	4.66*	2.93**	
Self	.16*** (9)			.23*** (22)			8.32***
Age group							
4–6	.20 (4)**	9.35 <sup>a</sup>	3.41**	.20 (8)***	9.45	4.41***	
7–10	.11 (7)**			.14 (17)***			3.50***
11–13	.22 (1)*			.29 (3)***			1.26
14–20	.16 (1)*			.25 (9)***			5.89***
Coding of moral emotion attribution							
Dichotomous score (i.e., positive vs. negative)	.12 (6)**	9.23*	3.30**	.13 (16)**	7.07*	3.03**	
Intensity score	.25 (4)***		4.46***	.27 (15)***		7.21***	
Combined emotion-reasoning score	.07 (3)**		2.67**	.20 (6)***		5.26***	
Gender							
Mixed	No male only samples	—	—	.19*** (33)	0.75	6.74***	
Male only		—	—	.27** (4)		3.18**	
Assessment of social behavior <sup>b</sup>							
Self-report, observation, composite	.12* (4)	0.20	2.46*	.26*** (10)	2.24	4.59***	
Other-report (peers or adults)	.15*** (9)		3.94***	.17*** (27)		.26***	
Domain of social behavior							
Broadband-dispositional	.10*** (9)	2.10	4.41***	.22*** (23)	0.93	6.17***	
Domain-specific-situational	.21** (4)		2.69**	.17** (14)		4.62***	
Study type							
Experimental	Correlational only	—	—	.42*** (2)	5.45*	4.23***	
Correlational		—	—	.19*** (35)		7.46***	
Study format							
Cross-sectional	.18*** (10)	6.38*	5.90***	.20*** (30)	0.00	6.14***	
Longitudinal	.07** (3)		2.67**	.20*** (7)		5.97***	
Study sample							
Extreme group	Community samples only	—	—	.22*** (12)	0.29	4.03***	
Community		—	—	.19*** (25)		6.33***	
Publication status							
Unpublished	.21*** (5)	3.96*	4.60***	.25*** (13)	2.20	5.73***	
Published	.10** (8)		3.29*	.17*** (24)		5.42***	

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

$d = .26, p < .01; Q(1) = 4.66, p < .01$ . In other words, self-attributed emotions had a stronger relation than other-attributed emotions on aggression.

Second, we investigated the effects of the other moderators on the outcome variables. The significant moderators of prosocial behavior were coding of moral emotion attribution, study format, and publication status. Studies that coded intensity of moral emotion attribution showed a larger effect size ( $d = .50$ ) than did studies that coded moral emotion attributions in a binary manner ( $d = .24$ ) or as a combined emotion-reasoning score ( $d = .13$ ),  $Q(2) = 9.23, p < .05$ . Cross-sectional studies yielded a larger effect size ( $d = .35$ ) than did longitudinal studies ( $d = .13$ ),  $Q(1) = 6.38, p < .05$ . Unpublished studies showed a larger effect size ( $d = .42$ ) than did published studies ( $d = .20$ ),  $Q(1) = 7.18, p < .01$ .

The significant moderators of antisocial behavior were coding of moral emotion attribution and study type. Studies that coded intensity of moral emotion attribution showed a larger effect size ( $d = .56$ ) than did studies that coded moral emotion attribution in a binary manner ( $d = .26$ ) or as a combined emotion-reasoning score ( $d = .39$ ),  $Q(2) = 7.07, p < .05$ . Experimental studies had a larger effect size ( $d = .91$ ) than did correlational studies ( $d = .38$ ),  $Q(1) = 5.45, p < .05$ .

Next, we investigated whether or not the 10 moderators of effect size could account for the heterogeneity in the effect sizes for both prosocial and antisocial behavior. Preliminary analyses revealed that, with a few exceptions, the moderators were not significantly intercorrelated. All the studies that examined prosocial behavior were correlational and used mixed samples. Therefore, study type and gender were excluded from the regression analysis. However, the final regression model of prosocial behavior was not significant.

Table 4  
Regression Model for Effect Size Moderators of Antisocial Behavior (k = 37)

Moderators	$\beta$
Type of moral emotion attribution	.42*
Coding of moral emotion attribution	.14
Assessment of social behavior	-.23
Domain of social behavior	-.05
Study type	-.36*
Study sample	-.06
Publication status	-.25

Note. Random-effects analysis; coefficients are standardized. \* $p < .05$ .

Given the small sample size ( $n = 37$ ), gender, age, and study format were not included in the final regression model of antisocial behavior because preliminary analyses indicated that these variables did not significantly predict aggressive behavior and were, in part, interrelated with other moderators. Thus, type of moral emotion attribution, coding of moral emotion attribution, assessment of social behavior, domain of social behavior, study type, study sample, and publication status were entered into the equation (Table 4). The model was significant,  $Q(7, 36) = 2.64, p < .05$ , with the moderators explaining 36% of the variance in effect size. Two variables yielded independently significant effects. The first of these was type of moral emotion attribution ( $\beta = .42, p < .05$ ), which means that self-attributed emotions were more closely related to antisocial behavior than were other-attributed emotions (Figure 1). The second was study type ( $\beta = -.36, p < .05$ ), indicating that moral emotion attributions were related more strongly to antisocial behavior in experimental than that in correlational studies.

Publication Bias

Finally, we tested for publication bias by computing fail-safe numbers (see Becker, 2005). According to Card, Stucky, Sawalani, and Little (2008, p. 1202), "Failsafe numbers indicate the number of studies with average effect sizes equal to zero that would have to exist to conclude nonsignificant effects. This number is meant to index the number of studies with effect sizes of zero that could have

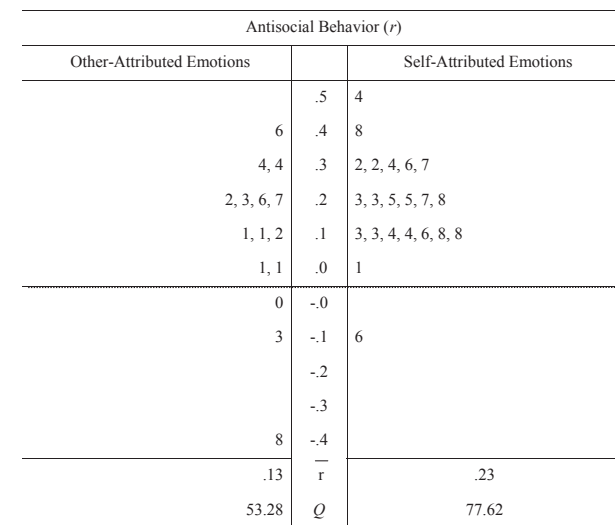


Figure 1. Stem-and-leaf plot of associations of self- and other-attributed emotions with antisocial behavior.

been excluded from the meta-analysis before the conclusions of significance would be invalidated." In our study ( $N = 42$ ), this number was 2,904, indicating that more than 2,900 additional studies with an average null result would be necessary to render the overall combined probability nonsignificant. The fail-safe number for studies measuring aggressive behavior ( $n = 37$ ) was 1,786, and, for studies measuring prosocial behavior ( $n = 13$ ), it was 123. As a rule of thumb for determining the critical fail-safe number that should be exceeded, Becker (2005) suggested the formula  $N_{\min} = 5k + 10$ , with  $k$  referring to the number of studies included in the meta-analysis.

### Discussion

Stimulated by developmental research on the happy-victimizer phenomenon (for overviews, see Arsenio et al., 2006; Krettenauer et al., 2008), researchers have begun to systematically study how moral emotion attributions relate to prosocial and antisocial behavior in childhood and adolescence. The main goal of the present meta-analytic review was to expand our understanding of the conceptual role of moral emotion attributions in moral development and morally relevant behavior. In addition, we aimed to integrate the available evidence on the role of moral emotion attributions in the prosocial and antisocial behavior of children and adolescents and to assess whether or not divergent findings can be explained by differences in samples and procedures. This is the first meta-analytic review of a rapidly increasing number of studies on the relation between moral emotion attributions and children's social behavior.

The first main finding of the meta-analysis, which was based on a sample of 42 studies with 8,009 participants, revealed small-size relations of emotion attributions with prosocial behavior and moderate-size relations of emotion attributions with antisocial behavior ( $d = .26$  and  $.39$ , respectively). This finding supports the theoretical proposition that moral emotion attributions such as sadness and guilt feelings play a significant role in the morally relevant behavior of children and adolescents (e.g., Hoffman, 2000; Krettenauer et al., 2008; Malti & Latzko, 2010). Age did not moderate the relation between moral emotion attributions and social behavior. On theoretical grounds, one would expect developmental changes to be most common during early to middle childhood, as the first studies examining the relation between moral emotion attribu-

tions and social behavior found that this is the time when children frequently change from positive to negative emotion attributions (Nunner-Winkler & Sodian, 1988). More recent longitudinal studies suggest that moral emotion attributions stabilize during mid-adolescence (Krettenauer et al., 2011). This finding suggests that moral emotion attributions likely reflect individual differences in morally relevant behavioral dispositions rather than mere deficits in the cognitive ability to take the perspective of self and other. This does not mean that moral emotion attributions do not depend on cognitive development: Research has repeatedly documented that moral emotion attributions may crucially depend on theory-of-mind development and the ability to coordinate perspectives of self and others in young children (Krettenauer et al., 2008). However, even if children have developed the cognitive prerequisites to attribute moral emotions, our findings indicate that links between inter-individual differences in moral emotion attributions and morally relevant behavior remain stable from childhood to late adolescence. This contradicts the view that younger children's emotion attributions reflect a lack of moral motivation that eventually is outgrown in the course of development. Rather, the findings indirectly support the view that young children often have moral motivation, for example, as a result of the ability to feel empathy (Eisenberg et al., 2006). Thus, the findings of this meta-analysis are most supportive of the theoretical notion that moral emotion attributions reflect interindividual differences in morally relevant behavioral dispositions across various age groups. Future research is needed to disentangle the social and psychological factors (i.e., cognitive, emotional, motivational, and behavioral) that lead to differences in strength of moral emotion attributions across development.

Notably, the effect sizes we found are similar to those found for comparable relations in other studies on empathy and social behavior; these effect sizes were also in the low to moderate range. Specifically, Eisenberg and Miller (1987) reported correlations between  $.10$  and  $.36$  for the relation between empathy and prosocial behavior, and Miller and Eisenberg (1988) found correlations between  $-.06$  and  $-.46$  for empathy in relation to antisocial behavior. One reason as to why moral emotion attributions have been found to be related to (im) moral action might be that moral emotion attributions have been operationalized as self-evaluative emotions with both cognitive and affective aspects (Tangney et al., 2007). As such, they not only involve an other-oriented affective reaction but also

reflect the validity of moral rules and obligations (Malti, Gummerman, et al., 2009). It has been argued that this internalized moral knowledge, when combined with an affective reaction toward the transgression, can create a sense of personal responsibility that is likely to lead to (im)moral conduct (Malti & Keller, 2010). Our meta-analysis supports this assumption and adds new knowledge by showing that, like empathy, moral emotion attributions are moderately related to prosocial and antisocial conduct.

Interestingly, the effect sizes of the relations between moral emotion attribution and prosocial and antisocial behavior were larger for antisocial than those for prosocial behavior. This finding corresponds with the results reported by Krettenauer and Johnston (2011) and by Krettenauer and Jia (in press), both of whom demonstrated that negatively charged moral emotion attributions are stronger when one is engaging in antisocial behavior than when one is failing to act prosocially. For positively charged emotions such as pride, the opposite pattern was found. The fact that our meta-analysis included only negative emotion attributions might account for the difference in effect sizes. Theoretically, negatively charged moral emotion attributions such as guilt are anticipated after rule-violating, aggressive behavior. Positively charged moral emotion attributions such as pride might be more closely related to prosocial behavior. Future studies are needed to disentangle how negatively and positively valenced emotion attributions in the moral domain relate to prosocial and antisocial behavior.

Our hypothesis that self-attributed moral emotions would be related more strongly than other-attributed moral emotions to prosocial and antisocial behavior was partly confirmed. The type of moral emotion attribution made no difference for prosocial behavior, but the  $d$  for the relation of moral emotions to antisocial behavior was higher if the emotions were self-attributed than if they were other-attributed. The finding that self-reported moral emotion expectancies had a stronger effect on antisocial behavior than did emotions attributed to hypothetical wrongdoers is important and gives new insights into the relation between moral emotion attributions and antisocial behavioral tendencies. Self-attributed moral emotions following transgressions might be perceived as personally binding and, as such, might help a person refrain from engaging in antisocial behavior. Other-attributed emotions might be perceived as less personally obligating (Keller et al., 2003). In contrast, children who behave prosocially may see emotions

attributed to hypothetical wrongdoers in the same way as if they were attributed to the self (see Malti et al., 2007). Alternatively, the sample size might have been too small to detect differences in the relation between moral emotion attributions and prosocial behavior.

Another important finding is that there were large differences in effect size across studies. Related meta-analyses of empathy and prosocial and antisocial behavior have likewise reported a wide range of effect sizes (Eisenberg & Miller, 1987; Miller & Eisenberg, 1988). A considerable amount of this between-studies variance was explained by additional moderator variables. A significant moderator for prosocial behavior in our analysis was coding of moral emotion attribution. Studies that included measures on the intensity of moral emotion attributions showed larger effect sizes than did studies that relied on either positive or negative scoring or a combined emotion-reasoning score. This is an interesting and novel finding; the intensity of emotion ratings perhaps reflects the strength of experienced moral emotions, which may relate more closely to actual behavioral tendencies than simple reports of type of emotion (i.e., positive vs. negative) or more reflexive emotion scores (including justifications of emotions).

Another moderator of prosocial behavior was study format. We found higher effect sizes in cross-sectional studies than in longitudinal studies. This finding is difficult to explain, especially since previous related longitudinal studies on empathic reasoning suggest that the relation between empathic reasoning and prosociality becomes clearer with age (e.g., Eisenberg, Lennon, & Roth, 1983). However, our meta-analysis did not document any age-related effects on the relation between moral emotion attribution and prosocial behavior. Thus, these inconsistencies might likely be due to the effects of selective attrition in the longitudinal research included in the present meta-analysis, which may relate to limited variance and related smaller effect sizes. Furthermore, effect sizes in unpublished manuscripts were higher than in published manuscripts. This somewhat surprising finding indicates, again, that it is unlikely that publication bias (i.e., larger effects in published studies) has threatened our findings for prosocial behavior.

For aggressive behavior, significant moderators in our meta-analysis were study type (i.e., experimental vs. correlational design) and coding of moral emotion attribution. Experiments had a larger effect size than correlational studies. Given the small sample



size, this finding needs to be interpreted cautiously. It might reflect differences in methodological rigor. Regarding coding of moral emotion attribution, the intensity of emotion ratings had a larger effect size than that of dichotomous positive versus negative ratings and combined emotion-reasoning scores. Again, perhaps intensity of emotion ratings reflects the actual perceived arousal and strength of an experienced emotion, and, thus, such ratings are more closely related to antisocial behavior.

### *Conclusions and Future Directions*

The present study provides new information on the relations between moral emotion attributions and the prosocial and antisocial behavior of children and adolescents. Since moral emotion attributions, as assessed in the happy-victimizer paradigm provide key information on how affective-moral experiences are linked to moral reasoning and morally relevant behavior, this analysis is timely. Our reliance on mixed-effects models allowed for greater generalizability of our findings than would have been the case had we used fixed-effects models (Card et al., 2008; Hedges & Vevea, 1998). However, the models we used still assume that the studies we included are a random sample of the population of studies; to the extent that they are not, our results are biased (Card et al., 2008, p. 1208). This observation brings to light another potential limitation of our meta-analysis that merits consideration. A well-known threat to the validity of meta-analyses is publication bias (Rosenthal, 1995). Nonsignificant study outcomes are generally underreported in the literature. If our attempts to retrieve unpublished studies failed, we may have disproportionately missed nonsignificant findings. However, we went to great lengths to retrieve unpublished studies by searching dissertation databases and by soliciting unpublished studies from researchers in the field. As a result, 14 of the 42 studies in our sample were unpublished, a reasonably high percentage (33%). Finally, even if there was a publication bias, it is unlikely that it influenced the robust main findings of our meta-analysis, because the fail-safe number indicates that the overall effect would have still been significant if had we included a large number of null studies.

Our literature review prior to the meta-analysis identified some important research gaps in this area of developmental research. Previous studies were predominantly conducted with unrepresentative, middle-class samples (for an exception, see Malti, Gummerman, et al., 2009). Future studies reflecting ethnic and cultural diversity are therefore war-

ranted. In addition, the majority of research we reviewed relied on concurrent data. Unfortunately, longitudinal investigations are rare and those that do exist are so different in methodology that meaningful meta-analytic combination is not yet possible. We strongly urge additional longitudinal research using a wide range of measurement strategies.

Although our meta-analysis revealed that there is a consistent relation between moral emotion attributions and social behavior across development, the question regarding possible intervening mechanisms remains unanswered. For example, older children may rely more heavily on anticipated consequential emotions following actual behavior because as a result of increased perspective-taking skills, whereas younger children might predominantly rely on emotional outcomes of previous (im)moral behaviors (Baumeister et al., 2007). Research on moral emotion attributions has not systematically distinguished between the roles that consequential emotions and anticipatory emotion expectancies play in children's and adolescents' social behavior (Malti & Ongley, in press). Future research on the role of anticipatory and consequential emotions in children's social behavior is warranted.

Finally, most of the existing happy-victimizer research has focused on moral emotion attributions in antisocial contexts, such as stealing or hitting. Utilizing research designs that systematically vary prosocial and antisocial contexts might help to disentangle the role of situational context as a moderator in the relation between moral emotion attributions and prosocial and antisocial behavior.

In summary, our meta-analytic review has contributed substantially to clarifying the role of moral emotion attributions in morally relevant behavior during childhood and adolescence. This synthesis provides new information about moral emotion attributions and their role in moral development. This information is important for clarifying the conceptual ambiguities surrounding moral emotion attributions. This work is also of value because it points to directions for future research. Clearly, more longitudinal research on the role of moral emotion attributions in social behavior is warranted if we are to better understand their role in the genesis of individual differences in such behavior.

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