

A Mutual Hostility Explanation for the Co-Occurrence of Delinquency and Depressive Mood in Adolescence

Belén Martínez-Ferrer (1), Håkan Stattin (2)

(1) Faculty of Social Sciences University Pablo Olavide, Seville, Spain

(2) Örebro University, Örebro, Sweden

Abstract

Different interpersonal experiences are related to delinquency and depressive mood. In many studies, delinquency has been associated with exposing others to hostility, while depressive mood has been associated with being a victim of others' hostility. In this study, we proposed that adolescents with a co-occurrence of high delinquency and depressive mood may be both perpetrators and victims in their relations with parents at home, peers and teachers at school, and other people encountered in leisure time. We studied a normative sample of 1452 mid-adolescents (50.61% boys and 49.38% girls). Cluster analyses found a group with a co-occurrence of high delinquency and high depressive mood. Adolescents in this cluster group were highest on being exposed to hostility, exposing others to hostility, and being involved in mutually hostile interactions with others in different everyday contexts. The findings were especially strong when we examined being a victim and a perpetrator across contexts. The results were similar for boys and girls. We conclude that the co-occurrence of high delinquency and depressive mood among some adolescents is intimately linked to the mutually hostile interactions that these adolescents experience in their everyday interpersonal contexts.

Keywords

Adolescence, Delinquency, Depression, Hostility, Victim, Perpetrator

A large body of research has found that externalizing problems and depressive mood tend to co-occur in adolescence (Akse et al. 2007; Van der Giessen et al. 2013; Wolff and Ollendick 2006). This co-occurrence of externalizing problems and depression has been addressed from mainly three theoretical perspectives: in the shared-risk-factors, the failure, and the acting-out models (Kofler et al. 2011). All three theoretical explanations have received some support but also have limitations that restrict their generalizability. In the present study, we propose another explanation for the co-occurrence of high delinquency and depressive mood among adolescents. We suggest that adolescents with a co-occurrence of high delinquency and depressive mood are likely to be involved in mutually hostile interactions with other people in their everyday life contexts. By harming other people, they are at risk of delinquent behavior. By being victims of others' hostility, they are at risk of depressive mood.

On the surface, it might seem surprising that delinquency is positively related to depression in adolescence. This is because delinquency typically refers to problematic behaviors that are directed outwards, and depression refers to behaviors directed towards the self. Also, although etiology, treatment and prognosis differ considerably between delinquency and depression (Keiley et al. 2003; Youngstrom et al. 2003), delinquency and depressive mood typically correlate positively. Kofler et al. (2011) suggested that three theoretical perspectives could be used to explain the course over time of the co-occurrence of high delinquency and depression in adolescence. They labeled these explanations: *shared risk* factors, the *failure* model, and the *acting out* model. The shared risk factors idea is that both conduct problems and depressive mood have a background that predicts both outcomes (Wolff and Ollendick 2006). So, an underlying core of common processes or a common syndrome is likely to explain the comorbidity of the disorders (Drabick et al. 2006). On this line of thinking, it has been concluded that conduct disorder and depressive mood are highly correlated with common risk factors, such as stressful life events, poor parental attachment and parenting practices (Fergusson et al. 1996), and affiliations with deviant or delinquent peers (Lee and Bukowski 2012). However, few studies have examined whether the co-occurrence of high delinquency and depression could be explained by these risk factors (Keiley et al. 2003). In those studies, there is still too little evidence to support the idea that delinquency and depressive mood are parts of a common syndrome (Chen and Simons-Morton 2009; Lee and Bukowski 2012; Reinke et al. 2012).

The failure model, primarily based on the coercion model (Patterson 1982), suggests that high levels of conduct problems predict later depressive mood. General failure across contexts (family, school, and peer) has been presumed to be the main link between delinquency and depression (Capaldi 1992). Some findings are consistent with this model. For example, it has been shown that antisocial behavior increases the likelihood of failures in peer and academic settings that produce depressive mood and strengthen delinquent behavior (Drabick et al. 2006; Patterson and Stoolmiller 1991; Van der Giessen et al. 2013). Nevertheless, this model has two main limitations. First, some studies have not supported the presence of mediational effects of peer rejection and academic failure in explaining the link between delinquency and depression (Ritakallio et al. 2008). Second, the failure model has been confirmed mainly in boys rather than in girls (Wiesner 2003).

Finally, the acting out perspective holds that depressive mood in adolescents may cause later conduct problems because acting out is a way of expressing anger (Akse et al. 2007). The idea is that depressed adolescents act out their negative feelings and symptoms in such a way that their antisocial behaviors hide their depressive mood (Ritakallio et al. 2008). In line with this idea, some studies have found that depression predicts subsequent conduct problems, such as delinquency (Beyers and Loeber 2003; Van der Giessen et al. 2013). Again, it is important to consider gender differences. For example, Lee and Bukowski (2012) concluded that even though depression predicted delinquency, the acting out model was confirmed only in girls, whereas depression, by contrast, appeared to play a protective role against antisocial behavior in boys. Likewise, it has been suggested that both externalizing and

internalizing problems increase the risk of subsequent comorbidity in boys, while having internalizing problems is only a risk factor for girls (Boots et al. 2011; Wiesner 2003).

Although it is widely recognized that externalizing problems, such as delinquency, and internalizing problems are connected, all three main frameworks are only partially supported by existing findings. We agree with Kuhn-McKearin (2015) that several factors may account for the inconsistencies between studies: (1) little research has considered comorbidity as an outcome; (2) most studies are conducted by selecting clinical samples, which limits generalization; (3) studies that test the influence of mediational variables are scarce; and (4) more research is needed to understand the effect of sex differences on the association between conduct problems and depression. Also, it should be emphasized that the three proposed frameworks overlap rather than being separate explanations. All of them in one way or another seek to find the mechanism(s) explaining why some adolescents are both delinquent and depressed. In this study, we propose a different explanation for the co-occurrence of high delinquency and depressive mood among adolescents than the ones that have featured in previous research. It is based on adolescents' experiences of hostility in their everyday life environments.

Some adolescents are exposed to others' hostility. Adolescents who are exposed to hostile treatment by others are at risk of developing depressive mood (e.g., Juvonen et al. 2003; Manasse and Ganem 2009). Other adolescents expose others to their hostility. Here, interpersonal violence, harassment, and other forms of aggression towards others have in the literature been associated with a delinquent life style (Arseneault et al. 2006; Juvonen et al. 2003). And, some adolescents are *both* perpetrators *and* victims of others' hostility. In this study, we argue that what characterizes the adolescents with high levels of delinquency and depressive mood is that they tend to be involved in mutually hostile interactions with others; they both expose other people to their hostility, and are exposed to other people's hostility.

One of the main findings of research on children's socialization in the family is that children who are aggressive towards others and who encounter aggressiveness from others tend to come from families where hostility is reciprocated. The coercion model (Patterson 1982) makes specific predictions about how hostility experiences at home generate similar hostility experiences in other contexts. It proposes that antisocial behavior originates and is learned in the family, through aggressive parent-child interactions during childhood and adolescence. In their families, some children learn that coercion is a useful strategy to control their parents' behaviors (Brennan et al. 2014). In conflict situations at school, these children will also use the aggressive behaviors that are learned and are successful at home towards their peers at school. Their peers will react with rejection and hostility, which, in turn, places the child at greater risk of conduct problems, which may include delinquency (Snyder et al. 2005). In short, according to the coercion model, mutually hostile interactions at home risk being transferred to similar mutually hostile interactions at school. These findings are supported by studies in the field of developmental psychopathology (Shields and Cicchetti 2001) and other studies (Schwartz et al. 1997), where a history of maltreatment at home has been linked both to

aggressive behavior towards peers and being victimized by peers. The transfer of mutual hostile interactions from home to peers at school and to people encountered in leisure time was also recently found for a normal sample of adolescents (Trifan and Stattin 2015). We propose that the coercion model is a relevant theoretical model for understanding how interpersonal situations of mutual hostility emerge at home and continue in other everyday life contexts among adolescents.

Adolescents who expose others to hostility and are themselves exposed to others' hostility have been most extensively studied in bullying research. They have been labeled bully-victims, provocative victims, or aggressive victims in the literature. They stand out as having particularly serious adjustment problems, compared with both bullies (only) and victims of bullying (only), including conduct problems (Haynie et al. 2001), depressive mood (Povedano et al. 2012), and school and peer-relationship problems (Juvonen et al. 2003). The adjustment problems of the adolescents who are both bullies and victims seem to extend over longer periods than do those who either only expose others or are only exposed (Kumpulainen et al. 1999). In addition, their adjustment problems are predicted by earlier internalizing and externalizing problems (Arseneault et al. 2006), and predict later adult psychiatric disorders, both externalizing and internalizing (Kumpulainen et al. 1998; Sourander et al. 2007). In short, adolescents who both expose their peers to bullying and are exposed to bullying by their peers seem to have more serious, broader adjustment problems, and longer lasting problems, than either those who bully or those who are victims of bullying. We assume that the same might be true for adolescents who are exposed to and expose others to hostility in everyday life contexts other than the school.

The Present Study

In person-centered approaches, persons rather than variables are used as the central organizing concerns. The interest is in studying groups of individuals who are homogeneous with regard to their syndromes of functioning. Many previous studies of the co-occurrence of delinquency and depressive mood have relied on variable-centered analyses (however, see Chen and Simons-Morton 2009; Reinke et al. 2012; Wiesner and Kim 2006). They have dealt with trying to establish whether early delinquency is a predictor of later depressive mood or whether depressive mood predicts later delinquency. They have paid less attention to the core question of what characterizes adolescents with high levels of both delinquency and depressive mood. In this study, we use a person-oriented approach to address that question.

We propose that adolescents with high levels of delinquency and depressive mood tend to be involved in mutually hostile interactions with other people. They expose others to their hostility and are exposed to others' hostility. These hostile interactions are contextual. They might occur at home, at school, and in leisure time. In this study we examine the extent to which adolescents with a co-occurrence of high delinquency and depressive mood expose others to their hostility, are exposed to others' hostility, and are involved in mutually hostile interactions with others in these everyday contexts. We define mutually hostile

interactions as both exposing other people to hostility and being exposed to others' hostility in a particular interpersonal context.

Being involved in mutually hostile interactions with others may cut across contexts and reflect a more general problematic interpersonal pattern that should be more serious than living with mutually hostile interactions in any one particular setting. Extending this idea, we examined whether adolescents who were exposed to others' hostility, exposed others to hostility, and were involved in mutually hostile interactions in several of their everyday life contexts, would particularly characterize the adolescents with a co-occurrence of high delinquency and depressive mood.

Our explanation for the co-occurrence of delinquency and depressive mood is similar to the explanation that Kofler et al. (2011) labeled shared risk factors, in the sense that we expect that being involved in mutually hostility interactions with others underlies the co-occurrence of delinquency and depressive mood. However, mutually hostile interactions presume the existence of two risk factors, not one. Adolescents with a co-occurrence of delinquency and depressive mood are supposed to be high on exposing others to hostility, which in the literature has been associated with delinquency, and high on being a victim of others' hostility as well, which has been associated with depressive mood. We examined the generality of this explanation across adolescents' normal everyday life interpersonal contexts. In view of differences in findings between the sexes in several previous studies, we analyzed our results separately for girls and boys.

Method

Participants

We collected data on all 7th through 9th graders (ages 13 to 15) in seven schools in a mid-size Swedish town of about 132,000 inhabitants. There were 13 junior high schools in the town, and we selected seven of the schools in order to oversample schools in poor neighborhoods. The target sample (according to school records) consisted of 1660 adolescents (851 boys and 809 girls). Of these adolescents, data were collected at the schools on 1452 adolescents (735 boys and 717 girls), amounting to 87.5% of the sample. They had a mean age of 14.4 years (SD 0.98).

At the time of the data collection, the average annual income of the population in the areas of the selected schools (33,000 US dollars per household) was similar to the Swedish national average. About 20% of the students were of immigrant background, slightly higher than the national average (17.3%; Statistics Sweden, 2012). Thirty-seven percent of the students had divorced or separated parents, compared with 27% in the general population. Seventy-four percent of the mothers and 89% of the fathers were in regular work. The unemployment rate in the town (4.6%) was lower than the national rate (6.1%). In response to a question on their family's domestic financial circumstances, 9% of the adolescents said their parents often complained about a lack of

money, 40% said their parents complained at times, and 51% said their parents never complained.

Procedure

The adolescents filled out questionnaires in their classrooms during regular school hours. The students had 1.5 h to finish the questionnaires, and they were told that their participation was voluntary and that their answers would be handled confidentially. Via regular mail we informed parents beforehand about the data collections. If they did not want their child to take part in the collections, they could send in a pre-paid envelope to refuse participation (fewer than 1% did). Students were informed that participation was voluntary and were assured that their answers would be kept confidential. They were informed that they could withdraw from the study (3% declined). The questionnaires were administered in Swedish. Adolescents with language difficulties had research assistants to read and explain the questions to them, and had additional time to finish if needed. No monetary incentives were provided to the adolescents, but they were offered refreshments during the time it took to finish the data collection. A Regional Ethical Review Board approved the procedures for the data collection and the measures employed.

Measures

Delinquency

Participants completed a delinquency inventory (Magnusson et al. 1975). The inventory has documented high validity when comparing self-reports with official data (Stattin et al. 2010). The 19-item inventory has continuously been updated to capture the most common types of delinquent behaviors among Swedish adolescents. Different aspects of delinquent behaviors are covered, such as “Have you taken things from a store, stand, or shop without paying – during the last year?” and “Have you bought or sold something that you knew or thought had been stolen – during the last year?” The response scale ranged from (1) *No -it has not happened-* to (5) *More than 10 times*. In order not to confound delinquency with hostility, we excluded all items in the delinquency inventory that involved threats to or violent behaviors towards other people. The non-violent delinquency subscale consisted of 11 items, and Cronbach’s alpha was 0.93. The correlation between the non-violent and the violent delinquency scales was 0.80.

Depressive Mood

was measured by 16 items from the Center for Epidemiological Studies-Depression Scale for Children (CES-DC; Radloff 1977). The four well-being items in the scale were not included. The adolescents were instructed to think about the last week, and the response scale ranged from (1) *Not at all*, to (4) *Often*. Cronbach’s alpha was 0.86.

All the measures covering exposing other people to hostility or being exposed to others’ hostility in different interpersonal contexts have more fully been

reported in Trifan and Stattin (2015). Here, we restricted ourselves to minimum coverage. It should be noted that the selection of measures was based on several pilot studies. We selected measures for each context on the basis of the most frequent types of hostility that adolescents encountered or used in that specific context. The measures were developed in the research program, unless stated otherwise.

Exposed and Exposing at Home

Exposed to Parents' Hostility

Two scales captured adolescents' exposure to parents' hostility: angry outbursts (5 items) and coldness-rejection (6 items). A stem question was posed to the adolescents about their parents' (bad) reactions: "What happens if you do something your mother [father] really dislikes?" For each of the items that the adolescents rated, they were provided with three response options, ranging from (1) *Never* to (3) *Most often*. An example of a response option on the angry outbursts scale is "Becomes very angry and has an outburst", and of an option on the coldness-rejection scale "Is silent and cold towards you". Because of strong correlations between the maternal and paternal reports ($r = 0.54$, $p < 0.001$), the two sets of reports were put together and averaged. Cronbach's alpha was 0.86 for the angry outbursts scale and 0.76 for the coldness-rejection scale. With a high Cronbach's alpha (0.79), the two scales were standardized and merged.

Exposing Parents to Hostility

Exposing parents to hostility was measured using an instrument that taps defiance. Adolescents were asked eight questions regarding defiant responses on their part to parental demands (e.g., "What do you usually do when your parents ask you to turn off the computer?"). They responded on 4 or 5 point scales. Each set of response options was unique, but ranged from (1) *Doing as parents wanted* to (4/5) *Ignoring parents' views*. Examples of scale end-points were: "Don't even listen to what they say", and "Don't care about what they are saying". Because of different response scales we standardized the variables and merged them. Cronbach's alpha was 0.79.

Exposed and Exposing at School

Exposed to Peers' Hostility at School

We used three measures of being exposed to hostility from peers. All of them were preceded with the question: "Has this happened during the last year at your school". The first was a bullying measure. Adolescents were first asked broadly: "Have you been exposed to bullying this semester?" with responses on a 4-point scale ranging from (1) *Definitely not true*, to (4) *Definitely true*. They were then asked three specific questions about the last semester, such as "Have you been mocked or teased in an unpleasant way, or has anyone said nasty things to you at school or on the way to or from school?" Cronbach's alpha was 0.71.

Personal Harassment

consisted of five items that tap verbal harassment aimed at the adolescents personally. An example is: “Has anyone told you that you need to change in order to be accepted – for example, lose weight, change style, or the way you are?” Responses, which were on a five-point scale and ranged from (1) *Never*, to (5) *Daily*. Cronbach’s alpha was 0.82.

Sexual Harassment

as developed by Witkowska and Menckel (2005), was measured by seven items such as: “Has anyone commented on your looks or your body in a sexual way that you don’t like?” The five-point response scale ranged from (1) *Never*, to (5) *Daily*. Cronbach’s alpha was 0.85.

The three scales measuring the participants’ exposure to peer hostility at school had a Cronbach alpha’s of 0.80. They were standardized and merged.

Exposing Peers to Hostility at School

First, participants responded to the three bullying items described above, but, this time, with regard to how often they had bullied others during the last semester (Alsaker and Brunner 1999). Following the personal harassment items, the participants were presented with one further item, concerning whether they had harassed their school peers in a similar manner. And, after the list of sexual harassment items, the participants responded to the further question: “Have you yourself on any occasion this semester said or done any of the things described above towards another person (regarding sexual matters)?” Response options ranged from (1) *No*, to (5) *Almost every day*. Because the items were measured on different response scales, they were standardized and merged. Cronbach’s alpha was 0.80.

Exposed to Teachers’ Hostility

Exposure to teachers’ hostility covers different aspects of being exposed to negative teacher behaviors (6 items). One question was: “Are there teachers who do not care about you?” All responses were on 3- or 4-point scales, suiting the particular question: (1) *All teachers care about me (are just, give me credit, etc.)*, (2) *There is one teacher who does not...* and (3) *There are several teachers who do not....* Because the response scales varied they were standardized and merged. Cronbach’s alpha was 0.84.

Exposing Teachers to Hostility

Exposing teachers to hostility was a six-item defiance scale, involving items such as: “What do you usually do if that teacher asks you to do something you don’t feel like doing?” Each 4- or 5-point response scale was formulated to accord with the particular question, with values in a range from compliance to disregard (e.g., “Don’t listen to what he/she says and do as I please”). Because

the response scales varied they were standardized and merged. Cronbach's alpha was 0.86.

Exposed and Exposing in Free-Time

Exposed to Others' Hostility in Free-Time

We used a measure of being exposed to physical threat and violence in free-time over the last semester (Andershed et al. 2001). We asked the adolescents four questions. An example of items was: "Have you experienced other groups of adolescents attacking you for no reason during free-time?" Responses were on a four-point scale, ranging from (1) *No, it has not happened* to (4) *Yes, it has happened four or more times*. Cronbach's alpha was 0.89.

Exposing Others to Hostility in Free-Time

Participants responded to the four physical threat and violence items described above, but, this time, with regard to how often they had exposed others to physical threat and violence in free-time over the last semester. An example of items was: "Have you attacked other groups of adolescents for no reason during free-time?" Responses were on a four-point scale, ranging from (1) *No, it has not happened*, to (4) *Yes, it has happened four or more times*. Cronbach's alpha was 0.87.

Missing Data

For the sample, the average of missing data was 1.8%, and never above 5% for an individual measure. The low level of missingness meant that it was not likely to bias the results (Graham 2009). We imputed missing data using MVA Expectation Maximization in SPSS version 21.

Statistical Analyses

After reporting on the correlations among the victim and perpetrator measures, and their associations with delinquency and depressive mood, we addressed the question of whether the adolescents characterized by high delinquency and high depressive mood would emerge as a natural occurring cluster. We first attended to the distributions of the delinquency and the depressive mood measures. The depressive mood measure was fairly normally distributed, but the delinquency scale was positively skewed. We used a logarithm transformation ($\ln x$) which reduced the skewness from 4.27 to 2.46 for the delinquency scale. Next, we applied hierarchical cluster analyses (using Ward's method) on the standardized measures of delinquency and depressive mood. In order to avoid clusters with few adolescents, we assigned adolescents scoring below -2.5 standard deviations on these measures a value of -2.5 , and adolescents scoring over 2.5 standard deviations a value of 2.5 . Based on a suggestion by Bergman et al. (2003), the number of clusters was determined by how well the clusters explained the error sums of squares; the recommendation is that they should explain at least 67.5% of the error sums of squares. Next, with knowledge of the number of clusters, we used non-hierarchical cluster

analyses, K-means clustering, to arrive at the final cluster solution. Such a two-stage approach, which uses both hierarchical and non-hierarchical methods, has been recommended (Kinder et al. 1991).

Next, we expected that being exposed to others' hostility and exposing others to hostility in each of the interpersonal contexts examined would overlap, and tap a broader construct of being involved in hostile interactions with other people. We used a MANOVA to examine whether the extracted clusters differed on this broader measure of hostile interactions with other people. Expecting significant multivariate effects for the cluster groups, we followed up with univariate analyses.

In order to examine mutual hostility more directly, we dichotomized the two exposing and exposed measures in each interpersonal context. Participants whose standardized score was higher than 0.50 on both the exposing and the exposed measures were assigned the label of having "mutually hostility interactions" and all other participants were assigned the label of having "no mutually hostile interactions". We used chi square tests to examine whether the cluster groups differed with regard to being involved in mutually hostile interactions in each interpersonal context. Again, we expected the highest proportion of mutually hostile interactions for the participants with a co-occurrence of high delinquency and depressive mood.

Next, we moved on to examine the aggregation over interpersonal contexts of being a victim of others' hostility and being a perpetrator of hostility. In a MANOVA with subsequent univariate analyses, we considered whether being a victim or a perpetrator could be subsumed under the general label of being involved in interpersonal hostility across contexts, and whether the cluster group that was high on delinquency and depressive mood would contain the adolescents particularly high on exposing others to hostility and being exposed to others' hostility across contexts. In order to be able to investigate how many contexts the participants were involved in mutually hostile interactions with others, we aggregated the number of times the participants were involved in these mutual hostile interactions across the four interpersonal contexts, and used an ANOVA to examine differences between the cluster groups.

Finally, to formally test the proposition that the interpersonal condition of being both a perpetrator and a victim is related to high co-occurrence of both delinquency and depressive mood, we cluster analyzed the adolescents' reports of exposing others to hostility and being exposed to others' hostility across the interpersonal contexts. We used the same two-stage clustering approach as earlier. We cross-tabulated this cluster solution with the cluster solution for the delinquency and depressive mood measures, and we used the EXACON program for single-cell contingency table analysis (Bergman and El-Khoury 1987) to determine whether the adolescents with a high co-occurrence of delinquency and depressive mood were highly overrepresented among the adolescents involved in mutually hostile interactions. In all the analyses above we examined differences between boys and girls.

Results

Correlates

Table 1 reports the correlations among the main measures in the study. With regard to sex differences, girls reported more depressive mood and less delinquency than boys. Girls were less exposed to others' hostility in leisure time compared with boys; they exposed peers and other people in leisure time to their hostility less; but they exposed their parents to their hostility more than boys did. With regard to hostility, first, delinquency and depressive mood correlated positively and significantly with all the hostility measures in the study ($p < 0.001$ at least). Second, being exposed to hostility in one interpersonal context was positively and significantly correlated ($p < 0.001$ at least) with being exposed in other interpersonal settings. With one exception (exposing at home and being exposed in leisure time) exposing others to hostility in one interpersonal setting was positively and significantly correlated ($p < 0.001$ at least) with being exposed to others' hostility in the other interpersonal settings. Third, with the exception of the home environment, in the other interpersonal contexts – peers, teachers, and people met in leisure time – exposing others to hostility was highly related to being exposed to hostility in the same interpersonal environment (r varied between 0.48 to and 0.69). Overall and central to the present study, being exposed to hostility and exposing others to hostility were not antagonistic conditions. They correlated positively.

Table 1
Correlations among the main measures in the study ($N = 1452$)

| | Delin q. | Depre ss. | Exposed by others: | | | | Exposing others: | | | |
|--------------------------|-------------|--------------|--------------------|-------|--------------|-------------|------------------|-------|--------------|-------------|
| | | | Home | Peers | Teach ers | Leisur e | Home | Peers | Teach ers | Leisur e |
| Gen der ¹ | - | 0.3 | 0.0 | - | - | - | 0.0 | - | - | - |
| | 0.1 | 0** | 2 | 0.0 | 0.0 | 0.17 | 8** | 0.1 | 0.0 | 0.1 |
| | 6** | * | | 2 | 1 | *** | | 6** | 3 | 9** |
| | * | | | | | | | * | | * |
| Deli nq. ² | | 0.1 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.4 | 0.3 | 0.4 |
| | | 6** | 7*** | 5** | 8** | 5** | 6** | 5** | 5** | 7** |
| | | * | | * | * | * | * | * | * | * |
| Dep ress. | | | 0.37 | 0.3 | 0.2 | 0.1 | 0.16 | 0.17 | 0.1 | 0.11 |
| | | | *** | 7** | 7** | 4** | *** | *** | 9** | *** |
| | | | | * | * | * | | * | | |
| Exp osed | | | | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | | | | 4** | 9** | 5** | 2** | 8** | 8** | 4** |

| | Delinq. | Depress. | Exposed by others: | | | Exposing others: | | | |
|-------------------|---------|----------|--------------------|-------------|-------------|------------------|-------------|-------------|-------------|
| | | | Home Peers | Teach ers | Leisure | Home Peers | Teach ers | Leisure | |
| home | | | * | * | * | * | * | * | |
| Exposed peers | | | | 0.30** * | 0.45** * | 0.16*** | 0.59** * | 0.30** * | 0.34** * |
| Exposed teachers | | | | 0.13** * | 0.31*** | 0.27** * | 0.48** * | 0.14** * | |
| Exposed leisure | | | | | 0.01 | 0.44** * | 0.17*** | 0.69** * | |
| Exposing home | | | | | | 0.18** * | 0.42** * | 0.05* | |
| Exposing peers | | | | | | | 0.36** * | 0.48** * | |
| Exposing teachers | | | | | | | | 0.22** * | |

Delinq. Delinquency, *Depress.* Depressive symptoms

¹ boys =1, girls =2. ² These correlations were almost identical to those using the logarithm-transformed delinquency scale

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A Cluster Analysis of Delinquency and Depressive Mood

We expected that there would be a distinct group of adolescents who would be high on both delinquent behavior and depressive mood. If these adolescents were a naturally occurring subgroup, they would emerge as a separate cluster when cluster-analyzing the two measures, delinquency and depressive mood. We first performed a hierarchical cluster analysis using Ward's method. In this analysis, four clusters explained 71.8% of the error sums of squares. We then performed a non-hierarchical cluster analysis, K-means clustering, for the four clusters, and the final clusters are reported in Table 2.

Table 2

Cluster analysis of delinquent behavior and depressive mood. The delinquency and depressive mood measures are standardized

| | Cluster: | | | |
|-------------------|-----------------------|-----------|-----------|-----------|
| | 1 | 2 | 3 | 4 |
| | LL^a | AH | HA | HH |
| Delinquency | -0.46 | -0.28 | 1.22 | 1.52 |
| Depressive mood | -0.61 | 1.11 | -0.42 | 1.25 |
| N | 808 | 361 | 181 | 102 |
| Sample percentage | 55.6 | 24.9 | 12.5 | 7 |
| Boys ^b | 448 | 94 | 137 | 56 |
| % boys | 55.4 | 26 | 75.7 | 54.9 |
| Girls | 360 | 267 | 44 | 46 |
| % girls | 44.6 | 74 | 24.3 | 45.1 |

For depressive mood: Low values (L): lowest value through -0.50 ; Average values (A): -0.49 through 0.49 ; High values (H): 0.50 through highest value. Because the delinquency scale was positively skewed, we changed the cut-offs to match the depressive mood measure. For delinquency: Low values (L): lowest value through -0.30 ; Average values (A): -0.29 through 0.29 ; High values (H): 0.30 through highest value

^aLL = low values for delinquency and low values for depressive mood

^bCross-tabulation between gender and cluster-group belonging: $\text{Chi}^2 = 141.05$ (3 df), $p < 0.001$; contingency coefficient = 0.30

As shown in Table 2, the four clusters that emerged had: (1) low values on both delinquency and depressive mood, (2) average values on delinquency and high values on depressive mood, (3) high values on delinquency and average values on depressive mood, and (4) high values on both delinquency and depressive mood. This last group, which is central to this study, contained 7% of the sample. To conclude, our cluster analysis verified the existence of a group of adolescents who scored high on both delinquent behaviors and depressive mood. Boys were overrepresented in the cluster group of adolescents scoring high on delinquency and average on depressive mood, and girls were overrepresented in the cluster group scoring average on delinquency and high on depressive mood. However, about as many boys as girls made up the group of adolescents who were high on both delinquency and depressive mood.

Are Adolescents with a Co-Occurrence of High Delinquency and Depressive Mood Exposed to Others' Hostility and Do they Expose Others to their Hostility in their Different Interpersonal Contexts?

After determining the cluster membership of the adolescents, we examined whether the extracted clusters differed from each other on the measures of being exposed to others' hostility and exposing others to hostility in the different interpersonal contexts – presuming that this would be particularly true for the participants with a co-occurrence of high delinquency and depressive mood. Our hypothesis is that adolescents with a co-occurrence of high delinquency and depressive mood will be particularly characterized by being exposed to others' hostility and exposing others to their hostility. We used a MANOVA to test this hypothesis. We assumed that the different measures of being exposed to hostility by others at home, at school, and in leisure time, and also exposing others to hostility at home, at school, and in leisure time, would conceptually overlap and tap a broader construct of being involved in hostile interactions with other people. In order to examine whether the measures could be aggregated into a single score, we first performed a reliability analysis, which included all eight measures of exposing others and being exposed by others in the different contexts. We found a Cronbach's alpha of 0.77 and an inter-item correlation of 0.30. In the multivariate tests of the MANOVA, we found a significant effect of cluster group: $F(24, 4168) = 27.76$, $p < 0.001$, Wilks' $\Lambda = 0.65$, $\eta^2 = 0.13$. We also found a significant effect of gender, $F(8, 1437) = 16.45$, $p < 0.001$, Wilks' $\Lambda = 0.92$, $\eta^2 = 0.08$, and a significant gender x cluster group interaction, $F(24, 4168) = 4.36$, $p < 0.001$, Wilks' $\Lambda = 0.93$, $\eta^2 = 0.02$. Cluster group can be considered to have a medium effect, while the gender and the gender x cluster group interaction effects can be considered small.

We followed up the multivariate test with univariate tests. Considering first the four cluster groups, we found significant differences ($p < 0.001$) between them on all eight hostility measures. The average partial eta square across the measures was 0.12, ranging from 0.08 to 0.17. Three of the eight hostility measures differed between boys and girls. Boys scored higher on exposing peers at school, being exposed to hostility in leisure time, and exposing others to hostility in leisure time. The average partial eta square for these three

measures was 0.03, ranging from 0.01 to 0.05. Finally, we found a significant gender x cluster group interaction for three of the eight measures, *p* value between 0.004 and 0.001. Because the average partial eta squares for these three measures were low, from 0.01 to 0.02, for the total sample and for both sexes we do not report on the details of these interactions.

We present the results from the univariate tests for each of the four interpersonal contexts (family, peers, teachers, people met in leisure time) in Table 3. First, as reported in the table, in all but one of these analyses, the adolescents who were high on delinquency and depressive mood scored significantly higher on the various exposed and exposing measures than all the other cluster groups. The average effect size was 0.16, ranging between 0.07 and 0.26. Thus, they were exposed to hostility by others and exposed others to hostility in the different interpersonal contexts more than the other cluster groups. We repeated these analyses separately for the sexes. For both boys and girls, the group of adolescents with a co-occurrence of high delinquency and depressive mood had the highest scores on all the exposed and exposing measures, and they had significantly higher means in post-hoc analyses in seven of the eight comparisons (except exposing parents to hostility). Thus, we conclude that the findings obtained can be generalized across the sexes.

Table 3

Differences between cluster groups in being exposed to hostility and exposing others to hostility in four interpersonal contexts, and across all the four interpersonal settings. The exposed and exposing measures are standardized. The table also reports the proportions of mutually hostile interactions in each interpersonal context

| | Low | | Depressed | | Delinquent | | Delinquent & Depressed | |
|--|------------------------|-----------|------------------------|-----------|-------------------|-----------|-----------------------------------|-----------|
| | M | SD | M | SD | M | SD | M | SD |
| The separate interpersonal contexts: | | | | | | | | |
| Home: | | | | | | | | |
| Exposed ¹ | - 0.26 ^c | (0.77) | 0.26 ^b | (0.97) | 0.17 ^b | (0.83) | 0.86 ^a | (0.94) |
| Exposing ² | - 0.19 ^c | (0.91) | 0.13 ^b | (0.98) | 0.40 ^a | (1.02) | 0.53 ^a | (1.15) |
| % mutual hostility ¹² | 4.2 | | 14.7 | | 19.9 | | 32.4 | |
| School (peers): | | | | | | | | |
| Exposed ³ | - 0.26 ^c | (0.56) | 0.26 ^b | (0.89) | 0.26 ^b | (0.99) | 0.86 ^a | (1.23) |
| Exposing ⁴ | - 0.18 ^d | (0.51) | - 0.01 ^c | (0.61) | 0.41 ^b | (0.93) | 0.85 ^a | (1.04) |

| | Low | | Depressed | | Delinquent | | Delinquent & Depressed | |
|-------------------------------------|------------------------|--------|------------------------|--------|-------------------|--------|------------------------|--------|
| | M | SD | M | SD | M | SD | M | SD |
| % mutual hostility ¹³ | 4.1 | | 10.3 | | 22.1 | | 46.1 | |
| School (teachers): | | | | | | | | |
| Exposed ⁵ | - 0.27 ^d | (0.87) | 0.19 ^c | (0.99) | 0.43 ^b | (0.96) | 0.80 ^a | (0.98) |
| Exposing ⁶ | - 0.25 ^d | (0.82) | 0.02 ^c | (0.95) | 0.59 ^b | (1.07) | 1.01 ^a | (1.07) |
| % mutual hostility ¹⁴ | 7.9 | | 16.1 | | 34.3 | | 53.9 | |
| Leisure time: | | | | | | | | |
| Exposed ⁷ | - 0.16 ^d | (0.59) | 0.00 ^c | (0.88) | 0.21 ^b | (1.27) | 1.07 ^a | (2.11) |
| Exposing ⁸ | - 0.16 ^c | (0.54) | - 0.07 ^c | (0.81) | 0.38 ^b | (1.48) | 1.08 ^a | (2.05) |
| % mutual hostility ¹⁵ | 2.2 | | 4.7 | | 11.6 | | 26.5 | |
| Across all interpersonal contexts: | | | | | | | | |
| Exposed ⁹ | - 0.27 ^c | (0.46) | 0.19 ^b | (0.65) | 0.28 ^b | (0.74) | 0.96 ^a | (0.91) |
| Exposing ¹⁰ | - 0.23 ^d | (0.49) | 0.00 ^c | (0.56) | 0.48 ^b | (0.84) | 0.95 ^a | (0.81) |
| N of Mutual hostility ¹¹ | 0.19 ^d | (0.48) | 0.46 ^c | (0.76) | 0.88 ^b | (1.05) | 1.59 ^a | (1.09) |

Across rows, superscripts represent significant differences ($p < 0.05$) between clusters in SNK post-hoc tests

All F tests: $F(3, 1448)$. ¹ $F = 75.79, p < 0.001, \eta^2 = 0.14$; ² $F = 33.67, p < 0.001, \eta^2 = 0.07$; ³ $F = 92.69, p < 0.001, \eta^2 = 0.16$; ⁴ $F = 104.33, p < 0.001, \eta^2 = 0.18$; ⁵ $F = 67.78, p < 0.001, \eta^2 = 0.12$; ⁶ $F = 88.00, p < 0.001, \eta^2 = 0.15$; ⁷ $F = 54.87, p < 0.001, \eta^2 = 0.10$; ⁸ $F = 63.54, p < 0.001, \eta^2 = 0.12$; ⁹ $F(3, 1448) = 171.65, p < 0.001, \eta^2 = 0.26$; ¹⁰ $F(3, 1448) = 169.46, p < .001, \eta^2 = 0.26$; ¹¹ $F(3, 731) = 150.33, p < .001, \eta^2 = 0.24$

All chi² tests, df = 3: ¹² chi² = 106.99, $p < 0.001$, contingency coefficient = 0.26; ¹³ chi² = 193.51, $p < 0.001$, cont. Coeff. = 0.34; ¹⁴ chi² = 188.67, $p < 0.001$, cont. Coeff. = 0.34; ¹⁵ chi² = 112.08, $p < 0.001$, cont. Coeff. = 0.27

Do adolescents who are high on delinquency and depressive mood tend to be involved in mutually hostile interactions with others in the four interpersonal contexts? We define being involved in mutually hostile interactions as scoring above the standardized score of 0.50 for both exposing others to hostility and being exposed to others' hostility. Using this mutual hostility criterion, the percentages of participants involved in mutually hostile interactions were 10.8% at home, 10.8% in school with peers, 16.5% in school with their teachers, and 5.7% in leisure time. In Table 3 (see % mutual hostility) we report the percentage in each cluster group who both were high on exposing others and being exposed to others hostility in the four interpersonal contexts. Here, the adolescents with co-occurring high delinquency and depressive mood experienced more frequent mutually hostile interactions in all four interpersonal contexts than did the other participants. The proportions of participants who were involved in mutually hostile interactions were considerably higher, and for peers at school and leisure time twice as high in the cluster with co-occurring high delinquency and depressive mood than the cluster of adolescents which was most similar – those high on delinquency and average on depressive mood. Separate analyses of boys and girls showed very similar findings, with all chi square tests being significant at the 0.001 level, and with the cluster group high on delinquency and depressive mood always having the highest proportion of participants involved in mutually hostile interactions with others.

Are Adolescents with a Co-Occurrence of High Delinquency and Depressive Mood Exposed to Others' Hostility, and Do they Expose Others to their Hostility *across* their Interpersonal Contexts?

Being involved in mutually hostile interactions with others across contexts may reflect a more general problematic interpersonal pattern than living with mutually hostile interactions in any one particular setting. We standardized each of the exposed and exposing measures and aggregated them into two exposing and exposure measures across the four contexts: family, school (peers and teachers), and leisure time. The correlation between the aggregated measure of exposing others to hostility and the aggregated measure of being exposed to others' hostility was 0.66 ($p < 0.001$).

First, we conducted a MANOVA to examine differences between the cluster groups and genders on the two aggregated hostility measures. Because there were gender difference and gender x group interactions in only some of the contexts in the earlier analyses, we expected to find only limited gender differences and gender x group interactions when we aggregated the two hostility measures across the contexts.

The multivariate test that examined differences between the cluster groups and genders on the aggregated measures, across the four interpersonal contexts, of

being exposed to hostility from others to hostility and of exposing others to hostility revealed a significant effect of cluster group, $F(6, 2886) = 105.30$, $p < 0.001$, Wilks' $\Lambda = 0.67$, $\eta^2 = 0.18$. This is a medium to strong effect. We found a significant gender effect with low effect size, $F(2, 1443) = 8.83$, $p < 0.001$, $\eta^2 = 0.01$, and a non-significant gender x cluster group effect, $F(6, 2886) = 1.71$, n.s., $\eta^2 = 0.00$.

We report differences between the four cluster groups on the aggregated hostility measures in Table 3 (see under Across all interpersonal contexts). For ease of comparison, we report the standardized scores for the aggregated measures. The findings are much in line with those that were earlier reported separately for each interpersonal context but they are stronger for the aggregated measures (the effect sizes can be considered strong). There were highly significant differences in exposing others to hostility and being exposed to others' hostility across contexts among the four cluster groups. The cluster group of adolescents that scored high on delinquency and depressive mood had higher scores on the aggregated measures of being exposed and exposing others to hostility across contexts than the other cluster groups.

We used an ANOVA to compare the cluster groups on how many interpersonal contexts they were involved in mutually hostile interactions, using the standardized score of 0.50 as a cut-off point (as previously). These results are also reported in Table 3 (see N of mutual hostility). The cluster with participants high on delinquency and depressive mood stand out with an average of 1.59 such interactions across the four interpersonal contexts. There were few sex differences. The η^2 values for boys for being exposed, exposing others, and number of mutually hostile interactions across contexts were 0.27, 0.26 and 0.26. They were 0.28, 0.26, and 0.21 for girls. These effect sizes can be considered strong.

The Specific Association between the Hostility Constellation of Scoring at High Levels of Exposing Others to Hostility and Being Exposed to Others' Hostility and the Co-Occurrence of High Delinquency and Depressive Mood

Our study hypothesis is that adolescents with a co-occurrence of high delinquency and depressive mood are both perpetrators and victims in their relations with other people. Previously, we examined the evidence of being a perpetrator and a victim separately for the four delinquency–depressive mood cluster groups, and we also examined adolescents scoring high on both being a perpetrator and a victim. Here, in this section, we perform a more formal test and expect that a high co-occurrence of both delinquency and depressive mood is related to being high on exposing others to hostility as well as being highly exposed to others' hostility.

We made use of the aggregated measures across interpersonal contexts of exposing others to hostility and being exposed to others' hostility. We cluster analyzed these two measures and found four clusters that explained 72.5% of the error sums of squares. The first cluster of adolescents ($n = 599$) had low values on both exposing and being exposed to others' hostility (-0.71 and

-0.72). The second cluster consisted of adolescents ($n = 307$) who were average on exposing and high on being exposed to hostility (-0.26 and 0.54). The third cluster comprised adolescents ($n = 346$) with elevated levels on exposing others to hostility and average on being exposed to hostility (0.41 and -0.23). Finally, the fourth cluster of adolescents ($n = 200$) was high both on exposing others and being exposed to others hostility (1.48 and 1.38) – the mutual hostility cluster.

We cross-tabulated the exposing and exposed cluster solution with the cluster solution for delinquency and depressive mood, and made use of the EXACON program for single-cell contingency table analysis (Bergman and El-Khoury 1987) to determine which specific cells occurred more often (a Type) and less often (an Antitype) than expected by chance.

As can be seen in Table 4, with a Bonferroni adjusted p -value of 0.05 and focusing on the significant types, the adolescents high on both delinquency and depressive mood were involved in mutually hostile interactions more often than expected by chance. The adolescents who were high on delinquency and average on depressive mood were also involved in mutually hostile interactions more often than expected by chance, and being quite high on exposing others to hostility and average with regard to being exposed to others' hostility was also a significant type for this cluster. Thus, the constellation of mutually hostile interactions characterized both the adolescents who were high both on delinquency and depressive mood and the adolescents who were quite high on delinquency and average on depressive mood. However, a majority of the adolescents who were high on both delinquency and depressive mood belonged to the mutually hostile interaction cluster group (67%, 67 out of 102) in comparison with a minority (29%, 53 of 181) of the adolescents high only on delinquency, 15% of the adolescents high on depressive mood, and 3% of the adolescents low on both delinquency and depressive mood.

Table 4

An Exacon analysis after cross-tabulating the cluster of exposing others to hostility and being exposed to others' hostility across interpersonal contexts with the cluster of delinquency and depressive mood

| | Delinquency-depressive mood: | | | |
|--------------------|-------------------------------------|---------------------|---------------------|------------------|
| | Low-low | Average-high | High-average | High-high |
| | (808) | (361) | (181) | (102) |
| Exposing-exposed: | | | | |
| Low-low (599) | 476 ^T | 101 ^{AT} | 26 ^{AT} | 1 ^{AT} |
| Average-high (307) | 128 ^{AT} | 132 ^T | 35 | 12 |

Delinquency-depressive mood:
Low-low Average-high High-average High-high
(808) (361) (181) (102)

| | | | | |
|--------------------|------------------|----|-----------------|-----------------|
| High-average (346) | 182 | 75 | 67 ^T | 22 |
| High-high (200) | 27 ^{AT} | 53 | 53 ^T | 67 ^T |

Chi² (9 df) = 510.62, $p < 0.001$; contingency coefficient = 0.51

T type (occurring significantly more often than expected by chance), *AT* antitype (occurring significantly less often than expected by chance)

It can also be seen in Table 4 that the adolescents high on delinquency were primarily involved in high hostility and average on being exposed to others' hostility more often than can be expected by chance, and the adolescents high on depressive mood were involved in interactions with others where they were exposed to others' hostility more often than can be expected by chance. Finally, the cluster of adolescents who scored low on both delinquency and depressive mood were overrepresented among the adolescents who reported low levels of both exposing others to hostility and being exposed to others' hostility across settings.

The findings were similar for boys and girls. For both sexes, a majority of the adolescents in the cluster group high on both delinquency and depressive mood belonged to the mutually hostile interaction cluster group (boys: 70% and girls: 61%) and a minority of the adolescents in the other clusters were members of the mutual hostility cluster (between 4 and 29% of the three other clusters for boys and between 2.5 and 32% for girls). Overall, these findings support the study hypothesis that the interpersonal condition of being high both on exposing others to hostility and being exposed to others' hostility is related to high co-occurrence of both high delinquency and depressive mood.

Discussion

The research question that we raised in this study is: What characterizes the interpersonal interactions in the daily life of adolescents who are high on delinquency and depressive mood? Our answer is that these adolescents tend to be involved in mutually hostile interactions with others. We used cluster analysis, and 7% of the adolescents fell into a cluster group high on both delinquency and depressive mood. This proportion is similar to those found in earlier studies (Overbeek et al. 2006). Members of this cluster group scored higher than those in other cluster groups on being exposed to hostility by their parents, peers, teachers, and other people encountered in leisure time, and exposing their parents, peers, teachers, and people encountered in leisure time to their own hostility. Also, the proportions of participants who were involved in mutually hostile interactions in each of the contexts examined were much higher than those of the other cluster groups. Here, we defined having mutually

hostile interactions as being high on exposing others to hostility and being exposed to others' hostility in any one context according to a common cut-off point.

The differences between the cluster group of adolescents with a co-occurrence of high delinquency and depressive mood and other adolescents were even stronger when we aggregated the measures of being exposed to others' hostility and exposing others to hostility across the interpersonal contexts. Effect size measures suggested that the differences between the cluster groups were strong for both being exposed to and for exposing others to hostility. In addition, we found the adolescents with a co-occurrence of high delinquency and depressive mood to be involved in mutually hostile interactions with others across their interpersonal contexts considerably more often than other adolescents. Also here the effect size was strong. Finally, we found that the cluster of adolescents with high delinquency and depressive mood considerably overlapped with the cluster of adolescents who were exposed to hostility *and* were exposing others to hostility across the interpersonal contexts. A majority, 67%, of the adolescents in the cluster with high delinquency and high depressive mood belonged to the cluster characterized by being exposed to hostility and exposing others to hostility. This was true for a minority of the adolescents with other constellations of delinquency and depressive mood.

Concerning gender differences, there were about equal proportions of boys and girls in the cluster group of adolescents with a co-occurrence of high delinquency and depressive mood. We found some significant gender differences between the cluster groups on the measures of being exposed to others' hostility and exposing others to hostility in the different interpersonal contexts. We also found some significant gender x group interactions. However, the effect sizes of these interactions were small. We found one significant gender difference, with low effect size, but we did not find a significant gender x group interaction when we examined differences between the cluster groups on the aggregated measures, across interpersonal contexts. In effect, the explanation we provide for the co-occurrence of high delinquency and depressive mood – that they reflect mutual hostility interactions with others – seems to be true for both genders.

Different theoretical models have been used earlier to address the question of the co-occurrence of high delinquency and depressive mood: the shared risk factors, failure, and acting out models (Kofler et al. 2011). Much research on the failure and acting out explanations has dealt with covariation over time; whether delinquency precedes depressive mood or whether depressive mood precedes delinquent behavior. With the exception of peer rejection (Ritakallio et al. 2008), the explanations that have been provided in research on these two models have centered on factors (such as social and academic failure, and the acting out of negative feelings) that have little in common with the explanation that we provide in this study. In our study we used the co-occurrence of high delinquency and depressive mood as an outcome. Commensurate with the shared risk factor explanation (Kofler et al. 2011), we argued that delinquency and depressive mood co-occur because these adolescents are involved in mutually hostile interactions with other people in their everyday life contexts. But over and above this hostility constellation interpretation, mutually hostile

interactions presume the existence of two risk conditions: being exposed to others' hostility and exposing others to hostility. We found support for our two propositions about risky hostility conditions and living with mutually hostile interactions.

What is lacking is an explanation of why some adolescents are both perpetrators and victims of hostility in their different everyday life contexts. In the bullying literature, poor anger regulation and lack of impulse control have been advanced as likely explanations of why some adolescents are both bullies and victims (Kumpulainen et al. 1998; Schwartz 2000). Also, in the developmental psychopathology literature, emotional dysregulation has been assumed to explain why maltreatment at home is associated with peer aggression and peer rejection (Shields and Cicchetti 2001). Recently, Trifan and Stattin (2015) tested these explanations when they examined whether adolescent who exposed their parents to hostility and were exposed by their parents' hostility tended to be involved in mutually hostility interactions in other everyday life contexts one year later. They found partial support for anger dysregulation and impulsivity mediating this link, suggesting that new explanations have to come in. There is a need in future studies to find explanations for how mutual hostile interactions evolve and how they become risk factors behind the co-occurrence of high delinquency and depressive mood. These explanations are likely to be built on a developmental understanding of how mutually hostile interactions at home produce similar mutually hostile interactions in other developmental contexts. Patterson's coercion model (Patterson 1982) provides, perhaps, the most comprehensive theoretical framework.

Much of previous research on young people who are both perpetrators and victims has focused on peer interactions in the school setting, where some adolescents are both bullies and victims. The general consensus is that bully-victims have particularly serious problems in comparison with adolescents who are bullies only or victims only (Kumpulainen et al. 1998; Sourander et al. 2007; Swearer et al. 2001). The same might be true of adolescents who also expose others and are exposed to others' hostility in other contexts. In this study we have shown that to be both a perpetrator and a victim is not limited to problematic peer relations at school. Adolescents can also be involved in mutually hostile interactions with their parents, as outlined in coercion theory (Patterson 1982), and also in interactions with their teachers, and in their interactions with the people that they meet in leisure time. In this study, exposing others to hostility and being exposed to others' hostility in the everyday life contexts we examined occurred most often for the cluster group of adolescents with high delinquency and depressive mood. This pattern of mutually hostile interactions was especially evident for the adolescents high on both delinquency and depressive mood when we examined being exposed to hostility and exposing other people to hostility across contexts. Possibly, when adolescents are found to be both perpetrators and victims in several of their most important interpersonal contexts this might be a reflection of a more general aggressive behavior pattern and suggest more a trait type of behavior than a state, and indicate that the co-occurrence of high delinquency and depressive mood is built on a more general psychopathological phenomenon than a contextually isolated one.

All this could have concrete clinical implications. For more effective treatments, efforts should be made to identify the extent to which these mutually hostile interactions are limited to a particular setting, for example, problematic peer interactions limited to school, or whether these mutual hostile interactions cut across contexts, potentially suggesting more general and serious interpersonal behavioral problems.

This study has both strengths and limitations. The most obvious strength is that we have proposed a new explanation for the co-occurrence of high delinquency and depressive mood among adolescents, and that our results are in line with this explanation. Another is that we used a large adolescent sample, and had good power in our analyses. Third, we took great care to measure being a victim of others' hostility and being a perpetrator of hostility in the daily interpersonal interactions of adolescents – with parents at home, with peers and teachers at school, and with people encountered in leisure time. We believe that our coverage of adolescents' hostile interactions in different everyday life contexts is appropriate for this study. Also, the psychometric properties of the measures were good. Fourth, by using person-oriented measures for data treatment, we were able to say something more specific than many earlier studies. We could identify a naturally occurring group of adolescents with a co-occurrence of high delinquency and depressive mood, and could compare them with adolescents with other types of delinquency and depressive mood conditions.

The study also has important limitations. First, we have proposed that hostile interactions in everyday settings generate a co-occurrence of high delinquency and depressive mood. However, this is a cross-sectional study and we cannot report on the directions of effects. Second, we used adolescents' self-reports of their own behavior, and of their parents', peers', and teachers' behaviors. The findings need to be confirmed by independent reports. Third, we cannot claim that the different hostility measures used in this study are directly comparable across contexts. For example, pilot studies have revealed that teachers seldom or never display directly hostile behaviors towards their pupils. Hence, we measured negative teacher reactions to the adolescents. Also, our pilot studies showed that the most common form of expressing hostility towards parents and teachers was defiance. Hence, hostility towards parents and teachers was measured with scales covering defiance. All in all, our pilot studies informed us about the problems involved in using a common measure of hostile interactions with others across interpersonal contexts. This means that we cannot claim that the level of hostility in our measures is at the same level across contexts. In addition, our measures of mutually hostile interactions do not reveal the interpersonal processes in operation. The measures do not necessarily indicate that the persons exposed to the participants' hostility are the same as the persons who expose the participants to hostility.

Finally, when measuring the co-occurrence of delinquency and depressive mood in the present study, the time frames for the two measures differ, with the last year as the reference point for delinquency and the last week for depressive mood. Thus, we cannot strictly say that these two types of problems are simultaneously present. The time frame used in the study, though, is in accordance with the current standard of considering depressed mood as a

negative emotional state that varies in intensity according to what is happening currently in one's life, and the idea that individual differences in delinquency require behavioral instances aggregated over longer periods of time to surface. Even though the time frames differed, information in our project shows that year-to-year stability was at the same level for delinquent behavior and depressive mood (0.47 and 0.49, respectively).

In this study we have advanced a new explanation for the co-occurrence of high delinquency and high depressive mood among some adolescents. We explain such co-occurrence on the basis of these adolescents' everyday hostility experiences. At the broadest level, the present study indicates that there is a group of adolescents who display both high delinquency and high depressive mood. In their interpersonal contexts they expose other people to hostility and they are exposed to others' hostility, and, in particular, they tend to live with mutually hostile interactions with other people in several of their everyday life contexts.

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