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Developmental Trajectories of (Cyber)Bullying Perpetration and Social Intelligence during Early
Adolescence

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Abstract

The purpose of the present study is to examine bullying perpetration and social intelligence (SI), which is a socio-cognitive characteristic that has been proposed as a possible regulator of traditional and cyberbullying. We compared SI for perpetrators and non-perpetrators of traditional bullying and/or cyberbullying and examined longitudinal associations. A four-wave panel study with 6-months time intervals was conducted among 1,103 adolescents. Latent class analysis was used to examine developmental trajectories of bullying across two years. Four profiles of adolescents were found: non-stop traditional bullies, (traditional and cyber) bullies with decreasing perpetration, (traditional and cyber) bullies with increasing perpetration, and non-involved. No separate non-stop cyberbullying class was found. In a next step, latent growth curves of SI were calculated for each profile. Non-stop traditional bullies had the lowest levels of SI and their level remained low. Further implications of these results for prevention and intervention, and for research are discussed.

Keywords: Bullying, Developmental Trajectories, Social Competence, Peers

Developmental trajectories of (cyber)bullying perpetration and social intelligence during early adolescence

Bullying has been defined as “an aggressive, intentional act carried out by a group or individual, repeatedly and over time against a victim who cannot easily defend him or herself” (Olweus, 1993; Smith et al., 2008, p. 376). This definition includes four major components: aggression, intentionality, repetitiveness and power imbalance (e.g., Dooley, Pyżalski, & Cross, 2009). The adoption of Information and Communication Technologies (ICT), (also) as a means to bully, has stimulated scholars to distinguish between traditional bullying and cyberbullying.

In research on traditional bullying, the difference between direct and indirect forms of bullying has proven important when studying perpetratorship. Direct forms of bullying include insulting someone face-to-face and pushing someone. Spreading lies about someone (behind the back of the victim) and trying to get others to exclude a group member are examples of indirect traditional bullying. Results show that the hidden or more subtle nature of indirect bullying forms, might explain why some girls, older adolescents, and those with higher social intelligence appear to be more involved in this type of bullying (e.g., Andreou, 2006; Kaukiainen et al., 1999).

Cyberbullying appears to add a new dimension to the covert nature of bullying. The devices that are used (such as mobile phones and computers) make it easier for a perpetrator to act anonymously (e.g., by using a nickname) and without directly facing the victim (i.e., there is a “screen” in between) (Slonje, Smith, & Frisé, 2013; Sticca & Perren, 2013). Moreover, cyberbullies have less chance of getting caught or punished as they can more easily perpetrate without adult supervision (Smith et al., 2008). Even “direct” forms of cyberbullying (like

insulting someone via chat, or threaten someone via a mobile phone text message), may therefore differ substantially from “direct” forms of traditional bullying. The same holds for indirect forms of cyberbullying (like posting an embarrassing or suggestive photo of someone on a social networking site that can be viewed by others or secretly breaking into someone’s online profile) compared to indirect forms of traditional bullying.

Studies on the profiles of traditional bullies and cyberbullies, reveal differences that might be related to this difference in “covertiness” or subtleness. With regard to *gender*, research shows that traditional bullying is more common among boys (e.g., Smith, 2013, p. 87). For cyberbullying, the results are not equivocal. While most studies found slightly more males among cyberbullies (Aricak et al., 2008; Li, 2006; Slonje & Smith, 2008), others (Patchin & Hinduja, 2006; Smith et al., 2008) did not find significant gender differences in cyberbullying. In a study by Kowalski and Limber (2007), girls even outnumbered boys. The fact that girls, who are less often traditional bullies, seem to draw level with or even outrun boys in cyberbullying, could be explained by the covert character of cyberbullying (that is related to ‘female’ forms of bullying) (Berger, 2007; Griffin & Gross, 2004). Regarding *age* and perpetration, traditional bullying perpetration seems to peak during middle school (or the first two years of secondary school), whereas cyberbullying peaks somewhat later (for overviews of prevalence rates, see for instance: Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Wölfer et al., 2013). With age, there thus seems to be a gradual shift away from physical bullying towards indirect and relational traditional bullying (Smith, 2013), and from more covert forms of traditional bullying (such as spreading rumors) to cyberbullying (which might be even more covert) (Hemphill et al, 2011).

Building on research showing that social intelligence is an important predictor of perpetration of indirect forms of traditional bullying (e.g., Kaukiainen et al., 1999), the current

paper addresses whether this characteristic is also relevant in explaining involvement in cyberbullying (compared to traditional bullying). By taking a developmental perspective, we look at how changes in social intelligence relates to changes in (cyber)bullying involvement.

Literature overview

Social intelligence and its development

Social intelligence (or social competence) refers to an underlying individual difference (Silvera, Martinussen, & Dahl, 2001, p. 313) and has been defined in diverse ways by researchers. Thorndike (1920) introduced the concept of social intelligence and defined it as a person's ability to understand and manage other people and to act wisely in human relations. In their review of (later) definitions of the concept, Silvera and colleagues (2001) show that researchers emphasize different components, such as the cognitive component ("the ability to understand other people"), the behavioral component ("the ability to interact successfully with other people") or the psychometric foundation ("the ability to perform well on a test that measures social skills"). Thus, social intelligence seems to be a multifaceted construct. Andreou (2006, p. 340) notes that although social-cognitive abilities have traditionally been seen as antecedents of good social adjustment (social intelligent individuals behave in a right way), it seems that social intelligence can also be regarded as a tool for achieving (antisocial) goals. Björkqvist et al. (2000) and Kaukiainen et al. (1999) too suggest that individuals with higher levels of social intelligence are capable of producing antisocial behavior, such as bullying, in order to accomplish desired goals.

Social intelligence develops during childhood and adolescence, whereby the process is different for different individuals (Choudhury, Blakemore, & Charman, 2006; Smith & Hart,

2008). Studies on the development of social cognitions, social intelligence, social competence, theory-of-mind skills and perspective taking often focus on the childhood period. For instance, studies show that theory-of-mind skills develop in infancy by the age of six (Sutton, Smith, & Swettenham, 1999). In the years beyond six, children get progressively better at predicting and explaining others' actions on the basis of their beliefs and desires, and at diagnosing those beliefs and desires (Sutton et al., 1999, p. 119). The development continues (subtly) during adolescence when the social environment changes enormously and the brain undergoes a restructuring process (Choudhury et al., 2006; Sharp, 2008; Steinberg & Morris, 2001). Adolescents are found to differ in social cognitive processes, such as perspective taking, from pre-adolescent children and adults, whereby adults have the highest proficiency, pre-adolescent children the lowest, and adolescents score in-between (Choudhury et al., 2006, p. 170).

Previous research has linked social intelligence to children's and adolescents' aggressive behavior and more specific to bullying (e.g., Andreou, 2006; Kaukiainen et al., 1999; Peeters, Cillessen, & Scholte, 2010; Wallenius, Punamäki, & Rimpelä, 2007).

(Cyber)bullying and social intelligence

Previous research on traditional bullying found seemingly contradictory results for the relation between bullying and social intelligence. Peeters and colleagues (2010, p. 1041) note that bullies can be found along the whole range of the social competence continuum and therefore vary in social intelligence. Different theoretical models have been proposed to explain these findings, such as the social information processing (SIP) model (or the social skills deficit model) (Crick & Dodge, 1996) and the theory of mind (TOM) (Sutton et al., 1999). The SIP framework describes the processes involved in responding to social cues. The model postulates

that biases or deficits in one (or more) of six different steps of communicating (encoding, interpretation, goal selection, response generation, response selection and behavioral enactment) lead to incompetent, maladaptive behavior, such as bullying (Arsenio & Lemerise, 2001; Crick & Dodge, 1994). Therefore, some bullies might be “unskilled” and low in social intelligence (Crick & Dodge, 1999). However, the authors note that not all aggressive behavior is unskilled or occurs as a function of processing deficits (Crick & Dodge, 1999, p. 128). Another theoretical framework, the TOM model, postulates that the ability of individuals to understand their own mind and that of others may underlie bullying behavior (Sutton et al., 1999, p. 119). Theory of mind is the ability to attribute mental states, such as beliefs, intentions, desires and knowledge, to oneself and others, and to understand that others have mental states that are different from one’s own (Sharp, 2008). Sutton and colleagues (1999) argue that at least some bullies are socially intelligent and have superior theory of mind skills.

Arsenio & Lemerise (2001, p. 60) note that some of the differences expressed in the debate also stem from a different definition of social competence (cf. *supra*), and from different types of aggression and bullying that are taken into account. More in particular, bullies who use indirect or relational forms of bullying, seem to differ from bullies who use direct forms (such as physical bullying) with regard to social intelligence (Andreou, 2006; Kaukiainen et al., 1999; Österman et al., 1994; Salmivalli, Kaukiainen, & Lagerspetz, 2000). Kaukiainen and colleagues (1999) found that indirect aggression correlated positively and significantly with social intelligence (adolescents aged 10 to 14), whereas physical and verbal forms of aggression had almost zero correlation. Similar, in the study of Andreou (2006), relational aggression was predicted by social intelligence, whereas overt aggression (similar to physical and verbal forms of aggression) by a lack of social skills (adolescents aged 10 to 12). More recent, Peeters et al.

(2010) found similar results for relational aggression (among a sample of eighth-graders), however, in their study (unpopular) male bullies lacking social intelligence were also highly relationally aggressive. Caravita and colleagues (2009) examined the interaction effects of theory-of-mind skills and individual and interpersonal variables (gender, affective empathy, and perceived popularity) on ringleader bullying (adolescents aged 9 to 11). A direct (positive) relation between theory-of-mind skills and bullying was found for boys, but not for girls. No significant indirect relations were found.

For cyberbullying, results are limited and also contradictory. For instance, Schultze-Krumbholz and Scheithauer (2009) did not find cyberbullies (seventh, eighth, and tenth grade) to be different from non-cyberbullies with regard to social intelligence. On the other hand, Vandebosch and Van Cleemput (2009) showed a positive relation between social competence and performing potentially offensive online practices (adolescents aged 12 to 18). An indirect relation was found by Deiss and colleagues (2012). These authors used the skills deficiency model to connect argumentative incompetence and social skills in general to cyberbullying (in a university student sample). Argumentative incompetence and social skills in general did not predict cyberbullying. The relation between argumentative incompetence and cyberbullying was moderated by internet self-efficacy. Individuals low in argumentative competence are more likely to turn to the internet to handle their aggression if they are comfortable in using the internet (high in internet self-efficacy) (Deiss et al., 2012, p. 19). The authors discuss that the skills deficiency model holds for cyberbullying on the condition that moderators, such as internet self-efficacy are taken into account (Deiss et al., 2012). For cyberbullying perpetration, no studies were found that reported differences for direct and indirect forms of bullying, as was the case for research on traditional bullying.

The present study

The current paper examines the relation between social intelligence and being a perpetrator of traditional bullying, cyberbullying or both forms over a period of two years. Based on the previous literature (e.g., Peeters et al., 2010), we expect that bullies can be found at both sides of the social intelligence continuum (low or high).

Previous studies have mostly focused on the relation between social intelligence and traditional bullying perpetration. Limited studies examined the relationship between bullying by electronic means (cyberbullying) and social intelligence. No study was found that focuses both on traditional and cyberbullying perpetration and their (longitudinal) association with social intelligence. The current paper compares the relation between traditional bullying and social intelligence with the relation between cyberbullying and social intelligence and investigates both traditional bullying and cyberbullying simultaneously (instead on focusing on direct and indirect forms of bullying). Björkqvist and colleagues (2000, p. 197) note that socially intelligent individuals choose methods that expose them to as little direct danger as possible for achieving their goals. Based on the characteristics of cyberbullying (such as the ability to remain anonymous, the “possibility to behave without directly facing the victim, and the limited amount of surveillance/control by parents and teachers), we expect that individuals with higher levels of social intelligence are more inclined to bully via the internet or mobile phone for acquiring personal goals, whether “directly” or “indirectly”.

The current study also captures changes over time (development) in bullying perpetration and in level of social intelligence as it is part of a four-wave panel study with 6-month time intervals. Studying traditional bullying and cyberbullying perpetration for a longer period of time

within this age group (10-14 years old at baseline) is interesting since knowledge on developmental trajectories of online and offline bullying is scarce (Sumter, Baumgartner, Valkenburg, & Peter, 2012). With regard to social intelligence, we expect in general (independent of involvement in bullying) a positive growth (as shown in the literature, social intelligence further develops during adolescence). We will test whether different developmental trajectories of bullying perpetration are associated with different levels and development of social intelligence.

Method

Sample

The data stem from a four-wave panel study in [NAME OF COUNTRY DELETED] with measurement points on fixed occasions (fall 2011, spring 2012, fall 2012, and spring 2013). There was a 6-month interval between each wave in order to allow a fuller understanding of developmental trajectories of personal characteristics and (cyber)bullying (main goal of the longitudinal study). This interval is adequate for capturing the relatively rapid sequence of developmental changes occurring during adolescence (Mul, 2004). A random stratified cluster sample was applied to select the respondents. The sampling criteria were grade and type of schooling (general, technical, and vocational secondary education). Due to an overrepresentation of certain grades, schooling types, and sexes, the analytic sample was weighted based on the proportions in the population. In this way, it is possible to generalize our findings for the whole population ([NAME OF NATIONALITY DELETED] adolescents aged 10 to 14 years). The sample was limited to adolescents aged 10 to 14 years at baseline as these adolescents are at higher risk for being involved in (cyber)bullying (e.g., Rigby & Smith, 2011; Wade & Beran,

2011). This age group is also interesting with regard to the developmental process of social intelligence (Smith & Hart, 2008).

Informed consent was obtained from the school head, as is customary in [NAME OF NATIONALITY DELETED] (Vandenbosch & Eggermont, 2012). Before the survey was administered, the parents of the students were notified with a letter in order to receive (passive) parental consent. Students filled in the questionnaire during school time in their school in the presence of a researcher. Students were guaranteed verbally and written that their responses were confidential.

In total, 1,802 students aged 10 to 14 completed the questionnaire at baseline and 1,103 students completed the questionnaires during the four measurement points (total attrition: 38.79%). Some students preferred not to fill in identification information (date of birth and first letter of the names of their biological parents) during one or more measurement point(s), which made it impossible to connect data from all the waves. Students could also drop out due to being absent during one or more time points. The attrition rates were: wave 1 to wave 2: 7.27%; wave 2 to wave 3: 27.65%; wave 3 to wave 4: 8.77%. The higher attrition rate between wave 2 and wave 3 could be explained by the transition to a new school year (students could change schools or classes). The analytical sample thus consisted of 1,103 students (53.3% girls) with a mean age of 12.09 years ($SD=1.45$; range 10-14). Most respondents had the [NAME OF COUNTRY DELETED] nationality (97.4%). A set of *t*-tests and Pearson Chi-squared tests explored whether there were significant differences for cyberbullying perpetration rates and levels of social intelligence between adolescents with data for four waves ($N=1,103$) and adolescents who had missing data on at least one wave ($N=699$). The results revealed that there were no significant differences for social intelligence. With regard to bullying perpetration, significant differences

were found for cyberbullying at time 1 ($\chi^2(1)=16.92$, $p<.001$), traditional bullying at time 1 ($\chi^2(1)=12.49$, $p<.001$), traditional bullying at time 2 ($\chi^2(1)=10.02$, $p<.01$), and cyberbullying at time 3 ($\chi^2(1)=6.42$, $p<.05$). Perpetration rates for dropouts were slightly lower (with exception of cyberbullying at time 1).

Measures

During each measurement point, a paper-and-pencil questionnaire was administered. For each wave, the questionnaire was exactly the same. The questionnaire consisted of a wide range of existing and newly developed questions and scales concerning cyberbullying, traditional bullying, and personal characteristics.

Self-reported cyberbullying behavior. In order to measure cyberbullying perpetration, a definition was presented to the respondents. The widely cited definition of Olweus (1993) describes bullying as an aggressive, intentional act or behavior that is carried out by a group or an individual repeatedly and over time against a victim who cannot easily defend him or herself. Following the definition, examples were given: “Bullying can happen in school, on the street, and in youth- or sport clubs. Bullying can also happen via the internet or mobile phone, for instance by texting mean messages via mobile phone or chat, by disseminating hurtful pictures via the internet or mobile phone, by posting offending reactions on message boards, and by spreading rumors via websites.” Next, respondents were asked how often they have bullied someone via the internet or mobile phone in the past six months. The answer options ranged from 1 (*never*) to 6 (*weekly*). Self-reported cyberbullying behavior was entered in the analysis as a dichotomous variable with zero as a score for “never engaged in cyberbullying in the past six months” and one as a score for “engaged in cyberbullying at least once in the past six months”

for each measurement point. In order to learn more about the type of aggression that was used, a follow-up question examined the frequencies of four different forms of cyberbullying perpetration: (1) I have sent hurtful things to somebody (such as insults, mean comments, and threats); (2) I have sent hurtful things about someone to others (such as gossip, lies, and secrets); (3) I did not send anything, but I did something else that was not nice (such as forwarding a computer virus on intention and breaking into someone's profile); (4) I have excluded or ignored someone deliberately (such as defriending someone). Again, the answer option ranged from 1 (*never*) to 6 (*weekly*).

Self-reported traditional bullying behavior. Besides cyberbullying behavior, traditional bullying perpetration was administered. These questions were introduced as followed: "The previous questions were about bullying via the internet or mobile phone. Bullying can also happen in the "real world", such as in school, in the street, in the youth movement, or in the sports club". Examples were also given: "Someone who bullies in the real world can, for example, say mean things, laugh with others, ignore or exclude someone, push or beat someone, or spread lies about someone". After the introduction and examples, respondents were asked how often they have bullied someone in the real world in the past six months. The answer options ranged again from 1 to 6 and scores were dichotomized as zero or one for each measurement point (cf. self-reported cyberbullying behavior). Subsequently, respondents were asked to indicate the frequencies (answer options ranged also from 1 to 6) of four different forms of traditional bullying perpetration: (1) I have said hurtful things to somebody (such as insults, mean comments, and threats); (2) I have said hurtful things about someone to others (such as gossip, lies, and secrets); (3) I did not say anything, but I did something else that was not nice

(such as pushing someone or breaking something of somebody else); (4) I have excluded or ignored someone deliberately.

Social intelligence. In order to measure respondents' level of social intelligence, a revised version of the Peer-Estimated Social Intelligence Scale (PESI) was used (Kaukiainen, Björkqvist, Österman, Lagerspetz, & Forsblom, 1995). The revised version consists of ten items and measures four components of social intelligence: person perception, social flexibility, accomplishment of one's own social goals and behavioral outcomes (Kaukiainen et al., 1999, p. 85). Before administering, the scale was translated to [NAME OF LANGUAGE DELETED] and back-translated to the original language to discover nuances of translation. Instead of peer nominations, self-reports were used. Self-estimated scores on social intelligence were found to correlate significantly with peer-estimated scores (Kaukiainen et al., 1999, 2002). Moreover, previous research on adolescents' aggression has used the scale with self-reports instead of peer-estimations (e.g., Wallenius et al., 2007). Response options ranged from 1 (*totally disagree*) to 4 (*totally agree*). The internal consistency of the scale (Cronbach's alpha) was acceptable for each measurement point: Wave 1: $\alpha=.783$; Wave 2: $\alpha=.808$; Wave 3: $\alpha=.832$; Wave 4: $\alpha=.837$. A mean score was computed for each respondent, for each measurement point.

Plan of analysis

In a first step, univariate and bivariate statistics were calculated for social intelligence and bullying perpetration. Second, latent class analysis (LCA) was performed on traditional bullying and cyberbullying perpetration to identify meaningful classes of individuals or "profiles" (Jung & Wickrama, 2008). Third, a latent growth model (LGM) was estimated to investigate how social intelligence develops during the four measurement points for the whole sample. Finally,

LCA and LGM were combined to examine in detail the development of social intelligence for the different profiles. For all the steps, data were weighted and school was used as a clustering variable. Mplus was used for estimating the latent classes and latent growth curves with MLR as estimator (Maximum Likelihood Estimation with Robust correction for non-normal distribution) (Muthén & Muthén, 2010).

Results

Descriptives

The results show that about 5 to 8 percent of the adolescents admitted that they had cyberbullied someone at least once in the past six months (Time 1: 6.7%, Time 2: 8.2%, Time 3: 5.2%, Time 4: 5.0%). For traditional bullying, perpetration was less stable and decreased during the four waves (Time 1: 21.5%; Time 2: 14.9%; Time 3: 10.4%; Time 4: 7.7%). Table 1 displays the frequencies of traditional bullying and cyberbullying perpetration for each measurement point. Most of the perpetrators stated that they bullied others once in the past six months. Table 2 provides more information on the frequencies of different forms of traditional bullying and cyberbullying perpetration. Chi-square tests were used to determine significant differences between each form online (cyberbullying) and offline (traditional bullying) for each measurement point. No significant differences were found. For both traditional bullying and cyberbullying, form 1 (sending/saying hurtful things to somebody), followed by form 4 (excluding or ignoring someone) are most common. None of the four forms of traditional bullying and of cyberbullying perpetration increased over the two years of the study. The frequencies of each form remained stable or declined very slightly. The lack of difference between traditional bullying and cyberbullying with regard to the frequencies of the various

bullying forms confirms that potential differences between traditional bullying and cyberbullying perpetration cannot be explained by the fact that one of them would be more (in)direct in nature.

(TABLE 1 AND TABLE 2 ABOUT HERE)

On average, scores of social intelligence were: Time 1: $M=2.64$, $SD=.43$; Time 2: $M=2.66$, $SD=.45$; Time 3: $M=2.69$, $SD=.46$; Time 4: $M=2.69$, $SD=.47$. Table 3 presents cross tabulations and t -scores for bullying perpetration and social intelligence for each measurement point. For each wave, cyberbullies had the highest level of social intelligence. Table 4 represents correlations between bullying perpetration, social intelligence, and socio-demographic variables (gender and age).

(TABLE 3 AND TABLE 4 ABOUT HERE)

Latent classes for bullying perpetration

In a second step we performed latent class analyses (mixture modeling) on (cyber)bullying perpetration to differentiate between subpopulations (based on their involvement with bullying during two years). With longitudinal data, we can identify classes that are characterized by different trajectories of the behavior under study (Collins & Lanza, 2010). Each respondent is assigned to one class only. We ran latent class analyses for one to six latent classes. Table 5 represents fit statistics for the different number of classes. Since the proportion (number of respondents) of the sixth class was very small, only the statistics for one to five classes are presented. The Akaike Information Criterion and the Bayesian Information Criterion, whereby a smaller value represents a more optimal balance of model fit and parsimony, indicate that four or five classes (AIC) or two, three or four classes (BIC) are preferable. Based on entropy, three or four classes are preferred. Entropy ranges between 0 and 1, with larger values indicating better

latent class separation. A significant p-value of the Vuong-Lo-Mendell-Rubin Likelihood Ratio test indicates that a model with k classes is better than that with $k-1$ classes. Based on the p-value of the VLMR LRT test a model with two classes is preferable. As Jung and Wickrama (2008, p. 311) indicate, determining the number of classes depends on a combination of factors, such as fit indices, but also the research question, parsimony, theoretical justification, and interpretability. Taking all these factors into account, we decided to conduct further analyses with four classes. The categorical response probabilities (range 0 to 1) of each class are presented in figure 1. The four classes were labeled as follows: (1) Adolescents who are non-stop traditional bullies; (2) Adolescents who bully (traditional and online) at the beginning of the study, but for whom the probability to perpetrate decreases over time; (3) Adolescents who are not involved in bullying at the beginning of the study, but for whom the probability to perpetrate (traditional bullying and cyberbullying) increases over time; (4) Adolescents who are not involved in bullying at any moment in time. The number of respondents and proportion for each class are : (1) Non-stop traditional bullies: $N=108$, 0.098; (2) Bullies – decreasing perpetration: $N=77$, 0.07; (3) Bullies – increasing perpetration: $N=28$, 0.025; (4) Non-involved: $N=890$, 0.807.

(TABLE 5 AND FIGURE 1 ABOUT HERE)

Adolescents in the non-stop traditional bullies class were less likely to report cyberbullying (CB) perpetration (red dotted line) and more likely to report traditional bullying (TB) (red line). Their probability to bully traditionally was the highest for measurement point one and two and decreased afterwards. Adolescents in the second category (decreasing perpetration) were likely to perpetrate both forms of bullying, but bullying decreased over time. Adolescents in the third category (increasing perpetration) were less likely to bully others at the beginning of the study,

but more likely to perpetrate both forms towards the end of the study. The fourth category consists of adolescents who were unlikely to perpetrate traditional and cyberbullying.

Unconditional growth model for social intelligence

The next part of the analyses showed a general (for all the respondents) linear growth curve for social intelligence with a gradual rise ($Y=2.647 + 0.014X$). The fit indices indicate a good fit: $\chi^2(5)=25.69, p<.001$; RMSEA=.065; CFI=.935. Both intercept (starting point) and slope (change over time) were positive and significant, which means that there is on average a positive development over time. However, the variances of intercept and slope were also significant ($p<.001$), which indicates that not all individuals grow at the same rate.

LCA and LGM combined

The unconditional growth model already indicated that the respondents differ in initial starting point and speed of change. Therefore, a latent growth curve for each profile was calculated, using latent class growth modeling (LCGM) (see figure 2) (Jung & Wickrama, 2008). The fit statistics of the model with four classes is presented in table 6 and can be compared to models with less and more classes. Table 7 shows the intercepts and slopes of the growth curves for the different profiles (latent class growth model with four classes/profiles). All classes have a positive linear growth curve, with exception of the non-stop traditional bullies (negative slope, not significant). Adolescents in class 2 (bullies - decreasing perpetration) have the highest level of social intelligence at the start of the study (intercept), but their growth (slope) is rather small. Adolescents in class 3 (bullies – increasing perpetration) have also a relative high starting value of social intelligence, but lower than that of class 2. The increase in social intelligence for adolescents in class 3 was strong (the strongest in comparison to the other classes). At the end of

the study, adolescents in class 2 and class 3 have more or less the same level of social intelligence. Non-involved adolescents (class 4) have an average starting value and growth. Adolescents in class 1 (non-stop traditional bullies) have the lowest levels of social intelligence and their level remained low during the study. In order to test whether the classes differed significantly from each other with regard to social intelligence, posterior probabilities (which is the conditional probability that an individual belongs to a certain class after all the observations are taken into account) were used to calculate mean differences (ANOVA) for social intelligence between each class for each measurement point (see table 8). Post hoc tests (Tukey HSD) indicated significant differences in social intelligence for all measurement points between “non-stop traditional bullies” and the three other classes: non-involved, “bullies – decreasing perpetration”, and “bullies - increasing perpetration” (except for measurement point 1). “Non-involved” students differed significantly from the “bullies – decreasing perpetration” class (except for measurement point 4). No significant mean difference in social intelligence was found between “bullies – increasing perpetration” and “non-involved” students, and between the classes “bullies – decreasing perpetration” and “bullies – increasing perpetration”. Within each class, gender and age (centered around the mean) were tested as predictors for the intercept and slope. Both socio-demographic characteristics were not found to be a significant predictor, with exception for age in the non-stop traditional bullies class. Older traditional bullies were found to have a lower starting point for social intelligence ($\beta = -.424, p < .05$).

(TABLE 6, TABLE 7, TABLE 8, AND FIGURE 2 ABOUT HERE)

Conclusion and discussion

The focus of this paper was on (cyber)bullying perpetration and the socio-cognitive characteristic social intelligence. As indicated in the literature section, the relation between

(cyber)bullying and social intelligence is not yet clear and longitudinal associations have not been examined yet. Also the investigation of both forms of bullying simultaneously (traditional bullying and cyberbullying), in relation to social intelligence is unique. Data were used from a four-wave panel study with 6-months time intervals amongst a sample of 1,103 [NAME OF COUNTRY DELETED] adolescents, aged 10 to 14 years.

First of all, some general conclusions can be drawn for traditional and cyberbullying perpetration, and social intelligence, independent of each other. The self-reported perpetration rates showed that a higher percentage of adolescents was involved at least once in the past six months in traditional bullying perpetration in comparison to cyberbullying perpetration. The percentage of cyberbullies was more or less stable during the period of the study, whereas the percentage of adolescents involved in traditional bullying perpetration declined. With regard to frequency, most of the bullies have bullied others once in the past six months. “Sending/saying hurtful things to somebody” and “excluding or ignoring someone” were the most common forms of traditional bullying and cyberbullying. A latent class analysis showed four profiles of bullies: non-stop traditional bullies, bullies with decreasing perpetration, bullies with increasing perpetration, and non-involved. While a separate “non-stop traditional bullies” profile was found, the analysis indicated no such group (with sufficient respondents) for cyberbullying in this age group over a period of two years. These findings seem to indicate that ICT do not create new categories of bullies (who are or were not involved in traditional bullying): amongst certain groups of youngsters cyberbullying appears to be an extension of their offline behavior, and follows the same (upward or downward) trend. Traditional bullying, on the other hand, does not always seem to be accompanied by cyberbullying. For social intelligence, as expected, there was, on average, a growth (in means) of social intelligence over the period of the study.

Secondly, the current study also examined the association between (cyber)bullying perpetration and social intelligence over time. The growth curves for each bully profile showed that profiles with a high probability to be involved in traditional bullying and cyberbullying have, on average over the period of the study, a higher level of social intelligence in comparison to the bully profile with a non-stop high probability to be involved in traditional bullying and a low probability to be involved in cyberbullying (“non-stop traditional bullies”). Phrased differently, adolescents with a relatively high level of social intelligence seem to be more inclined to be a perpetrator of traditional and cyberbullying; while those with a relatively low level of social intelligence are more inclined to bully (only) traditionally. Adolescents with on average social intelligence are most likely to be uninvolved. Social intelligence thus appears to provide a source of “power” (apart from, for example, physical strength) that might enable adolescents to traditional and cyberbully others, while the lack of social intelligence (in combination with other power sources, such as physical strength) might likewise increase the chance of involvement in traditional bullying. Another important finding relates to the initial level and change in social intelligence of the groups with decreasing and increasing (traditional and cyber) bullying perpetration. The first group started with the highest level of social intelligence and then only slightly grew on this variable. The second group started lower than the previous group, but reached eventually more or less the same level. The decrease in bullying amongst the first and the increase in bullying amongst the second group might be the result from the shifting “power” of these two groups (compared to each other and to other groups). For some bullies, the difference between their high level of social intelligence and that of others might constitute the “power imbalance”, which is necessary to bully others (cf. the definition of

bullying). It might also explain why bullying peaks at a certain point during adolescence, that is when developmental differences between youngsters of a similar age group are the greatest.

Our results point into the direction of the necessity of training (in schools) that focuses on further developing social competences and skills (e.g., for those lagging behind), and learning to use these competences and skills in appropriate ways. Empirical research shows that such training can be effective (e.g., Cherniss, Extein, Goleman, & Weissberg, 2006). Based on our results, training should try to reach especially (non-stop) traditional bullies, as their level of social intelligence is the lowest and might explain their (long-term) bullying behavior.

Adolescents who already have higher levels of social intelligence and might consider using these skills for (covert forms of) bullying, should receive the message that also these forms of bullying are unacceptable, hurtful for others, and punishable (e.g. bullying via the internet or mobile phone is not as anonymous as some may think).

The current study has shortcomings, which might open avenues for future research. Firstly, this research has focused on only one socio-cognitive characteristic, while other characteristics (such as empathy and emotional competence) might also play an important role in (the development of) bullying (Ang & Goh, 2010; Gasser & Keller, 2009) and moderate the relationship between social intelligence and (cyber)bullying. Björkqvist and colleagues (2000), for instance, show that social intelligence is required for aggressive behavior, but that empathy mitigates aggression. Other authors highlight the interdependency between social and emotional intelligence (Denham, von Salisch, Olthof, Kochanoff, & Caverly, 2008; Mavroveli, Petrides, Rieffe, & Bakker, 2007). Changes in children's and adolescents' social competence are accompanied by changes in emotional intelligence, which encompasses being aware of own emotions, and managing and expressing those emotions effectively (Mayer, Roberts, & Barsade,

2008). Previous research has already shown that adolescent bullies have a lesser understanding of the emotions of others (Lomas, Stough, Hansen, & Downey, 2012). In sum, the use of antisocial behavior in order to reach a certain goal depends on also other characteristics of the individual, but social intelligence offers the opportunity (cf. definition of social intelligence) to act in an antisocial (and prosocial) way (e.g., Björkqvist et al., 2000). Future research on the relation between (cyber)bullying perpetration and social intelligence should therefore take into account these variables.

A second remark involves the operationalization of (cyber)bullying perpetration. The widely cited definition of Olweus (1993) describes bullying as an aggressive, intentional act or behavior that is carried out by a group or an individual repeatedly and over time against a victim who cannot easily defend him or herself. This definition was presented to the respondents. Subsequently they could indicate on a six-point scale how often this “bullying” happened both off- and online in the past six months (never until weekly). Since the distribution of perpetration was skewed and most of the perpetrators perpetrated (cyber)bullying once in the past six months, a dichotomous variable was used. By using dummy coding, whereby “zero” stands for “never” and “one” for “at least once in the past six months”, the impression could be given that the repeated character of bullying was not taken into account. For instance, respondents who indicated they had bullied only once through the internet or mobile phone, could have regarded it as cyberbullying because it was part of a larger, mainly offline, bullying pattern. In their eyes, bullying “once” could also refer to one episode of bullying (consisting of several intentional, hurtful acts online or offline against someone who has difficulties in defending him or herself). With regard to cyberbullying, even when a respondent (despite the presented definition) might have indicated to have bullied someone when this in fact referred to a single intentional, hurtful

act against a person who cannot easily defend him or herself (without carrying out other acts on- and offline), we could speak of cyberbullying. Several authors (e.g., Langos, 2012; Sticca & Perren, 2013) argue (theoretically) that bullying acts performed online are often visible for a long(er) period of time and sometimes to a large audience (that may join the bully), and therefore have a high impact just as repeated (offline) bullying acts. The literature on traditional bullying and cyberbullying furthermore shows that empirical studies reporting analyses on the basis of dichotomous variables are also very common (e.g., for traditional bullying: Gradinger, Strohmeier, & Spiel, 2009; Raskauskas & Stoltz, 2007) (e.g., for cyberbullying: Vandebosch & Van Cleemput, 2009; Ybarra & Mitchell, 2004).

Finally, the present study focused on the comparison and overlap of traditional bullying and cyberbullying and did not taken into account the different forms of traditional bullying and cyberbullying, such as the important distinction between indirect and direct aggression. It could be possible, for instance, that spreading insults about someone behind the back of the victim (offline or online) seems to be more typical for adolescents with a higher or lower level of social intelligence than insulting someone directly (face-to-face or through ICT).

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Table 1

Frequencies of traditional bullying (TB) and cyberbullying (CB) perpetration for each wave

Wave		Never	Once in the past six months	Several times in the past six months	Once a month	Several times per month	Several times a week
1	TB	837 (78.5%)	140 (13.1%)	72 (6.8%)	7 (.7%)	7 (.6%)	3 (.3%)
	CB	1000 (93.3%)	54 (5.0%)	10 (.9%)	2 (.2%)	4 (.4%)	2 (.2%)
2	TB	907 (85.1%)	96 (9.0%)	45 (4.3%)	4 (.4%)	9 (.8%)	5 (.4%)
	CB	979 (91.8%)	69 (6.4%)	16 (1.5%)	0 (0%)	2 (.2%)	1 (.1%)
3	TB	961 (89.6%)	68 (6.3%)	23 (2.1%)	8 (.7%)	14 (1.3%)	0 (0%)
	CB	1025 (94.8%)	42 (3.9%)	9 (.8%)	2 (.2%)	3 (.3%)	0 (0%)
4	TB	997 (92.3%)	46 (4.3%)	19 (1.8%)	7 (.6%)	2 (.2%)	9 (.8%)
	CB	1021 (95.0%)	35 (3.2%)	9 (.8%)	2 (.2%)	1 (.1%)	7 (.6%)

Note. N (%)

Table 2

Frequencies of different forms of traditional bullying (TB) and cyberbullying (CB) perpetration for each wave

Wave		Never	Once in the past six months	Several times in the past six months	Once a month	Several times per month	Several times a week
1	TB F1	941 (86.1%)	95 (8.7%)	40 (3.6%)	5 (.4%)	10 (.9%)	2 (.2%)
	TB F2	1005 (92.1%)	50 (4.6%)	22 (2.0%)	8 (.7%)	5 (.4%)	2 (.2%)
	TB F3	1009 (92.4%)	59 (5.4%)	11 (1.0%)	3 (.3%)	10 (.9%)	0 (0%)
	TB F4	985 (90.2%)	63 (5.8%)	31 (2.9%)	3 (.3%)	8 (.7%)	1 (.1%)
2	TB F1	989 (89.7%)	62 (5.7%)	34 (3.1%)	5 (.4%)	6 (.5%)	6 (.6%)
	TB F2	1027 (94.1%)	40 (3.7%)	17 (1.6%)	2 (.2%)	3 (.3%)	2 (.2%)
	TB F3	1041 (95.3%)	33 (3.0%)	11 (1.0%)	2 (.2%)	3 (.3%)	2 (.2%)
	TB F4	1009 (92.4%)	51 (4.7%)	19 (1.8%)	2 (.2%)	3 (.3%)	7 (.6%)
3	TB F1	1020 (93.5%)	43 (4.0%)	17 (1.6%)	5 (.4%)	4 (.4%)	2 (.2%)
	TB F2	1043 (95.5%)	28 (2.6%)	11 (1.0%)	4 (.3%)	3 (.3%)	4 (.3%)
	TB F3	1053 (96.5%)	19 (1.7%)	7 (.6%)	3 (.3%)	8 (.8%)	1 (.1%)
	TB F4	1028 (94.1%)	38 (3.5%)	13 (1.2%)	5 (.4%)	2 (.2%)	6 (.6%)
4	TB F1	1013 (92.8%)	37 (3.4%)	16 (1.5%)	6 (.6%)	4 (.4%)	15 (1.4%)
	TB F2	1053 (96.5%)	15 (1.4%)	7 (.7%)	3 (.3%)	3 (.3%)	9 (.8%)
	TB F3	1050 (96.1%)	15 (1.4%)	7 (.7%)	5 (.5%)	5 (.5%)	9 (.8%)
	TB F4	1043 (95.5%)	18 (1.6%)	9 (.9%)	6 (.6%)	3 (.2%)	13 (1.2%)
1	CB F1	1061 (97.2%)	24 (2.2%)	5 (0.5%)	1 (.1%)	0 (0%)	0 (0%)
	CB F2	1068 (97.8%)	19 (1.7%)	4 (0.4%)	0 (0%)	0 (0%)	1 (.1%)
	CB F3	1080 (98.9%)	9 (.8%)	0 (0%)	1 (.1%)	1 (.1%)	1 (.1%)
	CB F4	1047 (95.9%)	35 (3.2%)	5 (.4%)	2 (.2%)	2 (.2%)	2 (.2%)
2	CB F1	1046 (95.8%)	33 (3.0%)	9 (.9%)	0 (0%)	0 (0%)	3 (.2%)
	CB F2	1063 (97.3%)	21 (1.9%)	4 (.4%)	1 (.1%)	1 (.1%)	2 (.2%)
	CB F3	1080 (98.9%)	7 (.7%)	1 (.1%)	2 (.2%)	0 (0%)	2 (.2%)
	CB F4	1046 (95.8%)	31 (2.8%)	6 (.6%)	2 (.2%)	3 (.3%)	4 (.4%)
3	CB F1	1055 (96.6%)	27 (2.4%)	6 (.5%)	0 (0%)	2 (.2%)	3 (.3%)
	CB F2	1074 (98.4%)	9 (.8%)	5 (.5%)	0 (0%)	1 (.1%)	2 (.2%)
	CB F3	1078 (98.7%)	8 (.7%)	2 (.2%)	1 (.1%)	2 (.2%)	2 (.2%)
	CB F4	1053 (96.5%)	30 (2.7%)	5 (.4%)	1 (.1%)	0 (0%)	3 (.3%)
4	CB F1	1050 (96.1%)	23 (2.1%)	7 (.6%)	2 (.2%)	1 (.1%)	9 (.8%)
	CB F2	1074 (98.3%)	6 (.5%)	4 (.4%)	2 (.2%)	2 (.2%)	4 (.4%)
	CB F3	1075 (98.5%)	7 (.7%)	3 (.3%)	0 (0%)	1 (.1%)	5 (.5%)
	CB F4	1061 (97.1%)	16 (1.5%)	5 (.4%)	2 (.2%)	1 (.1%)	8 (.7%)

Note. N (%)

F1: I have sent/said hurtful things to somebody (such as insults, mean comments, and threats); F2: I have sent/said hurtful things about someone to others (such as gossip, lies, and secrets);

F3: I did not send/say anything, but I did something else that was not nice (such as forwarding a computer virus on intention and breaking into someone's profile/ such as pushing someone or breaking something of somebody else);

F4: I have excluded or ignored someone deliberately (such as defriending someone)

Table 3

Cross tabulations and t-scores for bullying perpetration and social intelligence (SI) for each wave

Wave		<i>M</i> SI	<i>SD</i> SI	p-value <i>t</i> -test
1	Cyberbully	2.82	.57	.000***
	Non-cyberbully	2.62	.42	
	Traditional bully	2.69	.46	.059
	Non-traditional bully	2.63	.42	
2	Cyberbully	2.68	.51	.637
	Non-cyberbully	2.66	.44	
	Traditional bully	2.58	.43	.016*
	Non-traditional bully	2.67	.45	
3	Cyberbully	2.84	.61	.012*
	Non-cyberbully	2.68	.45	
	Traditional bully	2.68	.61	.797
	Non-traditional bully	2.69	.45	
4	Cyberbully	2.82	.48	.042*
	Non-cyberbully	2.68	.46	
	Traditional bully	2.74	.45	.280
	Non-traditional bully	2.68	.47	

Note. *** $p < .001$, * $p < .05$.

Table 4

Correlations between the variables (for each measurement point)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Cyberbullying T1	-													
2.Cyberbullying T2	.27***	-												
3.Cyberbullying T3	.42***	.37***	-											
4.Cyberbullying T4	.33***	.29***	.45***	-										
5.Trad.bullying T1	.37***	-.02	-.01	-.02	-									
6.Trad.bullying T2	.26***	.53***	.36***	.28***	.06*	-								
7.Trad.bullying T3	.32***	.28***	.51***	.42***	-.02	.29***	-							
8.Trad.bullying T4	-.02	-.02	-.01	.16***	.02	.08**	.07*	-						
9.SI T1	.07*	.02	.07*	.07*	-.03	.04	.05	-.01	-					
10.SI T2	-.02	-.01	.03	-.01	-.02	.00	-.03	-.01	.57***	-				
11.SI T3	.01	.00	.07*	.09**	-.09**	.01	.02	.00	.47***	.60***	-			
12.SI T4	.09**	.07*	.12***	.04	-.03	.05	.08**	-.03	.40***	.48***	.63***	-		
13. Gender (0=boy, 1=girl)	.03	.02	.07*	.07*	.00	-.03	.06	.02	-.05	-.04	-.04	.00	-	
14.Age	.07*	.01	.08**	.06*	.05	.03	.05	-.04	.07*	.06*	.07*	.08**	.02**	-

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. “Trad.bullying” stands for traditional bullying, “SI” for social intelligence.

Table 5

Fit statistics for latent class analyses with one to five classes

<i>k</i>	Pearson χ^2	AIC	BIC	Entropy	VLMR LRT p- value
1	$\chi^2(217)=1271.411, p<.001$	5381.630	5421.677	n/a	n/a
2	$\chi^2(232)=490.387, p<.001$	4554.329	4639.427	.836	.001
3	$\chi^2(225)=251.190, p<.001$	4510.583	4640.733	.898	.149
4	$\chi^2(216)=345.534, p<.001$	4467.505	4642.708	.874	.535
5	$\chi^2(207)=330.686, p<.001$	4454.733	4674.988	.830	.275

Table 6

Fit statistics of the latent class growth model (in comparison to the fit statistics of less and more classes)

<i>k</i>	Pearson χ^2	AIC	BIC	Entropy	VLMR LRT p- value
1	$\chi^2(217)=633.842, p<.001$	9170.117	9265.227	n/a	n/a
2	$\chi^2(232)=311.530, p<.001$	8340.899	8506.090	.841	.170
3	$\chi^2(206)=285.536, p<.01$	8273.149	8508.421	.904	.626
4	$\chi^2(216)=297.448, p<.001$	8265.757	8571.110	.889	.424
5	$\chi^2(206)=242.333, p<.05$	82221.874	8597.308	.927	.568

Table 7

Intercepts and slopes for the four classes model

Class	Intercept	p-value intercept	Slope	p-value slope
(1)Non-stop traditional bullies	1.554	.007**	-0.089	.618
(2)Bullies-decreasing perpetration	2.777	.000***	0.026	.226
(3)Bullies-increasing perpetration	2.590	.000***	0.093	.048*
(4)Non-involved	2.641	.000***	0.016	.000***

Note. ***p<.001, **p<.01, *p<.05

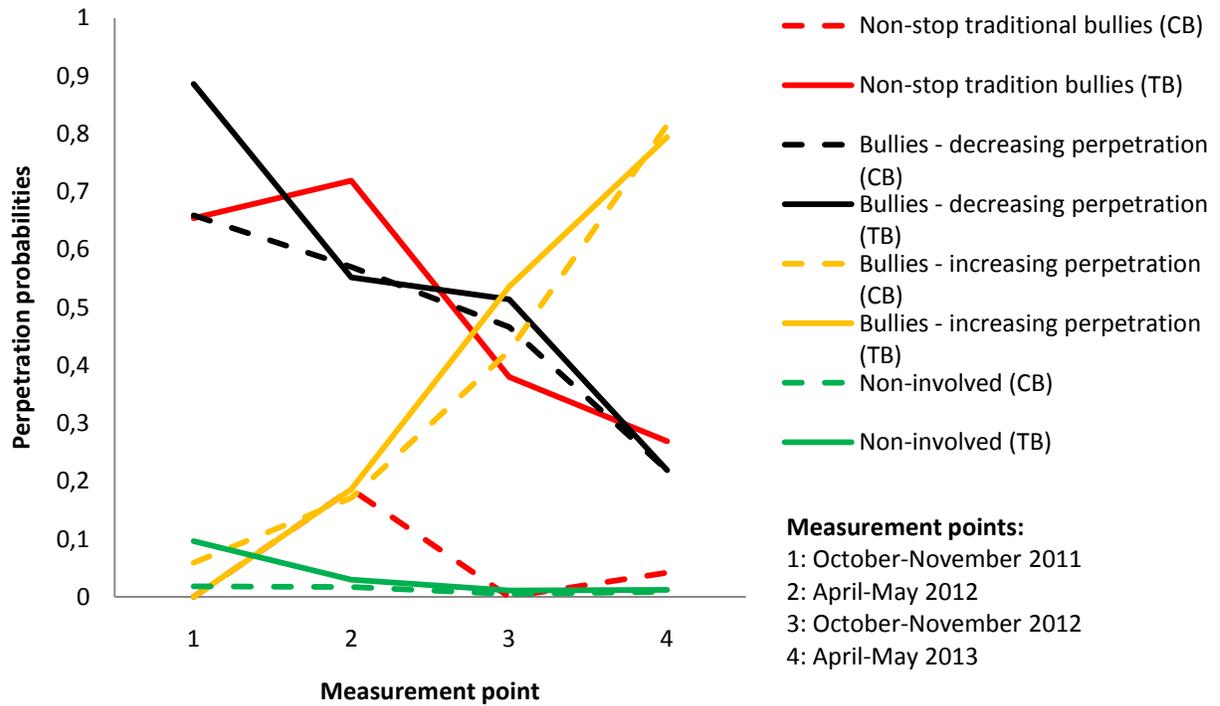
Table 8

Comparing means of social intelligence for different classes (ANOVA with Tukey HSD)

Wave	Classes	Mean difference	SE	p-value	F-test
1	(1)-(2)	.398	.055	.000	$F(3,1075)=17.928, p<.001$
	(1)-(3)	.218	.095	.100	
	(1)-(4)	.218	.040	.000	
	(2)-(3)	-.180	.097	.244	
	(2)-(4)	-.180	.044	.000	
	(3)-(4)	.001	.089	1.000	
2	(1)-(2)	.362	.058	.000	$F(3,1080)=13.722, p<.001$
	(1)-(3)	.284	.100	.023	
	(1)-(4)	.181	.042	.000	
	(2)-(3)	-.078	.101	.868	
	(2)-(4)	-.170	.045	.001	
	(3)-(4)	-.093	.093	.750	
3	(1)-(2)	.308	.062	.000	$F(3,1032)=9.215, p<.001$
	(1)-(3)	.307	.112	.031	
	(1)-(4)	.173	.045	.001	
	(2)-(3)	-.001	.113	1.000	
	(2)-(4)	-.135	.048	.027	
	(3)-(4)	-.134	.105	.578	
4	(1)-(2)	.292	.062	.000	$F(3,1024)=9.341, p<.001$
	(1)-(3)	.311	.111	.026	
	(1)-(4)	.208	.045	.000	
	(2)-(3)	.019	.112	.998	
	(2)-(4)	-.084	.048	.294	
	(3)-(4)	-.103	.104	.753	

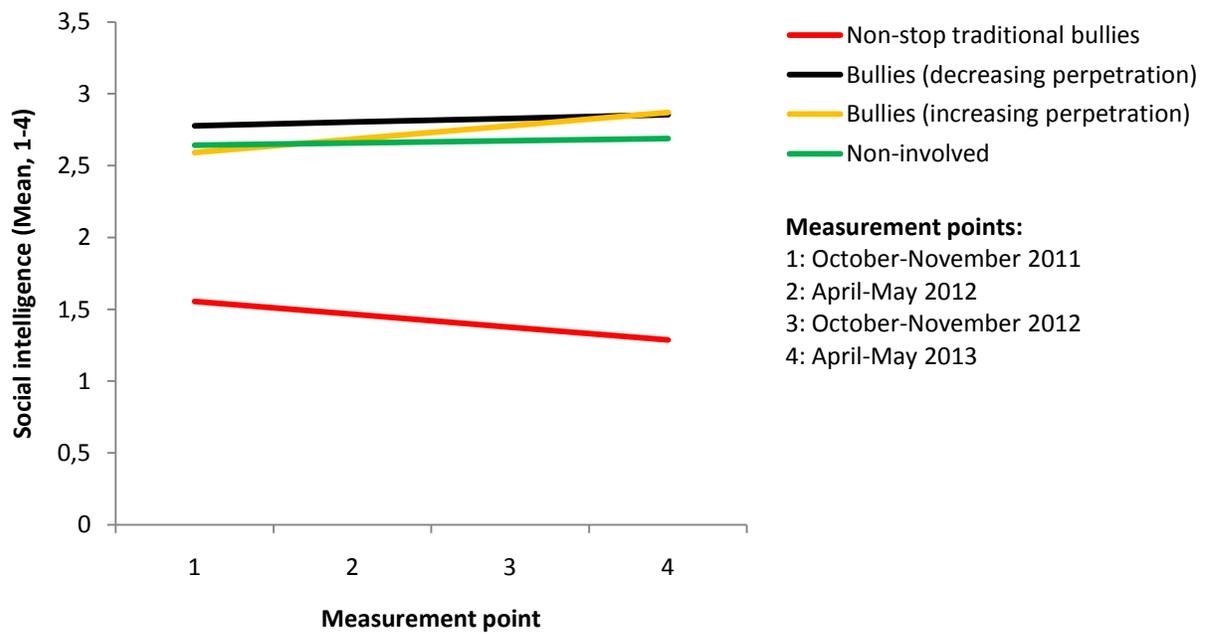
Note. (1)Non-stop traditional bullies, (2)Bullies-decreasing perpetration, (3)Bullies-increasing perpetration, (4)Non-involved

Figure 1. Four-Latent-Class Model of bullying perpetration during 2 years (N=1103)



Note. In Belgium, a school year officially begins on September 1 and ends on June 30.

Figure 2. Latent Class Growth Model (N=1103)



Note. In Belgium, a school year officially begins on September 1 and ends on June 30.