Children’s Self-Reported Emotions and Emotional Facial Expressions

Following Moral Transgressions

by

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A thesis submitted in conformity with the requirements for the degree of Master of Arts

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Abstract

This study examined self-reported emotions and emotional facial expressions following moral transgressions using an ethnically diverse sample of 242 4-, 8-, and 12-year-old children. Self-reported emotions were examined in response to three transgression contexts: an intentional harm, an instance of social exclusion, and an omission of a prosocial duty. Children’s emotional expressions of sadness, happiness, anger, fear and disgust were analyzed immediately after being asked how they would feel if they had committed one of the described transgressions. Emotional expressions were scored using automated emotion recognition software. Four-year-olds reported significantly more happiness as compared to 8- and 12-year-olds. In addition, self-reports of sadness decreased between 8- and 12-year-olds, while self-reported guilt increased between these age groups. Furthermore, 4- and 8-year-olds demonstrated higher levels of facially expressed happiness than 12-year-olds. These findings highlight the role of automatic affective and controlled cognitive processes in the development of children’s emotions following moral transgressions.
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1 Introduction

Over the past decade, the study of children’s emotions and morality has received increasing attention from developmental scientists. One of the reasons is that emotions in morally relevant situations have been found to be associated with children’s moral decision-making and to motivate morally relevant, other-oriented behaviour (for reviews, see Arsenio, in press; Krettenauer, Malti, & Sokol, 2008; Malti & Krettenauer, 2013; Ongley & Malti, 2013). Most previous developmental research on children’s emotions in contexts of morally relevant everyday situations has taken place in the happy-victimizer paradigm, in which children are asked to report their emotions following hypothetical moral transgression scenarios, such as stealing another child’s chocolate. The puzzling finding of this research is that young children tend to attribute positive (i.e., amoral) emotions to themselves as wrongdoers, although they understand from early on that it is wrong to break a moral rule, such as stealing a candy (Turiel, 1983). There is an increasing shift toward negative (i.e., moral) emotions between 6 to 8 years of age (for a review, see Arsenio, in press). Yet, little is known about what types of negatively valenced emotions children attribute to themselves as wrongdoers. For example, it is likely that they not only attribute sadness, but also a range of other negatively valenced emotions, such as guilt or fear (Wainryb & Reccia, 2012), and that the variety of different negatively valenced moral emotions increases with age, due to increasing social-cognitive capacities (Malti & Ongley, in press).

In addition, little if anything is known about what types of emotions children spontaneously experience in response to moral transgression scenarios. Spontaneous emotions are automatic emotional reactions. They last a fraction of a second (Ekman, 1992), thus temporally precede self-reported emotions. While self-reported emotions are conceptualized as
complex emotions and necessarily presuppose controlled cognitive thought (Malti & Ongley, in press), spontaneous emotions (also known as microexpressions) are basic emotions which do not depend on intentional thought for their activation (Ekman, 1977). Rather, they depend on automatic information processing mechanisms (Ekman, 1977; see Frijda, 1994). Thus, examining both spontaneously observed emotional facial expressions and self-reported emotions may shed light on children’s automatic affective processes and reflective, cognitive processes in children’s emotional experiences following moral transgression.

The present study aimed at filling these research gaps, in part, by investigating the development of self-reported emotions and emotional facial expressions in contexts of moral transgression. We utilized a sample of 4-, 8- and 12-year-old children, because previous happy-victimizer research has revealed important changes in self-reported emotions between early and middle childhood (Arsenio, in press). We extended this age range to early adolescence to investigate if further changes in types of self-reported emotions and emotional facial expressions occur.

1.1 The Development of Emotions following Moral Transgressions

Emotions in the context of morality have been labeled “moral” if they reflect an internalized moral standard, such as guilt feelings following a moral transgression, or an other-orientation, such as empathy with a victim of a transgression (Eisenberg, 2000; Malti, Gummerum, Keller, & Buchmann, 2009; Tangney, Stuewig, & Mashek, 2007). Moral emotions can be either positively or negatively valenced (Malti & Krettenauer, 2013; Tracy, Robins, & Tangney, 2007). Positively valenced moral emotions, such as pride, can arise when one has acted in congruence with an internalized moral standard, while negatively valenced moral emotions,
such as guilt feelings or righteous anger, can arise when one has violated their personal moral code (Malti & Ongley, in press).

Children’s emotions towards these moral transgressions have most commonly been evoked by reading scenarios in which one character violates these norms, and then asking children how they would feel if they had committed the transgression (e.g., Nunner-Winkler & Sodian, 1988; Keller, Lourenço, Malti, & Saalbach, 2003).

In the happy-victimizer paradigm, emotions have almost exclusively been studied by using children’s self-reported negatively valenced moral emotions in reaction to vignettes about hypothetical moral transgression. Distinct age-related differences have been consistently reported in self-reported emotions following transgressions, demonstrating that with age, children typically begin to attribute fewer positive (i.e., amoral) emotions to themselves as victimizers, while attributing more negative (i.e., moral) emotions. For example, in their study of 872 Swiss children, Malti, Gasser and Buchmann (2009) found that first- and second-grade elementary school children attributed significantly more negative emotions to themselves as victimizers than their kindergarten counterparts, regardless of whether the scenario described an intentional harm (stealing) or omitting a prosocial duty (not sharing). Studies of adolescents have found that anticipated negative (i.e., moral) emotions continue to develop after childhood, though the change is not as pronounced. For example, in a study of adolescents in grades 7, 9, 11 and 13, Krettenauer and Eichler (2006) showed that increases in anticipated negative emotions were marginally related with age. Thus, the development of negative self-reported emotion attributions appears most pronounced in middle childhood, with marginal increases in these negative emotion attributions in early adolescence. At the same time, research also indicates that some children and adolescents continue to anticipate positive, amoral emotions to themselves as
wrongdoers (Krettenauer & Eichler, 2006; Malti, Keller, & Buchmann, 2013) or in multifaceted contexts of social exclusion (Gasser, Malti, & Buholzer, 2013; Malti, Killen, & Gasser, 2012a; Malti, Ongley, Dys, & Colasante, 2012).

Developmental scientists have argued that the happy-victimizer phenomenon may arise from a lack of coordination between one’s actions and their negative influence on others (Malti & Ongley, in press). This lack of coordination might be due to cognitive limitations in early childhood (Gummerum, Cribbett, Nicolau, & Uren, 2013) motivational constraints (Nunner-Winkler & Sodian, 1988), and/or inter-individual differences (Malti & Krettenauer, 2013). Here, we therefore investigate what types of negative emotions children and adolescents attribute to themselves as hypothetical victimizers in moral transgression scenarios (e.g., anger, guilt, sadness, etc.). This is important as it can inform our understanding of what developmental changes take place in emotional experiences (following moral transgressions) as they become more differentiated (see Wainryb & Reccia, 2012).

The vast majority of developmental research on children’s emotions in situations involving moral transgressions has relied upon children’s verbal, self-reported emotions, which are necessarily infused with controlled cognitive thought. We therefore also examined spontaneous emotional reactions following moral transgression. Spontaneous emotional reactions, known as microexpressions, are rapid and unconscious emotional facial expressions, which last for a fraction of a second (Ekman & Friesen, 1969). Unlike self-reported emotions, spontaneous emotions precede, and are not interwoven with, proximal controlled cognition. Investigating observed, emotional facial reactions and self-reported emotions following moral transgressions may further elucidate the role of reflection and cognitive processes in emotions in the context of morality. This analysis can shed further light on recent integrative developmental
approaches to moral emotions, which aim to disentangle how cognitive processes and judgments are intertwined with emotional reactions in moral encounters across development (e.g., Malti & Ongley, in press; Malti & Dys, 2013).

The most common method of measuring spontaneous emotional reactions has involved analyzing slowed down videos of facial expressions in order to code for microexpressions. Traditionally, observed emotion coding has been done manually, wherein trained persons coded single frames of participants’ facial expressions by hand, one at a time. The most thoroughly validated of these approaches has been the Facial Action Coding System (FACS; Ekman, Friesen, & Hager, 2002). The system involves breaking down each facial expression into action units, which are generally conceived as the smallest visually discriminable facial movements (Cohn, Ambadar & Ekman, 2006). Each emotion is then identified by its corresponding combination of action units.

To date, it appears that only one study of moral emotions has employed a facial expression coding system to measure children’s emotions in contexts of morality. In this study, Wiggers and Willems (1983) showed 48 5-year-old girls emotion-conveying videos, while measuring their resulting empathic responses using the FACS. The authors measured “facial empathy”, or microexpressive mimicry, over a 10-second interval using the FACS. They also measured what they termed as “cognitive empathy” by asking girls to exactly identify the emotion displayed in their video. Lastly, they measured “affective empathy” by asking participants how they felt after watching a video. The findings revealed that cognitive empathy was a necessary but insufficient precondition for affective and facial empathy. In other words, without an understanding of what emotion was being elicited girls did not report or facially display empathic feelings. However, this study appears limited in that the time-interval used for
studying spontaneous emotions was excessively long and may have consequently measured emotions that arose after intentional thought and/or facial expressions unrelated to children’s feelings toward the target.

Employing traditional coding systems, like the FACS, can be troubling as they typically require multiple coders who are certifiably trained in the coding system and an extensive amount of time to code participants’ facial expressions. Fortunately, recent technological advances have yielded the creation of analogous automated systems, which demand fewer human resources and less specialization. The present study employed such technology, in the form of FaceReader 4.0, which was trained using the FACS (van Kuilenburg, Miering, & den Uyl, 2005).

### 1.2 Contextual Differences in Emotions following Moral Transgressions

Another aim of our study was to investigate contextual differences in children’s self-reported emotions and emotional facial expressions following moral transgressions. Previous research has revealed context-related differences in children’s self-reported emotions in situations of moral transgressions (e.g., Nunner-Winkler & Sodian, 1988; see Smetana, 2006).

Traditionally, self-reported emotions following moral transgressions have been studied using scenarios of intentional harm and the omission of a prosocial duty. This research has documented that children distinguish between different types of moral rules in their anticipation of emotions, such as harm and the omission of prosocial duties. For example, Malti and colleagues (2009) found that kindergarten children, but not first- and second-grade children, attributed higher levels of negative (i.e., moral) emotions to themselves as victimizers in contexts of stealing compared to not sharing. While the ostensible lack of context differentiation among older children may appear counterintuitive, these findings are due to the fact that older children predominantly attributed negatively valenced emotions. Thus, the findings may have been the
result of combining all negative emotions into a single category. In line with this idea Malti, Ongley, Dys and Colasante (2012b), found that feelings of guilt were anticipated more frequently by 12-year-olds in intentional harm contexts as compared to prosocial omission. Children and adolescents may distinguish moral transgression contexts based on severity, with intentional harm eliciting more guilt than the omission of prosocial duties.

In recent years, researchers have begun to expand this line of research by investigating how children feel in multifaceted situation of social exclusion (e.g., Hitti, Mulvey, & Killen, 2011; see Killen & Rutland, 2011). For example, a study by Malti and colleagues (2012a) found that in hypothetical vignettes depicting social exclusion based on nationality, personality and gender children attributed highest levels of negative emotions to children who exclude others based on nationality. Furthermore, contexts of social exclusion have also proven to be distinct from intentional harm and prosocial omission situations. For example, Malti et al. (2012b) found that imagining excluding an out-group peer yielded fewer guilt feelings than imaging intentionally harming another peer. What is less known, though, is whether children’s emotional facial expressions to transgressions differ depending on context.

1.3 The Current Study

In summary, the present study investigated the development of children’s self-reported emotions and emotional facial expressions in response to instances of harm, social exclusion, and the omission of a prosocial duty. First, we examined the various types of negatively valenced emotions that children anticipate in these situations while imaging themselves as victimizers. Based on previous research we expected children to report some positive emotions, such as happiness, and a range of negative emotions, particularly sadness, guilt, anger and fear.
Second, we tested the development of emotional facial expressions following moral transgressions. With little previous research conducted in this area, we speculated that the basic emotions of happiness, sadness, anger and fear would be most commonly observed.

By using a sample of 4-, 8- and 12-year-old children, we tested developmental differences in self-reported emotions, as well as in emotional facial expressions. Given that emotions in the context of morality become more tied to an inner world of mental states shared with other people (Carpendale & Lewis, 2006; Lagattuta & Thompson, 2007), we found it likely that children would increasingly attribute internalized emotions of guilt with age, and that they also show an increase in negatively valenced emotional facial expressions, particularly sadness, and a decrease in the positive emotional facial expression of happiness. In addition, it is likely that the developmental changes in moral emotions are similar for both self-attributed and spontaneously experienced emotions. Specifically, based on the happy-victimizer finding that children shift to attribute negative emotions to themselves as transgressors from age 4 to age 8, we expected to see a similar shift in emotional facial expressions from age 4 to age 8.

Third, we analyzed how contextual factors affect children’s self-reported emotions and emotional facial expressions. We used contexts that have been used extensively in the happy-victimizer research (i.e., harm, omission of prosocial duties), as well as in the more recent developmental literature on social exclusion (e.g., Killen & Rutland, 2011; Strohmeier, Malti, & Killen, 2013). Based on the previous literature, we expected children to anticipate more negatively valenced, moral emotions in contexts of harm compared to the omission of prosocial duties for self-reported emotions. While we expected some consistency between self-reported emotions and emotional facial expressions, we also anticipated that the latter may not be as
clearly differentiated given the limited capabilities of rapid, automatic processing mechanisms that underlie these expressions.

Lastly, since previous studies have shown that gender and socio-economic status are related to children’s self-reported moral emotions (e.g., Nunner-Winkler, Meyer-Nikele, & Wohlrab, 2007; Malti et al., 2009), we controlled for these variables in our statistical analyses.

2 Method

2.1 Participants

The participants recruited for the present study were 4-, 8-, and 12-year-old children who partook in a larger study on the development of children’s emotions and their relations to social behaviour. The children were recruited from recreation and community centers from a major suburban city in Canada. A total of 75 4-year-old (M age = 4.60 years, SD = 0.47; 35 girls [47%]), 94 8-year-old (M age = 8.38 years, SD = 0.33; 50 girls [53%]), and 73 12-year-old (M age = 12.54 years, SD = 0.38; 37 girls [51%]) children participated (N = 242). We asked primary caregivers to report their highest level of education, which we used as a proxy for socioeconomic status. Most primary caregivers reported completing an undergraduate university degree (55%), while the remainder reported completing a college degree (20%), graduate degree (15%) or high school diploma (8%). Two percent of caregivers did not report their level of education. In comparison to recent census data (Statistics Canada, 2007), the level of education of the participants in our sample is representative of the suburban city from which our sample was drawn.

2.2 Measures

Self-reported emotions following moral transgressions. Children’s self-reported emotions following moral transgressions were measured using validated vignettes that have been
extensively used in the happy-victimizer paradigm (see Keller et al., 2003; Malti et al., 2009; Ongley & Malti, 2013). Children were read six brief stories, each of which was accompanied by two hand-drawn images displayed on a tablet computer. Four stories depicted one of two types of moral transgressions: an intentional harm (stealing, hitting), or an omission of a prosocial duty (not sharing, not helping). In addition to these traditional scenarios, we added two social exclusion stories (excluding a new child from a lunch table, excluding an outgroup member from playing a computer game). All story characters were matched to the participant’s gender and age. One sample story, depicting intentional harm, went as follows: “Marc brought a chocolate bar to school. He shows the chocolate to James and puts it back in his jacket. James really likes chocolate so when nobody is watching he takes the chocolate bar from Marc’s jacket and eats it.” In line with previous happy-victimizer research, children were then asked how they would feel if they had done what the transgressor (in this case James) had done. Children’s verbal responses were recorded by the tester. Whenever children answered “I don’t know” their responses were probed by the interviewer. Although up to two emotions were recorded for each child, second emotions were only provided in 12% of stories and included some secondary emotions coded under the same category (e.g., sad and bad; anxious and afraid). Consequently and in line with previous research, only first-reported emotions were further analyzed in the present study (e.g., Malti et al., 2009).

Coding. Children’s responses were coded into one of twelve categories: neutral; sad or bad; angry; guilty; embarrassed; disgusted; fearful, anxious or worried; other negative emotions; happy, good or proud; other positive emotions; undifferentiated responses. Two independent raters coded a random subsample (n = 36; 15% of the data) of 4-8- and 12-year-olds’ self-
reported emotions, which demonstrated high inter-rater reliability (Cohen’s $\kappa = .99$). Initial disagreements were further discussed until a consensus was reached.

**Emotional facial expressions following moral transgressions.** Children’s interviews were video recorded and analyzed using Noldus’s FaceReader 4.0. This software, which was trained using the Facial Action Coding System (see Ekman, Friesen, & Hager, 2002; van Kuilenburg, Miering, & den Uyl, 2005) calibrates a 3-dimensional model of 491 critical points on the face and neck. Next, using the software’s neural network, scores were generated to reflect the match between the observed expression and five basic emotions (happiness, sadness, anger, fear and disgust) and a neutral expression. The program has performed well on tests of validity, correctly classifying 89% of images from the Karolinska Directed Emotional Faces set and 90% of images from the Radboud Faces Database (Bijlstra & Dotsch, 2011). Given the automatized nature of the system, it offers a more feasible alternative to traditional (manual) coding approaches. A critical time interval of $1/10^{th}$ of a second was established, starting from the moment the experimenter finished asking the child how they would feel if they had behaved like the moral transgressor in the story. The emotional facial expressions within this interval were identified as most crucial as they were believed to reflect children’s natural emotions towards themselves as transgressors in each situation. In other words, the spontaneous emotions expressed by children prior to this questioning could have reflected reactions to alternate perspectives, such as that of the victim, while later expressions could have been reflective of longer-lasting emotions (i.e., macroexpressions) rather than spontaneous emotions (Ekman, 1992). It was also the time frame during which children were most likely to attend to details of the story, which is important for evoking emotional states in participants (see Lewis, 2008).
Moreover, given that microexpressions are believed to last between 1/25\textsuperscript{th} and 1/5\textsuperscript{th} of a second (Ekman, 1992) the length of the interval was believed to be sufficient.

**Missing Data.** In total, 4796 emotional facial expressions were generated, translating to a missing data rate of 31%. These missing data were handled using multiple imputation. A modern approach to handling missing data was chosen in lieu of a traditional approach (e.g., listwise deletion, mean substitution) as the latter have been shown to reduce power, underestimate variability and/or undermine the validity of the sample characteristics (Schafer & Graham, 2002; Enders, 2001). Missing data points were dealt with using the Multiple Imputation by Chained Equations (mice) package using the statistical software R (van Buuren & Grooth-Oudshoorn, 2011). The process involves replacing missing values with plausible estimates of what those values would have been had they been observed, using other available data (Rubin, 1987; Little, Jorgensen, Lang, & Moore, 2013). In line with modern recommendations (Mistler & Enders, 2012; Little, 2013) we generated 40 multiply imputed datasets using variables believed to be related to the patterns of missingness (i.e., age, gender, SES, ethnicity, later observed emotion scores, etc.). In order to reduce noise variance in the imputation process, variable scores were collapsed within context prior to imputing (Little, 2013). Final statistics for emotional facial expressions were conducted using averaged results from all 40 imputed datasets (see Allison, 2001).

2.3 Procedure

A pilot study with 11 children was conducted to establish that all questions were age-appropriate and interview techniques were ideal as well as to ensure that the FaceReader technology worked appropriately with our age groups of interest. All children in the pilot study anticipated that the victim in each scenario would feel negatively (e.g., sad or bad), which is
consistent with other studies that even 4-year-old children understand that it is wrong to violate moral rules and that it has negative consequences for the victim (see Turiel, 1983). For these reasons, children’s understandings of the emotional consequences for the respective victims were not tested.

Children and their caregivers visited the research laboratory where caregivers provided written informed consent for the child’s participation in the study. Children were individually tested in a separate testing room. Children were read the six moral transgression stories and then interviewed about them. Interviews were recorded using two cameras, one of which was placed directly in front of each child’s chair to allow for accurate facial expression analyses. All testers were undergraduate psychology students who had been thoroughly trained in the relevant interview techniques, the emotion recognition technology, and coding. Meanwhile, caregivers filled out a questionnaire that contained demographic information as well as information on children’s social-emotional and moral development. Upon completing the study, all caregivers and children were thanked and caregivers were debriefed regarding the purpose of the study. Finally, as compensation, participating children received a book of their choice while adolescents received a bookstore gift card.

3 Results

3.1 Self-reported emotions following moral transgressions.

The means and standard deviations for overall self-reported emotions are shown in Table 1. Table 2 provides self-reported emotions by age group. As can be seen in Table 1, children most often reported feelings of sadness, happiness, anger and guilt. Shame, fear, disgust and other emotions were not commonly reported (less than 3%) and so were dropped from further analyses.
To test our hypotheses on developmental differences in self-reported emotions, a series of analyses of variance (ANOVAs) were conducted, while controlling for gender and SES. We found developmental effects for sadness, $F(2,231) = 11.58, p < .001$. For follow-up analyses of developmental differences we employed the Least Significant Difference (LSD) procedure as it has been shown to be the most appropriate for multiple comparison tests involving three means (Carmer and Swanson, 1973; Howell, 2012). Post-hoc tests revealed that 4- and 8-year-olds showed higher levels of sadness than 12-year-olds, Cohen’s $d = .77$ and $.66$, respectively; $ps < .001$. In line with our hypotheses, analyses revealed developmental differences for happiness, $F(2,231) = 13.69, p < .001$. Follow-up LSD post-hoc tests demonstrated that 4-year-olds showed more happiness than 8-year-olds, Cohen’s $d = .59$, and they also reported more happiness than 12-year-olds, Cohen’s $d = .74, ps < .001$. As expected, analyses of age differences in reports of guilt revealed significant differences, $F(2,231) = 26.38, p < .001$. Follow-up tests showed that 4-year-olds reported less guilt than 12-year-olds, Cohen’s $d = .95$, and 8-year-olds reported less guilt feelings than 12-year-olds, Cohen’s $d = .85, ps < .001$. Analyses revealed no developmental differences in self-reported anger.

Next, using a mixed-ANOVA we analyzed the effect of context (within-subjects factor) and age (between-subjects factor) on each self-reported emotion (i.e., sadness, happiness, anger and guilt). The only emotion that showed contextual variation was guilt. Specifically, guilt produced significant contextual differences, $F(2,448) = 4.62, p < .05$, with a significant main effect of age group, $F(2,224) = 25.88, p < .001$. Post-hoc LSD t-tests revealed that children reported more guilt in harm contexts as compared to social exclusion, Cohen’s $d = .58, p < .001$ and prosocial omission, Cohen’s $d = .74, p < .001$. However, the main effect of context was qualified by a significant two-way interaction of age by context, $F(4,448) = 5.88, p < .001$, as
seen in Figure 1. Bonferroni-corrected multiple comparisons revealed that 12-year-olds reported more guilt than 4- and 8-year-olds in harm (ps < .01) and prosocial omission contexts (ps < .05). Furthermore, 8-year-olds reported more guilt in harm contexts compared to exclusion contexts (p < .05), while 12-year-olds reported more guilt in harm contexts than exclusion (p < .01) and prosocial omission contexts (ps < .05). No other emotions showed significant contextual differences.

3.2 Emotional facial expressions following moral transgressions.

The means and standard deviations for overall emotional facial expressions are shown in Table 3. Table 4 displays emotional facial expressions by age group. Overall, children mostly commonly showed facial expressions of sadness in response to the vignettes, though happiness, anger and fear were also common. Disgust was uncommon, and was therefore omitted from further analyses.

Next, a series of ANOVAs was conducted on each emotional facial expression (i.e., sadness, happiness, anger and fear) to test for developmental differences, while controlling for gender and SES. ANOVAs revealed significant age effects for sadness, $F(2,237) = 5.42, p < .01$ and happiness, $F(2,237) = 6.10, p < .01$. Further analyses, using an LSD post-hoc test, revealed that 4-year-olds showed more sadness than 8-year-olds, Cohen’s $d = .42, p < .01$, and they also showed more sadness than 12-year-olds, Cohen’s $d = .50, p < .01$. Post-hoc LSD t-tests revealed significant differences in happiness between 4- and 12-year-olds, with 4-year-olds showing more happiness than 12-year-olds, Cohen’s $d = .60, p < .001$, and 8-year-olds showing more happiness than 12-year-olds, Cohen’s $d = .47, p < .01$. Despite producing no developmental differences, our analyses revealed that SES was positively related to the emotional facial expression of fear, $p$
Finally, mixed ANOVAs were conducted to test for contextual differences in emotional facial expressions. There were no significant effects.

4. Discussion

This study investigated the development of children’s self-reported emotions and emotional facial expressions following moral transgressions. In addition, we tested the role of transgression context in children’s anticipated and observed emotions. These questions were tested in an ethnically diverse sample of 4-, 8-, and 12-year-old children from Canada.

In line with our hypotheses, we found that self-reports of the basic emotion of sadness were lower for 12 year-olds as compared to 4- and 8-year-olds, while self-reported guilt held the opposite pattern (i.e., higher for 12-year-olds than for both 4- and 8-year-olds). This finding is in line with previous theorizing which suggests that basic emotions, such as sadness, often reflect precursors to complex moral emotions, such as guilt (Malti & Dys, 2013; Malti & Ongley, in press). This shift toward guilt is likely the result of a greater self-awareness that one has acted in a morally wrong way (see Izard, 1994), and an acceptance of responsibility for these actions, likely leading to a greater desire to make amends or punish the self (Ferguson & Stegge, 1998).

In addition, we replicated the happy-victimizer phenomenon (Nunner-Winkler & Sodian, 1988; Malti & Krettenauer, 2013) as 4-year-olds reported more happiness than 8- and 12-year-olds. Since our sample was ethnically diverse, this finding speaks to the robustness of the happy victimizer phenomenon across various cultures (e.g., Chaparro, Kim, Fernandez, & Malti, 2013; Keller et al., 2003; Malti & Keller, 2010).

Furthermore, we were also interested in the types of emotions children anticipated following moral transgressions. We found that sadness, happiness, guilt and anger were the most common self-reported categories in our study. In contrast, embarrassment, disgust and fear were
each reported infrequently. Interestingly, facial expressions of fear were commonly observed, while fear was not often self-reported. While this suggests that children do not typically feel longer-lasting fear, brief and spontaneous fear, for instance of sanctions, may trigger the consideration of a broader range of consequences for the self, thus leading to complex moral emotions, such as feelings of guilt or shame.

Interestingly, no developmental differences were found in self-reported anger. This suggests that the basic emotion of anger is a more stable emotional response from early childhood to early adolescence and may represent a temperamental individual difference. As such, it may be more closely related to other temperament characteristics, such as agreeableness (Krettenauer, Colasante, Buchmann, & Malti, in press).

Regarding our hypotheses on contextual differences in self-reported emotions, the findings revealed differences in self-reported guilt feelings, and this effect was qualified by an interaction with age. Guilt feelings were more commonly reported in harm contexts than in social exclusion or prosocial omission scenarios. We found a significant age by context interaction, suggesting that guilt feelings become more intense with age for the harm context. This latter finding is not surprising, as children may increasingly come to understand the negative consequences of harm on others, whereas for contexts of exclusion, they increasingly coordinate group norms, such as group identity, with moral considerations (Killen, 2007; Malti et al., 2012a). In addition, research has also shown that prosocial norms are perceived as somewhat more flexible than norms involving harm and fairness, with age (Malti & Ongley, in press).

As expected, our results on emotional facial expressions revealed that children most commonly responded to moral transgressions and social exclusion with spontaneous reactions of sadness. Happiness, anger and fear were also common responses with comparable frequency,
while disgust occurred very rarely. Interestingly, these findings mostly resonate with the findings on self-reported emotions as sadness, happiness and anger were the most commonly observed and reported emotions in response to these moral transgressions.

We also found developmental differences in the expression of two emotional facial expressions: sadness and happiness. Specifically, our findings indicated that 4-year-olds showed less sadness than 8- and 12-year-olds, suggesting that early- to mid-childhood is an important time for the development of spontaneously expressed sadness. In contrast, 4- and 8-year-olds showed more happiness than 12-year-olds, suggesting that the reduction in spontaneous happy-victimizing emotions does not occur until mid- to late-childhood. In light of our self-reported findings, this reflects an ongoing conflict between self-oriented desires and moral norms in middle childhood. These findings reflect what one may call a developmental “happy-victimizer lag” for spontaneous emotions. Given that spontaneous emotions are automatic emotional expressions that arise prior to controlled cognitive thought, and that self-reported emotions are far more cognitively infused, these findings suggest that cognitive judgment processes about moral dilemmas play a significant role in shifting from positive (i.e., immoral) to negative (i.e. moral) emotions, particularly in middle childhood. These findings support the idea of an integrated role between automatic and intentional, as well as affective and cognitive processes, in morality (Malti & Ongley, in press; Malti & Dys, 2013). Moreover, the findings demonstrated greater congruence between the spontaneous and self-reported emotions of 12-year-olds compared to 8-year-olds. One potential explanation for this pattern is that middle-childhood is a time in which children begin to coordinate the perspectives of others involved in moral transgressions (Malti & Keller, 2010). By cognitively processing these considerations, children’s thoughts begin to influence their emotions, and in so doing become increasingly tied to an inner
world of shared mental states with these others (Carpendale & Lewis, 2006; Lagattuta & Thompson, 2007). Thus, from middle-childhood to early-adolescence, as children have more extensively exercised this coordination process, these cognitively infused emotions may become internalized to the point that they are reflected in automatic, spontaneous emotional reactions. This idea is in line with Darwin’s principle of serviceable associated habits which asserts that repeated associations between a purposeful, voluntary act (e.g., reflecting upon the emotional consequences of one’s victim) and a state of mind (e.g., a feeling of sadness) lead to a habit which becomes a reflexive emotional expression (1872; Izard, 1971). Moreover, this idea is consistent with neuroscience research which has demonstrated that in response to moral transgressions activity in affective and cognitive regions of the brain are closely related, though this relationship changes with age (Decety, Michalska, & Kinzler, 2012).

Our hypotheses on contextual differences in emotional facial expressions were somewhat open-ended. On the one hand, we expected children’s emotional facial expressions to be similar to their self-reported reactions, but on the other hand, we expected these spontaneous emotional reactions to be less differentiated given the intricacies associated with evaluating the severity of the situation. Ultimately, the findings revealed no contextual differences in facial emotion expression. One possible explanation for this finding is that differentiating between contexts requires significant cognitive effort, and could not be processed automatically. This interpretation is consistent with theorizing in social psychology on attitudes and evaluations. For example, the Iterative Reprocessing model (Cunningham, Zelazo, Packer, & Bavel, 2007; Cunningham & Zelazo, 2007) posits that social evaluations follow an iterative process where initial, automatic evaluations provide quick and rough evaluations of social milieus. Meanwhile,
reflective processes, which interact with these automatic processes in several iterative stages, provide more nuanced and longer-lasting evaluations of social contexts.

Taken together, our findings on children’s self-reported emotions and emotional facial expressions shed light on the roles of automatic and controlled cognitive processes in the development of children’s emotions following moral transgressions. Nevertheless, this study came with several limitations. First, it employed a cross-sectional design, which does not permit it to track patterns of intra-individual development over time. Thus, a longitudinal study of children’s self-reported emotions and spontaneous emotional facial expressions to moral transgressions is warranted. In order to test the idea that distal, repeated, controlled cognitive thoughts can become internalized to the degree that they are reflected in spontaneous emotions, researchers may opt to integrate more methodologies into related future studies. For instance, developmental scientists may employ child and/or parent daily diaries about children’s emotional experiences in moral encounters, in conjunction with moral emotion attribution and reasoning tasks and spontaneous facial expression analyses. Finally, future studies may investigate how individual characteristics such as emotion regulation underlie the expression of children’s moral emotions. This could reveal valuable insight into the individual factors that underlie children’s emotions in morally relevant situations.

Despite these limitations, this study provides useful insight into the development of children’s self-reported emotions and emotional facial expressions following moral transgressions between early childhood and early adolescence.
References


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Appendices

Table 1

*Overall Means and Standard Deviations for Self-Reported Emotions*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Anger</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>Sadness</td>
<td>0.49</td>
<td>0.33</td>
</tr>
<tr>
<td>Fear</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Disgust</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>Shame</td>
<td>0.03</td>
<td>0.09</td>
</tr>
<tr>
<td>Guilt</td>
<td>0.07</td>
<td>0.16</td>
</tr>
</tbody>
</table>
Table 2

*Means and Standard Deviations for Self-Reported Emotions by Age*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>4-Year-Olds (n = 75)</th>
<th>8-Year-Olds (n = 94)</th>
<th>12-Year-Olds (n = 73)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Happiness</td>
<td>0.20</td>
<td>0.28</td>
<td>0.07</td>
</tr>
<tr>
<td>Anger</td>
<td>0.13</td>
<td>0.22</td>
<td>0.11</td>
</tr>
<tr>
<td>Sadness</td>
<td>0.58</td>
<td>0.33</td>
<td>0.54</td>
</tr>
<tr>
<td>Guilt</td>
<td>0.01</td>
<td>0.10</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Table 3

*Overall Means and Standard Deviations for Emotional Facial Expressions*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>Anger</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>Sadness</td>
<td>0.17</td>
<td>0.20</td>
</tr>
<tr>
<td>Fear</td>
<td>0.04</td>
<td>0.12</td>
</tr>
<tr>
<td>Disgust</td>
<td>0.01</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table 4

*Means and Standard Deviations for Emotional Facial Expressions by Age*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>4-Year-Olds (n = 75)</th>
<th>8-Year-Olds (n = 94)</th>
<th>12-Year-Olds (n = 73)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Happiness</td>
<td>0.05</td>
<td>0.07</td>
<td>0.05</td>
</tr>
<tr>
<td>Anger</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>Sadness</td>
<td>0.12</td>
<td>0.13</td>
<td>0.19</td>
</tr>
<tr>
<td>Fear</td>
<td>0.02</td>
<td>0.06</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Figure 1. Interaction of age group and context in self-reported guilt feelings.