ijbd

International Journal of
Behavioral Development
37(3) 192–201

DOI: 10.1177/0165025412472409
ijbd.sagepub.com
SAGE

Moral emotion attributions and personality traits as long-term predictors of antisocial conduct in early adulthood: Findings from a 20-year longitudinal study

Tobias Krettenauer,[1] Jens B. Asendorpf,[2] and Gertrud Nunner-Winkler[3]

Abstract

The study investigated long-term relations between moral emotion attributions in childhood and adolescence and antisocial conduct in early adulthood while taking into account potentially confounding personality factors. Specifically, onset of prediction, unique and indirect effects of moral emotion attributions were examined. In a longitudinal study of 143 children (67 females), measures of moral emotion attributions, conscientiousness and agreeableness were obtained at the ages of 4–7, 11–12, 18 and 23 years. Antisocial conduct was assessed at the age of 23 years. Moral emotion attributions predicted antisocial behavior not before late adolescence. This effect was independent of conscientiousness and agreeableness. Moreover, moral emotion attributions indirectly contributed to the prediction of antisocial conduct by predicting change in conscientiousness. Overall, findings suggest that the emotions adolescents anticipate in the context of (im)moral actions contribute to development of antisocial conduct independently of personality traits.

Keywords

antisocial behavior, longitudinal study, moral development, moral emotions, moral personality

Research has demonstrated repeatedly that the emotions children and adolescents attribute to a hypothetical moral wrongdoer (or to themselves when taking the perspective of the wrongdoer) are associated with actual (im)moral behavior in experimental as well as natural settings (cf. Asendorpf & Nunner-Winkler, 1992; Lake, Lane, & Harris, 1995; Malti, Gasser, & Buchmann, 2009). A recent meta-analysis that summarized 42 studies with more than 8000 participants (aged 4 to 20 years) reported a significant relationship between children's and adolescents' emotion attributions and antisocial as well as prosocial behavior (Malti & Krettenauer, 2012). This association was moderated by the type of behavior (antisocial versus prosocial) and the target of emotion attributions (self versus hypothetical wrongdoer). It was strongest for antisocial behavior and emotions attributed to the self with an effect size of $d = .49$. Thus, the emotions children and adolescents anticipate for themselves in the context of moral transgressions clearly have implications for their behavioral conduct (see also Krettenauer, Jia, & Mosleh, 2011). Strikingly, in this meta-analysis the association between moral emotion attributions and behavior was not moderated by the age of the participants. Thus, the relationship between self-attributed moral emotions and antisocial behavior was not limited to a specific developmental period. As noted by Malti and Krettenauer (2012), this finding suggests that moral emotion attributions reflect important inter-individual differences in morally relevant behavioral dispositions across a broad age range, rather than a developmental delay that is overcome in the course of development. However, this conclusion could be drawn only tentatively as most of the studies in this meta-analysis were cross-sectional and did not investigate whether moral emotion attributions predict antisocial behavior over extended periods of time.

The present study investigated long-term relations between moral emotion attributions in childhood and adolescence and antisocial conduct in early adulthood while taking into account potentially confounding personality factors as well as long-term stabilities in aggressive/antisocial behavior. By investigating longitudinal relationships, the study aimed at clarifying the link between moral emotion attributions and antisocial conduct that has been documented many times (e.g., Arsenio, Adams, & Gold, 2009; Arsenio, Gold, & Adams, 2004; Cimbora & McIntosh, 2003; Johnston & Krettenauer, 2011; Krettenauer & Eichler, 2006; Malti, Gasser, & Buchmann, 2009).

Antisocial behavior is known to mark a highly stable behavioral disposition (cf. Huesmann, Eron, & Lefkowitz, 1984) that is related to low agreeableness and low conscientiousness. Individuals who are less generous, less kind and sympathetic, less trusting as well as less organized, self-disciplined and reliable tend to be more often

[1] Wilfrid Laurier University, Canada
[2] Humboldt University Berlin, Germany
[3] Pullach, Germany

Corresponding author:
Dr. Tobias Krettenauer, Department of Psychology, Wilfrid Laurier University, 75 University Ave W, Waterloo, Ontario, N2L 3C5, Canada.
Email: tkrettenauer@wlu.ca

engaged in antisocial behavior (Decuyper, de Pauh, de Fruy, de Bolle, & de Clercq, 2009; Lynam et al., 2005; Miller & Lynam, 2001; Miller, Lynam, & Leukefeld, 2003). These relations between personality traits and antisocial conduct hold over impressively long periods of time (Asendorpf, Denissen, & van Aken, 2008; Caspi, 2000; Caspi, Elder, & Bem, 1987; Shiner, Masten, & Roberts, 2003). The perhaps best-known empirical example for such long-term relations comes from the New Zealand Dunedin study, a large epidemiological study of an entire birth cohort of children who were followed up from the age of 3 to 26 years. Caspi (2000) reported consistent associations between personality type at age 3 and criminal behavior at age 21. Children who were classified as undercontrolled at age 3 reported significantly higher involvement in a variety of criminal behaviors at age 21 and perceived less social deterrents for committing crimes. The same undercontrolled children scored lower on agreeableness and conscientiousness as adults (Caspi et al., 2003). In a similar vein, Shiner et al. (2003) reported significant correlations between academic conscientiousness and agreeableness at the age of 10 years and rule abiding conduct at the age of 30 years. Thus, the predictive relationship between conscientiousness and agreeableness in childhood and adolescence, on the one hand, and antisocial conduct in early adulthood, on the other, is well established.

If moral emotion attributions reflect morally relevant behavioral dispositions, as suggested by Malti and Krettenauer (2012), their predictive effect might be confounded with effects of personality traits. In the most extreme case, all variance in antisocial conduct would be attributable to personality traits so that considering moral emotion attributions as a predictor of antisocial conduct would be redundant. A less extreme outcome is defined by partially independent contributions of personality traits and moral emotion attributions as predictors of antisocial conduct. In this case, traits and moral emotion attributions would account for different portions of the variance in antisocial behavior, but would not necessarily reciprocally influence each other over time. If personality traits and moral emotion attributions influence each other over time, moral emotion attributions would contribute indirectly to antisocial conduct in early adulthood.

Moral emotion attributions in childhood and adolescence as predictor of antisocial conduct in early adulthood: Onset of prediction, unique and indirect effects

The present study aimed at investigating long-term relationships between moral emotion attributions and antisocial conduct while taking into account effects of personality traits and long-term stabilities of aggressive/antisocial behavior. Personality traits were represented by the Five-Factor-Model, specifically those traits that have been consistently shown to be associated with antisocial behavior, namely, agreeableness, and conscientiousness. In the study, antisocial conduct was assessed at the age of 23 years, that is, at a point in time when it likely reflects a life-course persistent tendency rather than transitory adjustment problems (Moffit, 1993). In contrast, moral emotion attributions and personality traits were assessed longitudinally at the ages of 4–7, 11–12, 18 and 23 years. Children's aggressive behavior was assessed at the age of 4–6 years, as a proxy for early antisocial conduct. The relationship between moral emotion attributions in childhood and adolescence and antisocial behavior in early adulthood was approached from three different but interrelated perspectives. First, it was examined at what age moral emotion attributions start to predict antisocial behavior as a developmental outcome in early adulthood. Second, it was tested whether the predictive effect of moral emotion attributions at various points in time depends on the effect of personality traits. Third, it was investigated whether moral emotion attributions and personality traits exert indirect effects on antisocial conduct by interacting reciprocally in the course of development. In the following, these three analytical perspectives are further elaborated and specific hypotheses are formulated. Note that in all these analyses, aggressive behavior in childhood was controlled to account for the fact that antisocial behavior by itself tends to be rather stable.

Onset of prediction. As described above, personality traits predict antisocial conduct of young adults quite early in development (Caspi, 2000). This early onset reflects the fact that personality traits by themselves mark stable dimensions of individual differences. For agreeableness and conscientiousness, rank-order stabilities are substantial in childhood and slightly increase from adolescence to adulthood (Roberts & DelVecchio, 2000). For moral emotion attributions few longitudinal studies exist. Nunner-Winkler (2009) reported a systematic increase in rank-order stability between the ages of 5 to 23 years. However, even in late adolescence, stability over a 5-year interval was moderate with $r = .36$, $p < .01$. In an 18-month longitudinal study of 15- to 18-year-olds, Krettenauer (2005) found a rank-order stability of self-attributed moral emotions of $r = .61$, $p < .01$.

Moral emotion attributions can be assumed to be less stable in childhood and early adolescence than personality traits. Consequently, it is expected that moral emotion attributions start to predict antisocial conduct in early adulthood later than personality traits and that this predictive relationship is not present before the age period of adolescence.

Unique effect. In theory, it is possible that moral emotion attributions and personality traits are largely redundant as predictors of antisocial conduct in early adulthood. However, as personality traits and moral emotion attributions typically account only for a portion of the variance in antisocial conduct, such an outcome is unlikely. Asendorpf and Nunner-Winkler (1992) demonstrated that personality traits and moral emotion attributions contribute independently to children's immoral behavior. Therefore, redundancy of moral emotion attributions as predictors of antisocial conduct was not assumed. Moral emotion attributions were expected to contribute independently to the prediction of antisocial conduct in early adulthood even when personality traits that are well known to be associated with antisocial behavior are statistically controlled.

Indirect effects. Even if moral emotion attributions do not contribute independently to antisocial behavior, this would not imply their irrelevance, as they might exert an indirect effect by influencing personality traits in the course of development. In other words, moral emotion attributions and personality traits might reciprocally interact over time. Reciprocal interaction can be assumed to be valid in many areas of personality development (cf. Caspi, 1998). Furthermore, there is empirical evidence that effortful control as a temperamental dimension akin to the personality traits of conscientiousness and agreeableness (Graziano, 1994; Jensen-Campell et al., 2002) promotes conscience development in childhood (for overviews see Kochanska & Aksan, 2006; Thompson,

Meyer, & McGinley, 2006). Yet, it has not been investigated whether this effect extends into adolescence and early adulthood.

Reciprocal interactions between personality traits and moral emotion attributions are not necessarily constant over time and likely depend on the rank-order stability of the involved constructs. In general, highly stable attributes are best predicted by autoregressive functions. They leave little room for time-lagged effects of other constructs. At the same time, stable attributes more likely exert cross-lagged influences because individual differences in these variables persist over a longer period of time and therefore have a higher chance to affect individual differences than less stable variables (cf. Davis, 1985; Lorenz, Conger, Simons, & Whitbeck, 1995).

As personality traits can be assumed to be more stable in childhood and early adolescence than moral emotion attributions, it is likely that personality traits exert stronger cross-lagged effects on the development of moral emotion attributions in this age period than the other way round. Later, when moral emotion attributions stabilize as a dimension of individual differences, their influence on personality traits might increase. As a consequence, in late adolescence cross-lagged effects of moral emotion attributions on personality traits might emerge.

Method

Participants

Participants were part of the Munich Longitudinal Study on the Genesis of Individual Competencies (LOGIC). The LOGIC sample originally consisted of 232 children born in 1980–1981 who were studied every year, from their first or second year in preschool until age 12, with low and unsystematic attrition, and later at ages 18 and 23 (see Schneider & Bullock, 2009; Weinert & Schneider, 1999). The sample was fairly unbiased because the schools were selected from a broad spectrum of neighborhoods, and more than 90% of the parents who were asked for permission gave their consent for their child's participation. The longitudinal sample in the present study consisted of the 143 participants for whom data on antisocial behavior were available at age 23 (for an investigation of selective attrition see Results section). It included 76 male and 67 female participants. Social status of parents' homes was diverse as indicated by the Occupational Prestige Index developed by Wegener (1988), with a maximum range of scores from 20 (e.g., unskilled worker) to 187 (e.g., surgeon) in the present sample, $M = 80.9$, $SD = 29.25$.

Assessments and measures

The present study refers to the following assessments: at ages 4–6 years, teacher Q-sorts assessing agreeableness, conscientiousness and aggressiveness, and IQ tests; at ages 12, 18 and 23 years parental scales assessing agreeableness and conscientiousness, and IQ tests; at ages 5–7, 11, 18, and 23 years, interviews on moral emotion attributions and moral motivation; at age 23, retrospective questions about antisocial behavior.

Teacher Q-sort measures of agreeableness and conscientiousness. The 54-item short version of the California Child Q-Set (CCQ; Block & Block, 1980) was adapted to German (Göttert & Asendorpf, 1989). All LOGIC participants attended a preschool or kindergarten from ages 5–6, the majority from ages 4–6. At the end of each school year, the child's main teacher provided a Q-sort description of the child according to a fixed, 9-point distribution, ranging from "extremely uncharacteristic" to "extremely characteristic." The teacher (mostly the same person across the 3 school years) was instructed to sort exactly 6 items into each of the 9 categories of increasing saliency for the child (forced equal distribution). To increase reliability of the judgments, the three Q-sorts at ages 4–6 were averaged item-wise, allowing for one missing score for each child (for details see Asendorpf & van Aken, 2003).

Asendorpf and van Aken (2003) developed brief scales each consisting of 4–6 CCQ items that assessed the Big Five dimensions of personality based on the German 54-item CCQ; 17 of the 24 items overlapped with items of the full 100-item CCQ that John, Caspi, Robins, Moffitt, and Stouthamer-Loeber (1994) used for similar Big Five scales. In the current study, the scales for agreeableness (Cronbach's $\alpha = .88$), and conscientiousness ($\alpha = .89$) were used.

Parental scales for agreeableness and conscientiousness. At age 12, the child's main caregiver (nearly always the mother) judged the child on 60 age-appropriate bipolar adjective pairs that were derived from the highest-loading items on the first 5 factors of a pool of 179 bipolar adjective pairs by Ostendorf (1990) in a multi-step procedure. Five 8-item Big Five scales were derived from these 60 items on the basis of a factor analysis (for details see Asendorpf & van Aken, 1999). The items were answered on a 5-point response scale. At age 18, the same scales were answered by both mother and father, and the two parental Big Five scores were averaged. At age 23, the German version of the NEO-Five Factor Inventory, by Borkenau and Ostendorf (1993), was answered by both parents (using a 5-point response scale), and their Big Five scores were averaged. Because some parents did not cooperate in the ratings, only approximately 80% of the participants were judged by a parent at each age. In the current study the scales for agreeableness ($\alpha > .73$ across the three ages and the two parents) and conscientiousness ($\alpha > .90$) were used.

Moral emotion attributions. At ages 5, 7 and 11, children were presented four moral conflicts in which a same-sex protagonist was tempted to transgress a moral rule in order to satisfy a personal desire (Nunner-Winkler, 1999). The stories were written in age-appropriate form but structurally identical across measurement points. They always involved two negative and two positive obligations (e.g., not to steal, to share). For each story, children's moral knowledge of the rules in question was assured. Subsequently, children were told that the protagonist gave in to the temptation (e.g., stole, did not share). Children then were asked how the protagonist feels in the given scenario and to justify their emotion attributions. Moral emotion attributions were assessed on a 4-point scale by summing up the number of morally appropriate moral emotion attributions across stories (that is, when the protagonist felt bad for the rule transgression and justified this emotion on moral terms). To keep the childhood measures of personality traits and moral emotion attributions symmetrical, the two first assessments of moral emotion attributions at the ages of 5 and 7 years were combined to one score.

At ages 18 and 23, moral emotion attributions were assessed by a rating procedure based on participants' hypothetical action decisions and their emotional reactions in the role of an agent (Nunner-Winkler, 2009). Participants were given three scenarios, in which personal desires conflicted with moral norms (Story 1: selling one's

bike to a second customer who is willing to pay the full price, even though one had promised to wait for the first customer with whom one had agreed on a reduced price; Story 2: accepting one's superior's praise for an invention a colleague had devised; Story 3: not returning a wallet lost by a poor-looking old woman) and one moral dilemma, in which two moral norms were in conflict (Story 4: backing one's friend for a morally-wrong action an innocent bystander is being blamed for). Participants were asked (a) to specify what they themselves (or a same sex protagonist in Story 4) would do in the situation; (b) to justify their choice; (c) to ascribe an emotion that they (or the protagonist in Story 4) would feel as an agent; and (d) to justify the attribution of these emotions.

Two independent, trained coders rated moral emotion attributions on a 5-point scale (for details, see Nunner-Winkler, Meyer-Nikele, Wohlrab, 2007). The ratings considered (a) participants' justifications of action decisions and emotion ascription (reflecting moral or pragmatic concerns); (b) asymmetries in emotion attributions to agent and victim (e.g., delight in the profit gained by an immoral action decision and indignation at unfair treatment in the role of the victim); (c) qualifications to their moral emotion attributions (e.g., "I would feel somewhat bad, I guess").

Both coders first made story-specific ratings (intercoder agreement $r = .80$, disagreements were resolved by discussion). In a second step, story-specific ratings were integrated into one overall score. The higher ratings (5 and 4) on the moral emotion attributions scale were given if participants across Stories 1–3 chose a moral action decision and justified it exclusively (5) or almost exclusively (4) on moral terms and for moral concerns expected to feel very bad (5) or bad (4) after having violated the moral obligation in Story 4. The lower ratings (1 and 2) were given if participants justified their action decisions and emotion attributions almost exclusively (2) or exclusively (1) on pragmatic terms, that is, by a desire to avoid negative consequences to self or to secure personal benefits. The middle value (3) was assigned (a) for an argumentation in which moral and pragmatic concerns were evenly balanced; (b) if the moral action was chosen in most stories, yet in a hesitating manner, often backing the choice by pragmatic interests and/or mitigating negative emotion attributions for wrongdoing; or (c) if the participant scored high on moral motivation in one or two of the stories, yet showed disregard for moral concerns in others.

Antisocial conduct. Antisocial behavior was assessed at age 23 within an interview in terms of the self-reported frequency of minor delinquent acts over the past year (fare-dodging when using public transportation, drinking and driving, bullying, lying, promise-breaking, stealing something worth less than €10, stealing something worth more than €10). The 7 items were standardized and averaged.

In addition, the participants were asked, if any, how many criminal charges they had received between ages 18 (when they legally became adults) and the day of the interview at age 23; these frequencies were then transformed to frequencies within exactly 5 years, and log+1-transformed due to their highly skewed distribution (see also Asendorpf et al., 2008). Because these two measures correlated .28 ($p < .001$), they were used as indicators for a broad-band index labeled "antisocial conduct." This index represents antisocial behavior from minor acts of delinquency and antisocial behavior to more severe forms of criminal activity such as drug trafficking and physical assault.

Aggressive behavior. Children's aggressive behavior was assessed by the same Q-sort procedure as described for conscientiousness and agreeableness using eight items that described aggressive and disruptive behavior in the school setting. Items included statements such as: "is aggressive," "teases other children," "attempts to transfer blame to others," "pushes and tries to stretch limits" (for details, see Asendorpf et al., 2008). Scores were averaged item-wise for assessments at the age of 4–6 years and combined to a single scale. The scale showed satisfactory internal consistency ($\alpha = .78$). It was used to control for the long-term stability of antisocial/aggressive behavior in all analyses.

IQ tests. A second control variable used in the present study is intelligence as IQ was shown to be related to both conscientiousness and antisocial conduct (Asendorpf & van Aken, 2003).Verbal intelligence was assessed with subscales of the German versions of the Wechsler scales for preschool children (ages 4 and 5 years: HAWIVA; Eggert, 1978) and adults (age 23: HAWIE; Tewes, 1991). Nonverbal intelligence was assessed with the Columbia Mental Maturity Scale (Burgemeister, Blum, & Lorge, 1972) at ages 4 and 6, and with the German version of the Culture Fair Intelligence Test (CFT-20; Weiss, 1987) at the age of 23. Total IQ scores ($M = 100$, $SD = 15$) averaging across the verbal and nonverbal IQ scores were computed for ages 4–6 and 23 years. The reliabilities of these IQ variables were high (α's > .82).

Results

Selective Attrition

Selective attrition was checked for the sample of 232 children who had valid data entries at some point in time over the 20-year longitudinal study. Of these participants, 143 had reported antisocial behavior at the age of 23 years. The 89 dropouts for whom data on antisocial conduct in early adulthood were missing were compared against the longitudinal sample for all measures involved in the main analyses, that is, agreeableness, conscientiousness and moral emotion attributions as well as aggressiveness at the ages of 4–6 years, and IQ at the ages of 4–6 and 23 years.

Dropouts had significantly higher scores on aggressiveness at the age of 4–6 years, $t(204) = 2.45$, $p = .011$, $d = .38$, as well as lower scores of conscientiousness at the ages of 4–6 years, $t(149) = -2.12$, $p = .035$, $d = -.37$, and 18 years, $t(147) = -2.12$, $p = .036$, $d = -.43$. Moreover, a lower score for moral emotion attributions at the first two time points of data collection (5–7 years) was found, $t(214) = -2.63$, $p < .01$, $d = .37$. No differences between the two groups were obtained for agreeableness and intelligence. Overall, effects of selective attrition were small to moderate in magnitude and concerned less socially desirable individual characteristics.

Main analyses

As described above, the present study approached long-term relations between moral emotion attributions and antisocial conduct from three different but interrelated perspectives by examining onset of prediction, unique and indirect effects. These three issues were addressed in three separate analyses.

First, antisocial conduct in early adulthood was regressed on moral emotion attributions at the four different measurement points. In this analysis, moral emotion attributions at the ages of 5–7 years were entered first followed by moral emotion attribution measures at the ages of 11, 18 and 23 years, respectively. This

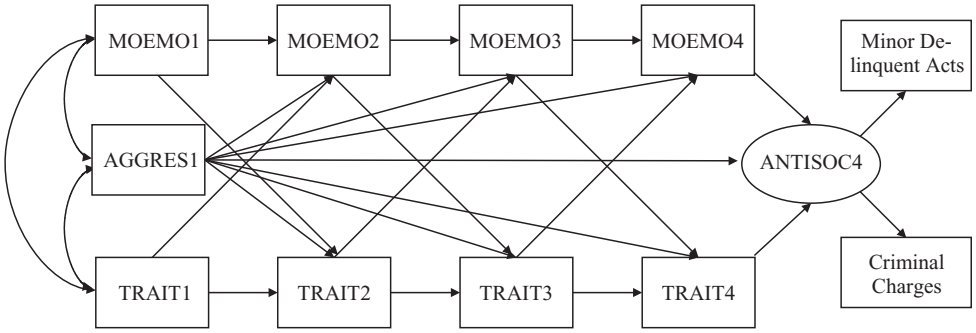

Figure 1. Generic model for testing reciprocal interactions between personality traits (TRAIT) and moral emotion attributions (MOEMO) as predictors for antisocial conduct in early adulthood (ANTISOC), while controlling for long-term effects of aggressiveness in childhood (AGGRES). Numbers denote time point of data collection (1 = 4–7 years, 2 = 11–12 years, 3 = 18 years, 4 = 23 years).

Table 1. Regression of antisocial conduct in early adulthood on moral emotion attributions in childhood and adolescence.

	Step 1		Step 2		Step 3		Step 4	
Predictors/controls	β	*t*	β	*t*	β	*t*	β	*t*
Aggressive behavior (4–6 years)	.24	2.88**	.24	2.76**	.18	2.37*	.13	1.74
Moral emotion attributions (5–7 years)	.00	−0.09	.01	0.11	.01	0.23	.00	0.11
Moral emotion attributions (11 years)			−.01	−0.16	.01	0.59	.04	0.49
Moral emotion attributions (18 years)					−.43	−5.69**	−.29	−3.49**
Moral emotion attributions (23 years)							−.27	−3.17**
ΔR^2	.06*		.00		.18**		.05**	

Note. $N = 143$; *$p < .05$; **$p < .01$.

procedure allowed to investigate at what time in the course of development moral emotion attributions become a significant predictor of young adults' antisocial conduct. Note that this analysis included children's aggressive behavior at the age of 4–6 years to control for long-term stability of antisocial behavior.

Secondly, antisocial conduct was simoultaneously regressed on agreeableness, conscientiousness, and moral emotion attributions at the four different measurement points. This analysis investigated whether moral emotion attributions predict antisocial conduct independently of personality traits. Again, this analysis included aggressiveness at the age of 4–6 years as a control variable. In addition, IQ was entered as a control variable in this analysis.

In the final step, indirect effects of moral emotion attributions were investigated using SEM techniques. Two models were compared. First, it was tested whether personality traits and moral emotion attributions from the age of 4 to 23 years contribute to antisocial conduct at the age of 23 years without assuming cross-lagged influences (independent contribution model; Model 1). In the second step, cross-lagged influences of personality traits on moral emotion attributions, and vice versa, were included (reciprocal interaction model, Model 2). The critical test concerned the difference between the two models: The less parsimonious model, which allows for cross-lagged effect and reciprocal interactions, was accepted only if it yielded a significant improvement in the overall model fit (for a similar analytic procedure see Masten et al., 2005). If such an improvement was not present, indirect effects were considered empirically unwarranted. For all models involving cross-lagged effects, it was tested whether personality traits contribute to the development of moral emotion attributions throughout childhood and adolescence, and vice versa. Note, that all models included children's aggressive behavior at the age of 4–6 years to control for the long-term effects of aggressiveness in childhood on the development of antisocial conduct, personality traits and moral emotion attributions (for the generic reciprocal interaction model as tested in the empirical analyses see Figure 1).

For the regression analyses, scores of minor delinquent acts and criminal charges were averaged, whereas for the SEM models antisocial conduct was considered a latent construct represented by these two manifest variables. All SEM analyses for this study were carried out with AMOS Version 20 (Arbuckle, 2011) using maximum-likelihood estimation. Relative fit was evaluated by the χ^2 difference for nested models as well as the ΔCFI > .01 cut-off criterion proposed by Cheung and Rensvold (2002). Because of the relatively small sample size it was important to keep the number of parameter estimates low. Separate SEM models were therefore run for agreeableness and conscientiousness.

Onset of prediction. Findings from the hierarchical regression of antisocial conduct in early adulthood on moral emotion attributions at the ages of 5–7, 11, 18 and 23 years are summarized in Table 1. Aggressive behavior at the age of 4–6 years was a significant predictor of antisocial conduct in early adulthood at 23 years of age whereas moral emotion attributions were not. Moral emotion attributions at 11 years of age did not yield a significant increase in the R^2, $\Delta F(1, 140) = 0.58$, $p = .45$. However, including moral emotion attributions at the age of 18 years improved the prediction significantly, $\Delta F(1, 139) = 35.14$, $p < .01$. The same was true for moral emotion attributions at the age of 23 years, $\Delta F(1, 138) = 35.14$, $p < .01$. Together, moral emotion attributions at the various ages significantly contributed to the prediction of antisocial

Table 2. Regression of antisocial conduct in early adulthood on personality traits and moral emotion attributions in childhood and adolescence.

	Model A		Model B	
Predictors/controls	β	*t*	β	*t*
Conscientiousness (4–6 years)	−.09	−1.13	−.18	−1.66
Conscientiousness (12 years)	.02	0.21	.02	0.18
Conscientiousness (18 years)	−.22	−2.21*	−.26	−2.57*
Conscientiousness (23 years)	−.05	−0.52	−.02	−0.24
Agreeableness (4–6 years)	−.02	−0.22	−.02	−0.23
Agreeableness (12 years)	−.09	−1.03	−.09	−1.02
Agreeableness (18 years)	−.03	−0.39	−.05	−0.52
Agreeableness (23 years)	.08	0.86	.09	1.05
Moral emotion attributions (5–7 years)	.01	0.04	−.03	−0.39
Moral emotion attributions (11 years)	.05	0.15	.04	0.53
Moral emotion attributions (18 years)	−.25	−2.89**	−.25	−2.90**
Moral emotion attributions (23 years)	−.27	−3.19**	−.29	−3.19**
Aggressive behavior (4–6 years)			−.06	−0.50
IQ (4–5 years)			−.01	−0.11
IQ (23 years)			.16	−1.88
R^2	.36		.38	

Note. $N = 143$; *$p < .05$; **$p < .01$.

conduct, $R^2 = .27$, $F(4, 138) = 12.92$, $p < .01$. Thus, moral emotions predicted antisocial conduct in early adulthood even when controlling for aggressive behavior in childhood. However, they did so not before the age of 18 years.

Unique effect. When predicting antisocial conduct in early adulthood simultaneously by agreeableness, conscientiousness and moral emotion attributions at the four measurement points, a significant overall effect was obtained, $R^2 = .36$, $F(12, 130) = 5.98$, $p < .01$. It turned that out conscientiousness at the age of 18 years and moral emotion attributions at the age of 18 and 23 years contributed independently to the prediction of antisocial conduct. Note, that including aggressiveness at the age of 4–6 years as well as intelligence at the first and last measurement points did not alter these findings. Although IQ at the age of 23 was found to be a marginally significant predictor of antisocial conduct, $p = .062$, the independent effects of conscientiousness at 18 years and moral emotion attributions at the ages of 18 and 23 years remained significant (see Table 2).

Indirect effects. The independent contribution model (Model 1) for agreeableness and moral emotion attributions as predictors of antisocial conduct while controlling for aggressive behavior in childhood yielded a good overall fit with $\chi^2 = 45.05$, $df = 35$, $p = .119$, CFI = 0.965 and RMSEA = .045. Still, by including reciprocal interactions between agreeableness and moral emotion attributions (Model 2) this model fit was improved, $\chi^2 = 33.46$, $df = 29$, $p = .26$, CFI = 0.985 and RMSEA = .033. The difference between Model 1 and Model 2 turned out to be significant, $\Delta\chi^2 = 11.54$, $\Delta df = 4$, $p = .02$ and ΔCFI > .01. Because Model 2 (reciprocal interaction) fitted the data better than Model 1 (independent contribution), Model 1 was discarded.

Figure 2a displays the standardized path coefficients for Model 2 (insignificant paths, $p > .10$, were omitted, marginally significant paths, $p < .10$ were dashed). As expected, agreeableness evidenced higher stability in childhood and adolescence than moral emotion attributions. Agreeableness did not evidence any significant cross-lagged effects. By contrast, moral emotion attributions in adolescence (18 years) contributed to agreeableness at the age of 23 years. Moral emotion attributions significantly predicted antisocial conduct at the age of 23 years, whereas the effect of agreeableness on antisocial conduct was not significant once aggressive behavior in childhood was controlled. Aggressive behavior at the age of 4–6 years significantly predicted moral emotion attributions in early adulthood.

For conscientiousness and moral emotion attributions, Model 1 (independent contributions) did not fit the data well, $\chi^2 = 51.69$, $df = 35$, $p = .034$, CFI = 0.953 and RMSEA = .058, whereas Model 2 evidenced an acceptable fit, with $\chi^2 = 41.62$, $df = 29$, $p = .061$, CFI = 0.964 and RMSEA = .055. Again, testing the difference between the two models (independent contribution versus reciprocal interaction) evidenced a significant improvement for Model 2, $\Delta\chi^2 = 10.07$, $\Delta df = 4$, $p = .04$ and ΔCFI > .01. Based on these results, Model 2 was chosen.

Figure 2b shows the standardized path coefficients for Model 2 involving conscientiousness, moral emotion attributions, aggressive behavior at the age of 4–6 years and antisocial conduct at the age of 23 years. Conscientiousness evidenced a much higher longitudinal stability than moral emotion attributions that turned out to be even higher than the stability of agreeableness. Conscientiousness in early adolescence (12 years) contributed significantly to moral emotion attributions in late adolescence (18 years). At the same time, a significant cross-lagged effect of moral emotion attributions at 18 years on conscientiousness at age 23 was found. Conscientiousness and moral emotion attributions both substantially predicted antisocial conduct at the age of 23 years, yielding an R^2 of .81. Similar to the findings reported for agreeableness, aggressive behavior in childhood predicted moral emotion attributions in early adulthood.

Discussion

The present study aimed at clarifying the nature of the link that connects moral emotion attributions with antisocial conduct. As demonstrated by Malti and Krettenauer (2012), the emotions children, adolescents and young adults attribute to a moral wrongdoer (or to themselves when taking the perspective of the wrongdoer) are consistently related to antisocial behavior across various developmental ages. This finding suggests that moral emotion attributions contribute to moral behavior as behavioral dispositions rather than as age-specific developmental delays. It raises the question at what point in time moral emotion attributions become predictive of antisocial conduct as a developmental outcome and to what extent this predictive effect depends on personality factors that are well known be associated with antisocial behavior. The present study addressed both of these questions by investigating long-term relations between moral emotion attributions in childhood and adolescence and antisocial conduct in early adulthood.

When controlling children's aggressive behavior at the age of 4–6 years, it was found that moral emotion attributions in childhood and early adolescence were not predictive of antisocial behavior in early adulthood. This predictive relationship did not emerge before late adolescence (18 years). The finding is in stark contrast with

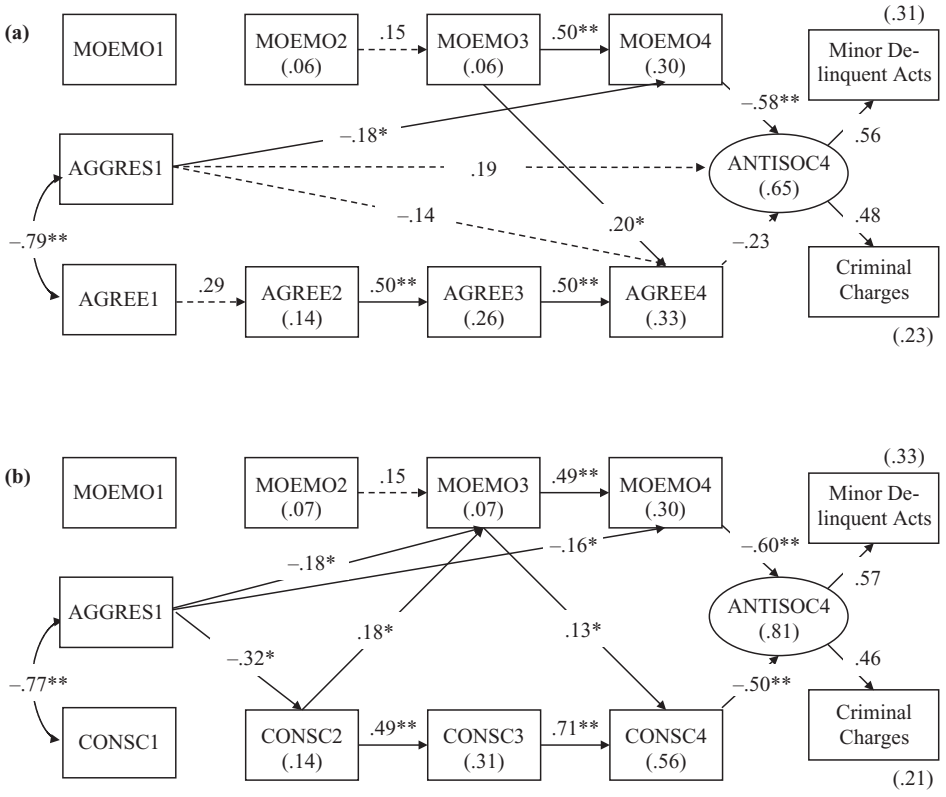

Figure 2. Standardized path coefficients of SEM models involving moral emotion attributions (MOEMO), and (a) agreeableness (AGREE) and (b) conscientiousness (CONSC) as predictors of antisocial conduct (ANTISOC) while controlling for long-term effects of aggressiveness in childhood (AGGRES). Paths with $p > .10$ were omitted, marginally significant paths, $p < .10$, are dashed. R^2 values are in parentheses. Numbers denote time point of data collection (1 = 4–7 years, 2 = 11–12 years, 3 = 18 years, 4 = 23 years). * $p < .05$; ** $p < .01$. For fit indices consult main text.

research reporting long-term relationships between personality traits in childhood and antisocial conduct in adulthood (Asendorpf et al., 2008; Caspi, 2000; Caspi et al., 1987; Shiner et al., 2003). The late onset in the predictive effect of moral emotion attributions likely is due to a much lower positional stability of moral emotion attributions in childhood and early adolescence as compared to personality traits. Obviously, moral emotion attributions do not tap into the very same personality characteristics that are represented by measures of conscientiousness and agreeableness.

In line with this conclusion, a substantial unique effect of moral emotion attributions as predictor of antisocial conduct was found that was independent of the effect of conscientiousness and agreeableness and independent of the effect of aggressiveness in childhood. This finding confirms previous research on the relationship between children's and adolescents' moral emotion attributions and antisocial behavior (e.g., Arsenio et al., 2004, 2009; Cimbora & McIntosh, 2003; Johnston & Krettenauer, 2011; Krettenauer & Eichler, 2006; Malti et al., 2009). It goes beyond this research by showing that the predictive effect of moral emotion attributions on antisocial conduct does not depend on personality traits. At the same time, the present study shows that the effect of personality traits on antisocial behavior is not attributable to moral emotions. Individuals scoring high on conscientiousness and agreeableness are generally less prone to engage in risk behavior (e.g., Trobst, Herbst, Masters, & Costa, 2002). This tendency might include antisocial behavior as a particular type of risk taking and, thus, explain why personality traits account for antisocial conduct independently of any moral concerns.

The independent contribution of moral emotion attributions and personality traits to the prediction of antisocial conduct does not imply that moral emotion attributions and personality factors demarcate separate developmental domains. It was found that conscientiousness in early adolescence (12 years) contributed to the development of moral emotion attributions in late adolescence (18 years). Moral emotion attributions, in turn, predicted change in conscientiousness between the age of 18 and 23 years. For agreeableness, reciprocal interaction was less salient as the more parsimonious independent contribution model already yielded an acceptable model fit. Agreeableness did not evidence any cross-lagged effects on the development of moral emotion attributions, and did not evidence unique effects on antisocial behavior. Thus, indirect effects of moral emotion attributions on antisocial conduct can be assumed for conscientiousness but not for agreeableness.

An important lingering question of these analyses that warrants further research relates to the longitudinal (that is, positional) stability of moral emotion attributions that was found to be very low between the ages of 4–7 and 11 years, and moderate between the ages of 18 and 23 years. The low longitudinal stability of moral emotion attributions in childhood may account for the late onset in prediction and also for the fact that cross-lagged effects of moral emotion attributions on personality traits did not occur before the age of 18 years. Note, that the low longitudinal stabilities are not simply due to changes in the assessment procedure. In the present

study, changes in the assessment of moral emotion attributions occurred between the ages of 11 and 18 years. This change might have reduced longitudinal stability between 11 and 18 years but leaves the stability estimates between 4–7 and 11 years as well as 18 and 23 years unaffected. The finding that moral emotion attributions evidence very low stability in the childhood years might be due to children's cognitive development (e.g., emotion understanding, theory of mind). As children grow older, the influence of cognitive development on moral emotion attributions might decrease. Moreover, Krettenauer, Campbell and Hertz (in press) demonstrated that the relationship between moral emotion attributions and children's moral self concept systematically changes in the childhood years. In younger ages (4–6 years), moral emotion attributions are unrelated to children's moral self-concept, whereas in late childhood (11–12 years) a substantial correlation between moral emotion attributions and children's moral self view was found. In middle to late adolescence, moral emotions attributions where shown to be substantively correlated with individuals' moral identity (Krettenauer, 2011; Johnston & Krettenauer, 2011). Thus, the increase in longitudinal stability of moral emotion attributions as documented in this study might be due to processes of identity formation that are generally assumed to have a stabilizing effect on personality development (Roberts, Wood, Caspi, 2008). As the current study did not include a measure of moral identity, this interpretation is speculative and needs to be validated by further research.

The present study captured a long time interval of almost 20 years. This advantage came at significant costs that define important limitations of the study. First of all, the sample size was relatively small which prevented the detection of small effects and made it impossible to run subgroup comparisons. As a consequence, it is unknown whether or not the findings reported in this study equally apply to males and females. Second, there was selective attrition in the longitudinal sample with a disproportionate loss of individuals with less socially-desirable characteristics. Third, the assessment procedures of the core constructs under study (moral emotion attributions and personality traits) changed over time. As a consequence, developmental changes are confounded with changes in assessment procedures. While this limitation does not affect all longitudinal stability estimates, it particularly might have reduced stability estimates for moral emotion attributions between the ages of 11 and 18 years as well as stability estimates for personality traits between 4–6 and 11 years. Also, the late onset in the long-term prediction of antisocial behavior by moral emotion attributions might be attributable to changes in the assessment procedure, as children were asked to attribute moral emotions to a hypothetical wrongdoer whereas in adolescence self-attributed emotions were assessed. Malti and Krettenauer (2012) found self-attributed emotions to be a stronger predictor of social behavior than other-attributed emotions. This might account for the finding that moral emotion attributions became predictive of antisocial behavior not before the age of 18 years. Last but not least, although longitudinal studies allow investigation of time-lagged relationships between variables, the data are correlational in nature and do not allow for causal conclusions.

Despite these limitations, the findings of the present study spur recent efforts to integrate developmental and personality perspectives for the study of moral personality development (Hill & Roberts, 2010; Lapsley & Hill, 2009). Hill and Roberts pointed out that models of personality and identity development are not antagonistic but should be considered "fellow travellers" (Hill & Roberts, 2010, p. 318) when studying development of moral personality. The present study provides empirical evidence in support of this view.

Acknowledgments

We thank the LOGIC participants and their parents for spending part of their lifetime with the LOGIC study.

Funding

This study was supported by grants from the Max Planck Society and the Volkswagen Foundation, Germany.

References

Arbuckle, J. S. (2011). IBM SPSS® Amos™ 20 User's Guide. Chicago, IL: SPSS.

Arsenio, W. F., Adams, E., & Gold, J. (2009). Social information processing, moral reasoning, and emotion attributions: Relations with adolescents' reactive and proactive aggression. *Child Development*, *80*, 1739–1755.

Arsenio, W. F., Gold, J., & Adams, E. (2004). Adolescents' emotion expectancies regarding aggressive and nonaggressive events: Connection with behavior problems. *Journal of Experimental Child Psychology*, *89*, 338–355.

Asendorpf, J. B., Denissen, J. J. A., & van Aken, M. A. G. (2008). Inhibited and aggressive preschool children at 23 years of age: Personality and social transitions into adulthood. *Developmental Psychology*, *44*, 997–1011.

Asendorpf, J. B., & Nunner-Winkler, G. (1992). Children's moral motive strength and temperamental inhibition reduce their immoral behavior in real moral conflicts. *Child Development*, *63*, 1223–1235.

Asendorpf, J. B., & van Aken, M. A. G. (1999). Resilient, overcontrolled, and undercontrolled personality prototypes in childhood: Replicability, predictive power, and the trait-type issue. *Journal of Personality and Social Psychology*, *77*, 815–832.

Asendorpf, J. B., & van Aken, M. A. G. (2003). Validity of Big Five personality judgments in childhood: A 9 year longitudinal study. *European Journal of Personality*, *17*, 1–17.

Block, J. H., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W.A. Collins (Ed.), *Minnesota Symposium on Child Psychology* (Vol. *13*, pp. 39–101). Hillsdale, NJ: Erlbaum.

Borkenau, P., & Ostendorf, F. (1993). *NEO-Fünf-Faktoren Inventar (NEO-FFI)* [NEO Five-Factor Inventory]. Göttingen, Germany: Verlag für Psychologie.

Burgemeister, B., Blum, L., & Lorge, J. (1972). *Columbia Mental Maturity Scale*. New York, NY: Harcourt Brace Jovanovich.

Caspi, A. (1998). Personality development across the life course. In W. Damon (Ed.), *Handbook of child psychology (Vol. 3)* (pp. 311–388). New York, NY: Wiley & Sons.

Caspi, A. (2000). The child is father of the man: Personality continuities from childhood to adulthood. *Journal of Personality and Social Psychology*, *78*, 158–172.

Caspi, A., Elder, G. H., & Bem, D. J. (1987). Moving against the world: Life-course patterns of explosive children. *Developmental Psychology*, *23*, 308–313.

Caspi, A., Harrington, H., Milne, B., Amell, J. W., Reremoana, F. T., & Moffitt, T. E. (2003). Children's behavioral styles at age 3 are linked to their adult personality traits at age 26. *Journal of Personality*, *71*, 497–513.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*, 233–255.

Cimbora, D. M., & McIntosh, D. N. (2003). Emotional responses to antisocial acts in adolescent males with conduct disorder: A link to affective morality. *Journal of Clinical Child and Adolescent Psychology*, *32*, 269–301.

Davis, J. A. (1985). *The logic of causal order*. Beverly Hills, CA: SAGE Publications.

Decuyper, M., de Pauh, S., de Fruy, F., de Bolle, M., & de Clercq, B. J. (2009). A meta-analysis of psychopathy-, antisocial PD- and FFM associations. *European Journal of Personality*, *23*, 531–565.

Eggert, D. (Ed.) (1978). *Hannover–Wechsler Intelligenztest für das Vorschulalter (HAWIVA)* [Wechsler intelligence scale for preschool children]. Bern, Switzerland: Huber.

Göttert, R., & Asendorpf, J. B. (1989). Eine deutsche Version des California Child Q Sort, Kurzform [A German short version of the California Child Q Set]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, *21*, 70–82.

Graziano, W. G. (1994). The development of agreeableness as a dimension of personality. In C. F. Halverson Jr., G. A. Kohnstamm & R. P. Martin (Eds.), *Development of the structure of temperament and personality from infancy to adulthood* (pp. 339–354). Hillsdale, NJ: Erlbaum.

Hill, P. L., & Roberts, B. W. (2010). Propositions for the study of moral personality development. *Current Directions in Psychological Science*, *19*, 380–383.

Huesmann, R. L., Eron, L. D., & Lefkowitz, M. M. (1984). Stability of aggression over time and generations. *Developmental Psychology*, *20*, 1120–1134.

Jensen-Campbell, L. A., Rosselli, M., Workman, K. A., Santisi, M., Rios, J., & Bojan, D. (2002). Agreeableness, conscientiousness, and effortful control processes. *Journal of Research in Personality*, *36*, 476–489.

John, O. P., Caspi, A., Robins, R. W., Moffitt, T. E., & Stouthamer-Loeber, M. (1994). The "Little Five": Exploring the nomological network of the five-factor model of personality in adolescent boys. *Child Development*, *65*, 160–178.

Johnston, M., & Krettenauer, T. (2011). Moral self and moral emotion expectancies as predictors of anti- and prosocial behavior in adolescence: A case for mediation? *European Journal of Developmental Psychology*, *8*, 228–243

Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality*, *76*, 1587–1617.

Krettenauer, T. (2005). [Longitudinal stability of adolescents' self-attributed moral emotions]. Unpublished raw data.

Krettenauer, T. (2011). The dual moral self: Moral centrality and intrinsic moral motivation. *The Journal of Genetic Psychology*, *172*, 309–328.

Krettenauer, T., Campbell, S., & Hertz, S. (in press). Moral emotions and the development of the moral self in childhood. *European Journal of Developmental Psychology*.

Krettenauer, T., & Eichler, D. (2006). Adolescents' self-attributed moral emotions following a moral transgression: relations with delinquency, confidence in moral judgment, and age. *British Journal of Developmental Psychology*, *24*, 489–506.

Krettenauer, T., Jia, F., & Mosleh, M. (2011). The role of emotion expectancies in adolescents' moral decision making. *Journal of Experimental Child Psychology*, *108*, 358–370.

Lake, N., Lane, S., & Harris, P. L. (1995). The expectation of guilt and resistance to temptation. *Early development and parenting*, *4*, 63–73.

Lapsley, D. K., & Hill, P. L. (2009). The development of moral personality. In D. Narvaez & D. K. Lapsley (Eds.), *Personality, identity, and character* (pp. 185–213). Cambridge, UK: Cambridge University Press.

Lorenz, O., Conger, R. D., Simons, R. L., & Whitbeck, L. B. (1995). The effects of unequal covariances and reliabilities in contemporary inference: The case of hostility and marital happiness. *Journal of Marriage and Family*, *57*, 1049–1064.

Lynam, D., Caspi, A., Moffitt, T. E., Raine, A., Loeber, R., & Stouthamer-Loeber, M. (2005). Adolescent psychopathy and the Big Five: Results from two samples. *Journal of Abnormal Child Psychology*, *33*, 431–443.

Malti, T., Gasser, L., & Buchmann, M. (2009). Aggressive and prosocial children's emotion attributions and moral reasoning. *Aggressive Behavior*, *35*, 90–102.

Malti, T., & Krettenauer, T. (2012). The relation of moral emotion attributions to pro- and antisocial behavior: A meta-analysis. *Child Development*. Advance online publication. 10.1111/j.1467-8624.2012.01851.x

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradovic, J., & Riley, J. R., . . . , Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*, 733–746.

Miller, J. D., & Lynam, D. (2001). Structural models of personality and their relation to antisocial behavior: A meta-analytic review. *Criminology*, *39*, 765–798.

Miller, J. D., Lynam, D., & Leukefeld, C. (2003). Examining antisocial behavior through the lens of the Five Factor Model of personality. *Aggressive Behavior*, *29*, 497–514.

Moffit, T. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100*, 674–701.

Nunner-Winkler, G. (1999). Development of moral understanding and moral motivation. In F. E. Weinert & W. Schneider (Eds.), *Individual development from 3 to 12* (pp. 253–292). Cambridge, UK: Cambridge University Press.

Nunner-Winkler, G. (2009). Moral motivation from childhood to early adulthood. In W. Schneider & M. Bullock (Eds.), *Human development from early childhood to early adulthood* (pp. 91–118). New York, NY: Psychology Press.

Nunner-Winkler, G., Meyer-Nikele, M., & Wohlrab, D. (2007). Gender differences in moral motivation. *Merrill-Palmer Quarterly*, *53*, 26–52.

Ostendorf, F. (1990). *Sprache und Persönlichkeitsstruktur: Zur Validität des Fünf-Faktoren-Modells der Persönlichkeit* [Language and personality structure: Validity of the five-factor model of personality]. Regensburg, Germany: S. Roderer.

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, *126*, 3–25.

Roberts, B. W., Wood, D., & Caspi, A. (2008). The develoment of personality traits in adulthood. In P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality* (pp. 375–398). New York, NY: Guilford.

Schneider, W., & Bullock, M. (Eds.) (2009). Human development from early childhood to early adulthood: Findings from a 20 year longitudinal study. New York, NY: Psychology Press.

Shiner, R. L., Masten, A. S., & Roberts, J. M. (2003). Childhood personality foreshadows adult personality and life outcomes two decades later. *Journal of Personality*, *71*, 1145–1170.

Tewes, U. (1991). *Hamburg–Wechsler Intelligenztest für Erwachsene – Revision 1991* [Hamburg–Wechsler intelligence test for adults – Revision 1991]. Bern, Switzerland: Huber.

Thompson, R. A., Meyer, S., & McGinley, M. (2006). Understanding values in relationships: The development of conscience. In M. Killen & J. G. Smetana (Eds.), *Handbook of moral development* (pp. 267–297). Mahwah, NJ: Erlbaum.

Trobst, K., Herbst, J., Masters, H., & Costa, P. (2002). Personality pathways to unsafe sex: Personality, condom use and HIV risk behaviors. *Journal of Research in Personality*, *36*, 117–133.

Wegener, B. (1988). *Kritik des Prestiges* [Critique of Prestige]. Opladen: Westdeutscher Verlag.

Weinert, F. E., & Schneider, W. (1999). *Individual development from 3 to 12: Findings from the Munich Longitudinal Study*. Cambridge, UK: Cambridge University Press.

Weiss, R. (1987). *Grundintelligenztest Skala 2 (CFT 20)* [Culture Fair Intelligence Test] (3rd ed.). Göttingen, Germany: Hogrefe.