"Do You Trust Him?" Children's Trust Beliefs and Developmental Trajectories of Aggressive Behavior in an Ethnically Diverse Sample

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Abstract This study investigated the role of trust beliefs (i.e., trustworthiness, trustfulness) on aggression trajectories in a four-wave longitudinal study using an ethnically diverse sample of 8- to 11-year-old children (N=1,028), as well as the risk profiles of low trust beliefs and low socioeconomic status on aggression trajectories. At Time 1 to Time 4, teachers provided ratings of overt aggressive behavior. At Time 1, children's trust beliefs were assessed by a sociometric peer nomination instrument and derived using social relations analysis. Latent growth curve analysis revealed five trajectories of aggressive behavior: high-stable, medium-stable, low-stable, increasing, and decreasing. As hypothesized, children in the high-stable trajectory were perceived as less trustworthy than children in the low-stable, medium-stable, and increasing trajectories. Children in the high-stable trajectory were less trustful than children in the low-stable trajectory and had a significantly higher risk profile (i.e., low trust beliefs and low SES) compared to children in the low-stable trajectory. Our findings indicate that the developmental course of aggression during middle childhood is predicted by children's trustworthiness and trustfulness. A risk profile of low trust and low socioeconomic status contributes to high-stable aggression trajectories.

Keywords Trust beliefs · Aggressive behavior · Developmental trajectory · SES risk · Middle childhood

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Introduction

From early on, developmental scientists and clinicians alike have stressed the role of early trust in children's psychosocial development and mental health outcomes. Being perceived as trustworthy and trusting others are important components of one's social reputation (Fehr 2009). These, in turn, are important in determining a child's attributions about a peer's aggressive behavior and their behavior toward that peer (Dodge 1980). Research has revealed a clear link between the frequency of children's aggressive behavior and the maintenance of a negative peer reputation (Rubin et al. 2006). What is not known though, is if and how trust is associated with the development of overt aggressive behavior. It is therefore intriguing to study if children who are mistrusted by others and who mistrust others remain stable in aggression over time.

Theoretically, psychosocial theories of human development have elaborated on the link between early trust and (mal)adaptive development (Erikson 1963). Accordingly, the development of early trust is important for children's peer relationships, adaptive psychological development, and mental health. Trust in the self and others not only provides motivation for constructive social interactions in the present, but also lays the foundation for positive attitudes about one's future and meaningful involvements in society. In contrast, if early trust has been violated, the development of healthy outcomes may become disturbed and, as a result, externalizing psychopathology and identity diffusion may occur (Edelstein 2005).

Despite the recognition that trust is crucial for a child's social reputation and mental health, studies on children's trust and overt aggression are scarce and the few existing studies have been limited to cross-sectional research designs (for an exception, see Rotenberg et al. 2005a). The present study aimed to fill parts of this research gap. We examined children's trust in others, their own perceived trustworthiness and the relations of these qualities to trajectories of aggressive behavior in a four-wave multiethnic longitudinal study. We deliberately chose to investigate these research questions in middle childhood (i.e., 8 to 11 years of age) because children's understanding of trust in peer relations undergoes qualitative transformations during this time (Gummerum and Keller 2008). More specifically, in middle childhood, children increasingly consider trust as important for friendship and peer relations. They begin to take into account underlying inter-individual differences that might affect mutual interactions and the friend's behavior in their relationship. Relatedly, research indicates that children in middle childhood prefer friendships that are characterized by mutual trust (Kahn and Turiel 1988).

Children's Trust Beliefs and Aggressive Behavior Trajectories

In the present research, we defined trust beliefs as: a) the target child's trustfulness in others (i.e., the child's beliefs about the extent to which other children can be trusted); and b) the target child's trustworthiness (i.e., other children's beliefs about the extent to which the target child is trustworthy; Rotenberg et al. 2004). Trustfulness and trustworthiness have been defined as two important components of trust (Rotenberg et al. 2005b). One notable tool to assess trust in children has been to assess their trust beliefs about keeping promises (e.g., Rotenberg et al. 2005b). Keeping promises contains two important component of trust: emotional trust and reliability; the former refers to an individual's belief that others will not cause them any emotional harm (James 2002) and the latter refers to an individual's commitment to fulfilling their promise (Powell and Heriot 2000). We relied on this validated assessment tool and tested trust through peer-reported beliefs in children's ability to keep promises.

Aggressive behavior is defined as any behavior directed toward another child that is carried out with the proximate intent to cause physical or psychological harm. In addition, the victimizer must believe that the behavior will harm the target, and the target must be motivated to avoid the victimizer's behavior (Anderson and Bushman 2002; Malti and Krettenauer 2012). There are good reasons to believe that the development of many forms of severe aggression is related to a lack of trust. For example, van IJzendoorn (1997) suggested that the development of overt aggressive behavior is related to early attachment problems and violations of the emotional needs of a child; these violations result in mistrust, an early precursor of antisocial conduct in childhood. Theoretically, this link can be explained by the notion that early mistrust and unresolved inner conflicts subsequently cause identity problems (originating in developmental regression, and eventually, developmental crisis; see Edelstein 2005). This, in turn, may lead to the development of negative emotions and cognitive biases, replacing the cruel caregiver by a non-genuine self and identifying with the person the self fears the most (i.e., the aggressor). The related mistrust, anger, and despair may lead to aggression towards others (Edelstein 2005). Thus, early trust problems may be an antecedent of subsequent overt aggression with the intention to harm others, which may consequently place children at risk for antisocial behavior problems in adolescence (Farrington 2005). Furthermore, aggressive, hostile behaviors may destroy or seriously damage a child's social reputation with peers and cause stigmatization, which may exacerbate behavior problems over time. Since children who are extremely aggressive are at risk for social exclusion (Bierman 2004), it is reasonable to assume that children in a high-stable aggressive trajectory may express less trust beliefs than children in a low-stable aggressive trajectory.

So far, previous studies have not taken into account the developmental nature of aggression in relation to trust. Longitudinal research on aggression has examined the developmental trajectories of children with overt aggressive behavior (e.g., Bongers et al. 2004; Broidy et al. 2003) and the majority of these investigations have found two to five distinct groups of children with different risk factors. Typically, although one or two subgroups do not demonstrate serious difficulty and are not at increased risk for later maladjustment or criminal behavior, among the remaining children, there is usually a group whose aggressive behavior problems are consistently high throughout development and a declining group whose externalizing problems start at a high level but decrease over time. Still, other researchers have identified a group whose aggressive behaviors start low but increase throughout elementary and middle school (e.g., Schaeffer et al. 2003). In summary, the existing trajectory research suggests that there may be distinct trajectories of aggressive behaviors. More specifically, the literature has frequently found consistently low, consistently high, increasing, and decreasing externalizing trajectories, with partly different risk factors. A recent study by Malti et al. (2012) investigated developmental trajectories in peer-reported externalizing behavior and links to friendship understanding in a sample of children from the United States. The findings revealed that low trust in close friendship relationships differentiated increasing from low-stable externalizing and decreasing

externalizing behavior trajectories (see also Malti and Keller 2009). Based on this literature, we were interested in investigating if children in a high-stable or increasing aggressive trajectory express less trust beliefs than children in a low-stable or decreasing aggressive trajectory.

We were also interested in identifying risk profiles of trust beliefs and socioeconomic status (SES), and the role of these risk profiles on aggressive behavior trajectories. Research clearly indicates that low SES is associated with aggressive problem behaviors in childhood (Dodge et al. 1994). One of the reasons for this link may be that economic hardship and related experiences of social injustice alter the processes by which a child is socialized (Elder and Caspi 1988) which, in turn, affect children's aggressive behavior (Dodge et al. 1994). A second reason for this link may be that children from families with lower SES have less access to social, cultural, and economic resources (Lareau 2011). It has been argued that experiences of socioeconomic deprivation and low social capital may lower one's trust in others. More specifically, some researchers have argued that children who grow up in families with low SES may be more likely than children from families with higher SES to possess certain beliefs that are adaptive in the environments in which they live, but have negative mental health consequences (Chen 2004). For example, living in a dangerous neighborhood may make individuals likely to mistrust others and to be less optimistic about their community and society at large than individuals who live in a safe neighborhood with higher SES; these beliefs have been found to put individuals at increased risk for health problems (Adler et al. 1994) and may also contribute to stigmatizing or social exclusion by individuals with higher SES. Hence, young people from lower socioeconomic strata might be perceived as less trustworthy, particularly if they live in poor, segregated neighborhoods (McLoyd et al. 2009). In the present study, we therefore investigated if children from low SES backgrounds and with low trust beliefs (i.e., low trust in others and low perceptions of trustworthiness by others) are at particularly high risk for displaying stable high levels of aggressive behavior over time. This argument has been supported by a study that revealed that high levels of social capital (including trust) leads to reduced or eliminated SES effects on psychological health symptoms (Elgar et al. 2010; see also Kawachi et al. 1997).

To summarize, our main objectives were to identify trajectories of aggressive behavior in middle childhood by examining the development of aggression in a longitudinal sample of 8- to 11-year-old children, and to investigate whether children's trust beliefs would predict these trajectories. Based on the extant trajectory research on aggressive behavior, we expected to find several groups of behaviors, including a group that was consistently low on aggressive behavior, a group that was consistently high on aggressive behavior, a group that decreased in aggressive behavior over time, and a group that increased in aggressive behavior over time (Campbell et al. 2006). We hypothesized that children would remain high-stable on aggressive behavior if they lacked trust in others and were perceived as untrustworthy. In contrast, we hypothesized that children with high trust beliefs would remain in the low-stable or decreasing aggressive behavior trajectories. We also expected that low trust beliefs would increase aggressive behavior in children with initially low aggressive behavior.

We also investigated if risk profiles of trust and statuses would have an effect on trajectories of aggressive behavior. We hypothesized that children from families with low SES and with low trust beliefs would show higher risk for high-stable aggressive behavior trajectories. As previous studies have indicated that sex differences exist in aggression trajectories (Pepler et al. 2008), sex was included as a control variable.

Method

Participants

The data were drawn from an ongoing combined longitudinal and intervention study, the Zurich Project on the Social Development of Children and Youth (z-proso). A sample of 56 elementary schools was selected, stratified by enrollment size and socioeconomic background of the school district. The gross sample at the first assessment point consisted of all 1,675 first graders from these elementary schools (Malti et al. 2011). The present analysis focused on the longitudinal component of the study. For further details regarding the intervention component of the study, see Eisner et al. (2012) and Malti et al. (2011).

With respect to country of origin, 11 % of the children were born outside of Switzerland. In 46 % of the cases, both parents were born outside of Switzerland. Birth countries of both parents combined included ex-Yugoslavia (16 %), Germany (5 %), Portugal (5 %), Sri Lanka (5 %), Turkey (4 %), Rest of Asia (4 %), Italy (3 %), Spain (2 %), EU-15 countries (4 %), Other South/East Europe (2 %), Sub-Saharan Africa (3 %), North Africa (1 %), Brazil (1 %), rest of Latin America (3 %), Middle East (2 %), USA/CAN/NZ/AUS (1 %), and unknown (0.1 %). The city of Zurich has one of the highest populations of immigrants in Europe and the sample was fairly representative (see Eisner et al. 2011). In terms of educational attainment of the parents, 24 % of those interviewed had little or no secondary education, 32 % had vocational training, 29 % had attended vocational school or had earned a baccalaureate degree or advanced vocational diploma, and 16 % had a university degree. When compared to the Census data from the city of

Zurich, highly educated parents were slightly overrepresented in the present study.

There were four data collection waves that took place annually between 2005/6 and 2008/9. Each wave collected data from the child, the primary caregiver, and the teacher. In the present study, we analyzed data from the child (about her/himself and her/his peers) and the teacher. The initial response rates for the study were 81 % for the child interviews (N=1,361) and 81 % for the teacher assessments (N=1,350). For the present analysis, we used waves 1 through 4. For Time 1 (T1), the mean age of the children was 8.11 years (SD=0.38). The retention rate at T1 was 97 % for the child interviews and 96 % for the teacher assessments. For Time 2 (T2, mean age=9.21, SD=0.37), the retention rate was 96 % for the teacher assessments, for Time 3 (T3, mean age 10.70, SD=0.38), the retention rate was 92 % for the teacher assessments, and for Time 4 (T4, mean age 11.60, SD=0.37), the retention rate was 77 % for the teacher assessments.

Sample attrition effects were tested by comparing the participating children at T4 with those who did not participate at T4 (N=275) on demographic variables (i.e., SES and sex) and the main study variables (i.e., trustfulness, trustworthiness, aggression). Children who did not participate at T4 were more aggressive, OR=1.30, p<0.05, and also slightly more likely to have parents with low socioeconomic status than children who stayed in the sample at T4, OR=0.98, p<0.01.

Measures

Aggressive Behavior At T1-T4, we used the Social Behavior Questionnaire (SBQ; Tremblay et al. 1991) to collect teacher data on the child's aggressive behavior. This instrument has been used in a variety of longitudinal studies (e.g., Lacourse et al. 2002) and has been shown to be sensitive to behavior changes in intervention studies (e.g., Lösel et al. 2006; Malti et al. 2011). Teachers are considered a valid source for evaluating child aggression during middle childhood (Henry 2006).

The teacher-ratings of aggressive behavior are particularly well-suited for testing if any relation exists between aggression in children and the trust beliefs as perceived among classmates (see below), as both apply to the same situational context (i.e., the classroom). The 11 items measure overt aggression using a 5-point Likert scale (e.g., "is cruel, bullies or is mean to others"). The reliabilities (Cronbach's α) of the SBQ were 0.93 at T1, 0.93 at T2, 0.94 at T3, and 0.93 at T4. The mean aggression levels were 0.55 (SD =0.64) at T1, 0.57 (SD =0.64) at T2, 0.54 (SD=0.69) at T3, and 0.48 (SD =0.63) at T4.

We tested the discriminant validity of the overt aggression scale to make sure that aggression is a discriminant factor of comorbid childhood disorders such as ADHD and anxiety/depression. Teacher-rated ADHD and teacher-rated anxiety/depression were measured by the SBQ. According to the variance extracted test, evidence of discriminant validity is shown if the average variance extracted is greater than the squared correlations between the two factors of interest (Fornell and Larcker 1981). The results from these analyses provided evidence of discriminant validity of the three factors (average extracted variance aggression: 0.54, aggression and ADHD: r^2=0.39, aggression and anxiety/depression: r^2=0.25).

The Zurich school system requires that children remain in the same class with the same teacher from Grade 1 to Grade 3, but that they enter new classes in Grade 4 (i.e., middle school).

Trust Beliefs At T1, the participants' trustfulness and their trustworthiness were assessed by their perceptions that others keep promises and their promise-keeping trustworthiness (as reported by peers), respectively. Perceptions or reports of promise-keeping have served as primary measures of trust in others and trustworthiness in adults (see Rotenberg et al. 2010; Rotter 1980) and in children (Betts and Rotenberg 2008; Hochreich 1973) for over three decades. Researchers have assessed children's reports of promise-keeping per se because such behavior is observable by children in the natural social environment (see Rotenberg et al. 2004). Furthermore, researchers have required children to judge the promise-keeping of *several* peers - classmates - because it yields multiple judgments which are reliable and show evidence of validity (see Rotenberg et al. 2004).

As in previous research, participants in the current study were asked to rate each of their classmates on the extent to which they would keep a promise on 5-point scale: 1 (never), 2 (sometimes), 3(neither sometimes or very often), 4 (very often), and 5 (always). The participant was asked what 'keeping a promise' meant to him/her and, in the very rare cases in which a child did not understand what it meant (< 1 %), the interviewer explained that 'a promise is when someone says (s)he will do something. And keeping a promise is when this person indeed does what (s)he promised'. Participants were instructed not to share their answers with others after the interview. Twelve children did not understand what keeping a promise meant and were therefore not further interviewed.

The measure followed a round robin design in which each participant rated, and was rated by, each of his/her classmates. We focused on two measures of trust (i.e., trust in others and trustworthiness; Betts and Rotenberg 2008). The measures of trustfulness and trustworthiness were calculated using a social relations analysis (see Kenny et al. 2006; Kenny and La Voie 1984; Rotenberg et al. 2012) with the statistical software WinSoReMo (Kenny and Xuan

2002). This program splits the trust ratings into components specific for the actor (i.e., a child's trust beliefs in classmates), the partner (i.e., the child's trustworthiness as rated by classmates), the relationship (one's behavior towards another individual in particular, beyond the actor and partner components), and error variance. The social relations analysis of the promise-keeping judgments yielded significant actor variance, 0.17, $p<0.05$ which provides evidence for the internal consistency and shows that there are reliable differences between participants in their beliefs that classmates keep promises. The social relations analysis of the promise-keeping judgments also yielded significant partner variance, 0.15, $p<0.05$. The reliability of this effect estimate was 0.67 based on a group size of 10.85. The significant partner variance findings provide evidence for internal consistency and show significant agreement among classmates in their reports of the promise-keeping of individual participants. The actor variance scores were used in the study as the measure of trust in others and the partner variance scores were used as the measure of trustworthiness. The social relations analysis ensured that trustfulness and trustworthiness scores were statistically independent.

The observed actor effects and partner effects as measures of trustfulness and trustworthiness respectively, replicate those found in children from a range of cultures/countries including United Kingdom, Italy, and Japan (Betts and Rotenberg 2008). Research has yielded evidence for the reliability of these measures as evidenced by stability across time during middle childhood (Rotenberg et al. 2004). Evidence for the validity of the trust belief measure is provided by its association with children's judgments of trust in classmates per se (Rotenberg 1984) and standardized measures of children's generalized trust beliefs in peers (Rotenberg et al. 2005b). Evidence for the validity of the trustworthiness measure is provided by its association with teachers' reports of corresponding forms of children's trustworthiness (Rotenberg et al. 2008).

Socioeconomic Status Socioeconomic status (SES) was based on coding the caregivers' current professions (Elias and Birch 1994); the codes were transformed into an International Socio-Economic Index of occupational status (ISEI) score (Ganzeboom et al. 1992). The possible range of scores on the ISEI scale is 16 to 90. The final SES score was based on the caregiver with the highest ISEI score and mean-centered for the multivariate analyses ($M=0.00$, $SD=19.56$, Range 32.41 to 41.59).

Procedure

The parents were asked to sign an informed consent form at the beginning of the first wave (valid until the third wave) and at the beginning of the fourth wave. Computer-assisted

45-minute interviews with the children were conducted at school by 44 interviewers who had been intensively trained by the research team. The interview contained questions on the child's social behavior, social development, and social environment. The interview was fully structured and standardized; that is, the interviewers administered a pre-constructed questionnaire and entered the answers into their computer. Special care was taken to recruit native speakers or cross-culturally competent interviewers for the larger immigrant communities. The teachers completed a questionnaire at all four assessment points.

Results

Semiparametric group-based analyses were used to identify homogeneous clusters of developmental trajectories within the sample (Nagin 1999). The analyses proceeded in three steps: First, we identified the best-fitting trajectory model for aggressive behavior using the SAS PROC TRAJ group-based modeling procedure (Jones and Nagin 2007; Jones et al. 2001). The Bayesian Information Criterion (BIC) was used to determine the number of trajectory groups and whether an intercept-only (stable), linear, or quadratic shape fit the data best. The models with BIC scores closest to zero provide the best fit to the data. The censored normal model was used to account for cutting off at the lower bound of the scale. Second, we added trustfulness, trustworthiness, sex, and SES to the models. The final trajectory models were identified by jointly estimating the trajectory parameters and the predicted probabilities of group membership (Nagin 2005). Third, multinomial regression analyses were estimated by assessing the relationship between trust beliefs and the trajectories. These models were estimated separately for each variable (i.e., trustfulness, trustworthiness) because the social relations analysis ensured that the scores on trustfulness already controlled for trustworthiness and vice versa; hence, adding both variables simultaneously into the equation would not be useful.

The trust scores were only computed in classes with at least 5 participating children ($N=1030$). This was done to ensure that the estimates were based on a sufficient amount of informants. Data for two children were deleted because aggression scores were missing for all waves. This resulted in a final sample size of $N=1,028$. The SAS PROC TRAJ group-based modeling procedure accommodates data that are missing completely at random on the trajectory variables (i.e., aggression), but not missing data on the predictor variables. Multiple imputation was used to account for missing data as follows: For aggression, 7 % of the data points were missing, and these were distributed randomly in the database; Little MCAR test was not significant. For the trust variables and sex, there were no missing values. For

SES, 13 % of the data points were missing and they were not distributed randomly, Little MCAR test was significant, $\chi^2(3)=32.58$, $p<0.01$. Therefore, multiple imputation was carried out to estimate the values for the missing data points using fully conditional specification in SPSS. This is an iterative Markov chain Monte Carlo (MCMC) method. It predicts the missing values for a variable using all other available variables included in the model; the number of iterations used was 10, and the imputed values in this iteration round were used for imputation. The number of imputations was seven. We then computed the averages of the regression coefficients, standard errors, and significance tests by using SAS (see Allison 2001).

Developmental Trajectories of Aggressive Behavior

We estimated models for one to five groups. The Bayesian Information Criterion (*BIC*) scores of the baseline first-order polynomial model (intercept+linear time) were inspected. They continued to improve as more groups were added. Because *BIC* scores are not useful for identifying the preferred number of groups in such cases, we determined the number of groups by identifying the model that was most parsimonious and that captured distinctive developmental patterns in the data (Nagin 2005). The observed scores were compared with the predicted scores; the two sets of scores were found to be very similar.

The *BIC* values for the one-, two-, three-, four-, and five-group models were −4356.06, -4035.81, -3947.80, -3915.59, and −3873.48, respectively. The five-group model provided the most parsimonious and best-fitting solution to the data (Figure 1). Two of the groups showed intercept-only trajectories; adding linear terms for these groups did not improve the

Fig. 1 Fitted mean trajectories for aggressive behavior. LS=Low-stable. MS=Medium-stable. I=Increasing. D=Decreasing. HS=High-stable

BIC value. For the remaining three groups, linear trajectories were estimated. Adding quadratic terms did not improve fit. The mean assignment probabilities were good (0.79 to 0.88 across imputation sets).

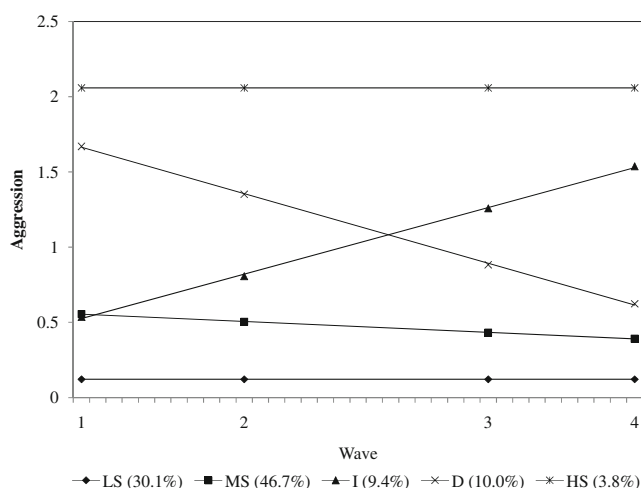Children's Trust Beliefs and Aggressive Behavior Trajectories

We used multinomial logistic regression models to investigate whether the children with high scores on trustworthiness and trustfulness were overrepresented in specific trajectory groups (for descriptive statistics, see Table 1). The first model estimated the role of trustfulness on trajectory group membership, and the second model tested if trustworthiness differentiated group membership (Table 2). The high-stable aggression group was the reference group. As expected, the low-stable, the medium-stable, and the increasing groups had significantly higher levels of trustworthiness than the high-stable group. The low-stable group had higher levels of trustfulness than the high-stable group.

Furthermore, members of the low-stable, medium-stable, and decreasing groups were less likely to be male than members of the high-stable group. Members of the low-stable group were more likely to come from high SES backgrounds compared to members of the high-stable group.

Next, we compared: 1) the increasing and decreasing trajectory groups; 2) the low-stable with the increasing, decreasing, and medium-stable groups; and 3) and the medium-stable with the increasing and decreasing groups (Table 3). Multinomial logistic regression models showed that the low-stable group had higher levels of trustfulness and trustworthiness than the increasing and decreasing groups, and higher levels of trustworthiness than the medium-stable group. The medium-stable group had higher levels of trustworthiness than the increasing and decreasing groups and the decreasing group had lower levels of trustworthiness than the increasing group.

Risk Profiles Associated with Aggression Trajectories

Finally, we examined the risk profiles of trust and socioeconomic status (SES) associated with the aggression trajectories. We included both caregivers' current occupation and level of education as indicators of SES in these analyses and used latent profile analysis (LPA) in MPlus (version 6.11) to investigate patterns of trust and SES as risk factors of aggression trajectories. Latent profile analysis describes a latent variable model that represents a probabilistic variant of traditional non-hierarchical cluster analysis procedures, and that outperforms the more traditional models (see

Table 1 Means (SDs) for the independent variables across aggression trajectories

	Aggressive behavior trajectories				
	Low-stable (30.1 %)	Medium-stable (46.7 %)	Increasing (9.4 %)	Decreasing (10.0 %)	High-stable (3.8 %)
Trustfulness	1.40 (0.37)	1.36 (0.40)	1.30 (0.40)	1.21 (0.41)	1.25 (0.37)
Trustworthiness	1.51 (0.27)	1.24 (0.35)	1.14 (0.33)	0.92 (0.40)	0.88 (0.33)
Control variables					
Sex (male)	0.34 (0.47)	0.48 (0.50)	0.73 (0.45)	0.61 (0.49)	0.89 (0.31)
SES	5.57 (18.41)	−2.19 (18.81)	−1.87 (17.62)	−9.25 (17.65)	−5.36 (18.49)

Lazarsfeld and Henry 1968). It is typically used to build typologies. Here, we used it to build a typology of risk profiles based on trust beliefs and socioeconomic status. The group membership of individuals was unknown and was described through a hypothesized latent variable. All the covariates were used as indicators for this latent variable. We estimated models for one to four groups separately for trustfulness and trustworthiness. The *BIC* scores, the Lo-Mendell-Rubin (*LMR*) likelihood ratio test, and Substantive Interpretation were used to determine the number of groups. The *BIC* scores and the *LMR* test indicated that the four-group models fit the data best for both trustfulness and trustworthiness. However, Substantive Interpretation indicated that the three-group model was the most parsimonious, as adding another group did not lead to additional differences in trust beliefs between the groups. We therefore selected the three-group model. For both trustfulness and trustworthiness in this model, entropy was 0.90 and the average latent class probabilities for most likely latent class membership, used to evaluate the precision of group assignment, ranged from 0.94 to 0.98.

Each child was assigned to a latent class for which the highest individual posterior probability was obtained. The model with trustworthiness revealed that children in the

low-risk group (38 %) had high levels of SES and trustworthiness (mean levels, weighted by estimated class probabilities, were 14.52, 9.39, and 1.34). Children in the medium-risk group (48 %) had intermediate levels of SES and trustworthiness (−6.62, 5.19, 1.24). Children in the high-risk group (15 %) had low levels of SES and trustworthiness (−20.58, 2.12, 1.18). The findings of the model with trustfulness looked very similar for SES. However, trustfulness did not substantially differ across the risk groups.

Table 4 shows the probabilities linking the risk classes to the aggression trajectories. The probability of a child falling into the low-stable aggression group was highest for a child in the low-risk group, whereas the probability of a child falling into the low-stable aggression group was lower for a child in the medium or high-risk groups.

We used multinomial logistic regression models to investigate whether the children with high-risk profiles were overrepresented in specific trajectory groups, compared to low-risk or medium-risk profiles. The high-stable aggression group was the reference group. The first model estimated the combined risk profile of trustfulness and SES on trajectory group membership, and the second model tested the combined risk profile of trustworthiness and SES on trajectory group membership. As expected, children in the low-stable aggression group had a significantly higher

Table 2 Multinomial Coefficients (SE) for the multinomial logit model for aggression trajectories

	Aggressive behavior trajectories			
	Low-stable	Medium-stable	Increasing	Decreasing
Model 1				
Trustfulness	1.12* (0.48)	0.63 (0.42)	0.19 (0.51)	0.02 (0.50)
Control variables				
Sex (male)	−2.48** (0.54)	−1.88** (0.51)	−0.86 (0.59)	−1.22* (0.59)
SES	0.04** (0.01)	0.02 (0.01)	0.02 (0.01)	0.00 (0.01)
Model 2				
Trustworthiness	5.09** (0.68)	2.70** (0.60)	1.65* (0.69)	0.45 (0.70)
Control variables				
Sex (male)	−2.21** (0.57)	−1.74** (0.54)	−0.88 (0.62)	−1.27* (0.62)
SES	0.03* (0.01)	0.01 (0.01)	0.01 (0.01)	−0.01 (0.02)

The high-stable group was the reference category

* *p*<0.05, **p<0.01

Table 3 Multinomial Coefficients (SE) for the multinomial logit model for aggression trajectories among the low-stable, medium-stable, decreasing, and increasing trajectories

	Aggressive behavior trajectories		
	Medium-stable versus low-stable	Increasing versus low-stable	Decreasing versus low-stable
Model 1			
Trustfulness	−0.49 (0.30)	−0.92* (0.39)	−1.10** (0.38)
Control variables			
Sex (male)	0.59** (0.23)	1.62** (0.34)	1.25** (0.32)
SES	−0.02** (0.01)	−0.02** (0.01)	−0.04** (0.01)
Model 2			
Trustworthiness	−2.39** (0.39)	−3.44** (0.53)	−4.64** (0.53)
Control variables			
Sex (male)	0.47* (0.23)	1.33** (0.34)	0.94** (0.35)
SES	−0.02** (0.01)	−0.02* (0.01)	−0.04** (0.01)

* $p < 0.05$, ** $p < 0.01$

likelihood of having a low- compared to a high-risk profile of both trustfulness and SES and trustworthiness and SES than the children in the high-stable aggression group (Table 5).

Discussion

Psychosocial theories on human development have suggested that trust serves as an important underpinning of children's (mal)adaptive development (e.g., Erikson 1963). Researchers have also emphasized a link between unresolved conflicts about trust, deficits in moral development, and the development of overt aggressive behavior (van IJzendoorn 1997). Surprisingly, little longitudinal research has been conducted thus far to provide evidence for the hypothesized link between trust and aggressive behavior. In the present study, we argued that both children's trust in others, as well as their trustworthiness, play an important role in the development of aggressive behavior. We deliberately chose to investigate these questions in middle

childhood, as this is the time when qualitative transformations in children's relationship conceptions occur and when interpersonal trust becomes an increasingly central concept (Keller 2004); more specifically, interpersonal trust becomes increasingly significant for one's friendships and peer relationships during middle childhood and it is also a central aspect in choosing and maintaining friendships (Keller 2004). Thus, this research contributes novel information with respect to how trust relates to children's aggression trajectories.

Our findings revealed five trajectories of teacher-reported aggression: stable-low, stable-medium, stable-high, decreasing, and increasing. In line with previous research, most of the children were consistently low or medium stable in aggression. We also found smaller groups who decreased in aggressive behavior or increased in aggressive behavior over time. This is consistent with other studies, which have found that only a small fraction of children show consistently high aggressive behavior (e.g., Bongers et al. 2004).

One main finding was that children's trust beliefs differentiated aggression trajectories. Children in a high-stable

Table 4 Probabilities of aggression trajectories by risk class

	Aggressive behavior trajectories				
	Low-stable	Medium-stable	Increasing	Decreasing	High-stable
Model 1: Trustfulness					
Low risk	0.299	0.539	0.065	0.070	0.026
Medium risk	0.193	0.558	0.079	0.122	0.047
High risk	0.124	0.606	0.095	0.131	0.044
Model 2: Trustworthiness					
Low risk	0.301	0.539	0.065	0.070	0.026
Medium risk	0.192	0.558	0.079	0.123	0.048
High risk	0.124	0.606	0.095	0.131	0.044

Table 5 Multinomial Coefficients (SE) for the multinomial logit model for aggression trajectories by risk class

	Aggressive behavior trajectories			
	Low-stable	Medium-stable	Increasing	Decreasing
Model 1: Trustfulness				
Low risk vs. high risk	1.40*	0.40	0.14	−0.11
Medium risk vs. high risk	0.37	−0.16	−0.26	−0.15
Model 2: Trustworthiness				
Low risk vs. high risk	1.41*	0.41	0.14	−0.11
Medium risk vs. high risk	0.36	−0.16	−0.26	−0.15

The high-stable aggression group was the reference category

* $p < 0.05$., ** $p < 0.01$

trajectory were rated as less trustworthy by their peers than children in low-stable, medium-stable, and increasing trajectories. These findings support the argument that a lack of perceived trust is conceptually related with aggressive conduct and maladjustment (van IJzendoorn 1997). Related research on trust beliefs in sibling relationships has shown that older siblings' reports of trustworthiness are related to maladaptive outcomes, including externalizing behavior (Gamble et al. 2011). Some early studies have also documented that the perceptions of others on the self are related to children's morally relevant behavior. For example, Beaman et al. (1979) found that self-awareness induced by the presence of a mirror placed behind a candy bowl decreased transgression rates for children who had been individuated by asking them their name and address. More recent research in experimental economics has shown that experiences of distrust tend to increase levels of aggression in men (Zak et al. 2005). This suggests that trustworthiness might have a causal effect on later aggression and that it is not a mere marker or proxy of pre-existing aggression. The present research contributes to the existing literature by showing that perceived low trustworthiness contributes to children's high-stable aggression trajectories.

Interestingly and surprisingly, children in the increasing aggression trajectory had higher levels of trustworthiness at Time 1 than children in the high-stable aggression group. We also found that children in the increasing aggression trajectory group had comparably low aggression scores than children in the low-stable aggression group at Time 1. Perhaps this finding indicates that children in the increasing trajectory, who are viewed as being trustworthy at Time 1, have different antecedents and/or etiologies for their aggression compared to children in the high-stable group, who clearly lack trustworthiness. Thus, low trustworthiness might be a particularly relevant risk factor for aggressive children who remain high-stable over time, but less so for children with increasing aggression. Alternatively, it is possible that one's trustworthiness decreases with increasing aggression. Future longitudinal research on both trust and aggression is needed to further disentangle if and how trust trajectories and aggression trajectories develop in concerto.

The trustfulness findings provide further evidence for the role of children's trust beliefs in aggressive behavior. Children with low trust in others were less frequently in a low-stable than in a high-stable trajectory. One explanation for this finding may be that children with low trust understand the impact of their behavior on others less, and this may lead them to behave in less other-oriented and in more antisocial ways. Alternatively, children with low trust in others may feel that other children don't trust them, and thus, they may not see a need to behave any differently. Future research on the role of trustfulness in children's aggression is warranted.

As expected, our findings indicated that boys were over-represented in the high-stable trajectory compared to the other trajectories. This is consistent with previous studies (Pepler et al. 2008). Interestingly, girls were perceived as higher on trustworthiness than boys; this finding resonates with research indicating that women are perceived as higher on trustworthiness than males (Boltz and Dyer 2010). This finding is likely related to the socialization of gender roles in boys and girls. For example, a willingness to defend one's own resources are a crucial part of boys' early socialization, whereas girls are frequently socialized to be fair and caring, attributes which are likely to increase one's trustworthiness (Malti et al. 2011).

The findings also revealed effects of risk profiles of SES and trust beliefs on aggression trajectories. Specifically, children with high SES and trust beliefs were more likely to be in the low-stable aggression trajectory, whereas children with low SES and trust beliefs were more likely to be in the high-stable aggression trajectory. This extends previous research on the role of economic risk on aggressive behavior (Dodge et al. 1994). Research also indicates that children from families with lower socioeconomic status show less well-being than children from families with higher socio-economic status (Bradley and Corwyn 2002). Our findings indicate that children from families with low SES, when also perceived as low on trustworthiness, might be at increased risk for exacerbated levels of behavioral and related mental health problems and stigma.

This study is not without limitations. First, although we relied on longitudinal data and the findings demonstrated

the hypothesized links between children's trust beliefs and aggression trajectories, our data were correlational and, thus, causal relations could not be established. Second, our combined longitudinal-experimental approach might have affected our findings; however, the chances that our research design biased the findings are low, since attrition bias was low and comparable across treatment conditions, and very few intervention effects were found (see Eisner et al. 2012; Malti et al. 2011). Additionally, it is not clear whether an intervention necessarily interferes with the goals of a longitudinal study, as interventions can be viewed as one of many interventions that impact all children over time (Farrington et al. 2010). Third, we focused on overt aggressive behavior, as we were interested in the development of highly stable patterns of overt aggression and its links with deficits in trust beliefs. However, future research may also focus on specific subtypes of aggression (i.e., proactive versus reactive aggression) and their differential links to trust beliefs. Fourth, our trust beliefs instrument measured only one component of trust (i.e., reliability). Future research should examine trust beliefs more in-depth, including both central components of trust (i.e., emotional trust and reliability). Fifth, the Swiss school grouping structure requires that children remain in the same class with the same teacher from Grade 1 to Grade 3, but that they enter new classes in Grade 4; this structuring may not generalize to schools with more traditional grouping in the early grades.

In summary, the present research provides novel insights into how children's trust beliefs are linked with trajectories of overt aggressive behavior. This is the first longitudinal study using a large, ethnically diverse sample to show that children's trust beliefs predict trajectories of aggression, and that risk profiles of low trust and low SES contribute to highly-stable aggression trajectories. Theoretically, these findings extend models on the role of trust in the development of psychopathology and adaptation (Erikson 1963). They indicate that a child's trustfulness in others, as well as his or her perceived trustworthiness, affect differential developmental pathways of aggression across middle childhood. Importantly, children with low trust beliefs and from families with low SES appear to be particularly at risk for high-stable pathways of aggressive behavior. These findings are of interest not only for theoretical reasons, but also because of their clinical relevance for interventions aimed at reducing aggression in children by strengthening interpersonal trust. Our findings indicate that it might be useful to tailor interventions aimed at reducing aggression differentially, based on children's trust belief scores. For example, children with highly-stable aggressive behavior trajectories may particularly benefit from interventions aimed at increasing trust in others, as well as in strengthening peer relationships to increase a target child's trustworthiness by his or her peers. From a clinical stance, this differential approach

implies that psychotherapeutic interventions with children who display stable aggression over time may benefit from a systematic implementation of screening procedures that include measures of interpersonal trust. Only by identifying if beliefs about trust in others and trustworthiness are low is an intervention strategy likely to have an impact on the child's trust beliefs and related social reputation among peers and behavior of the child toward peers which, in turn, may affect the child's future social interactions and adaptive skills.

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