Psychopathology and prosocial behavior in adolescents from socio-economically disadvantaged families: The role of proximal and distal adverse life events

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Acknowledgements

This article was written while the authors were supported by a grant from the British Academy to investigate contextual risk effects on children's emotional and behavioral problems. The authors are grateful to Ciara McEwen, Anna Walton, and Rachel Hodgins who collected the data.

Word count: 6256 words

Abstract

The study investigated if proximal contextual risk (number of adverse life events experienced in the last year) or distal contextual risk (number of adverse life events experienced before the last year) is a better predictor of adolescent psychopathology and prosocial behavior. It also tested for the specificity, accumulation and gradient of contextual risk in psychopathology and prosocial behavior, and for the interaction between proximal and distal contextual risk in psychopathology and prosocial behavior. The sample was 199 11-18 year old children from a socio-economically disadvantaged area in North-East London. The Strengths and Difficulties Questionnaire (SDQ), which measures four difficulties (hyperactivity, emotional symptoms, conduct problems, and peer problems) and prosocial behavior, was used. Confounders were age, gender, and maternal educational qualifications. To model the relationship between the five SDQ scales and contextual risk multivariate response regression models and multivariate response logistic regression models that allow the error terms of the scale specific models to be correlated were fitted. This study highlighted the importance of proximal contextual risk in predicting both broad and externalizing psychopathology, and the importance of considering risk accumulation rather than specificity in predicting psychopathology. By showing that the number of proximal adverse life events experienced had a steady, additive effect on broad and externalizing psychopathology, it also highlighted the need to protect adolescents experiencing current risk from further risk exposure. By showing that the number of distal adverse life events experienced did not affect the proximal risk's impact on either broad or externalizing psychopathology, it highlighted the need to protect all adolescents, irrespective of experience of early life adversities, from risk.

Keywords: adolescence, contextual risk, multivariate response models, psychopathology

Introduction

Contextual risk factors do not occur in isolation, and it is the combination of various contextual risk factors that portends negative child outcomes (Rutter, 1979). Despite this, the body of literature that examines the relationship between multiple risk exposure and children's psychopathology using a cumulative risk approach is still relatively small (Ackerman et al., 1999; Appleyard et al., 2005; Atzaba-Poria et al., 2004; Burchinal et al., 2000; Deater-Deckard et al., 1998; Evans, 2003; Flouri & Kallis, 2007; Morales & Guerra, 2006; Sameroff et al., 1993; Tiet et al., 1998). Furthermore, research has not yet established convincingly the functional form of cumulative risk's effect on psychopathology (Appleyard et al., 2005, for a review), with consequences for both theory development and intervention design. There is evidence for a linear effect whereby increments in risk factors have a steady, additive impact on mental health problems in children (Deater-Deckard et al., 1998). But as few researchers (e.g., Appleyard et al., 2005; Deater-Deckard et al., 1998; Flouri & Kallis, 2007; Gerard & Buehler, 2004; Morales & Guerra, 2006; Simmons et al., 1987) actually report whether their investigations included appropriate tests for nonlinear patterns of cumulative risk, this ignores the possibility of a nonlinear relationship that might manifest itself as an acceleration or a leveling-off of problems at a critical level of risk. For example, there is evidence that cumulative life transitions impact on children's mental health problems in a curvilinear, accelerated manner (Simmons et al., 1987), indicating that a high level of life change is especially difficult to manage. In contrast, complicating the issue even more, recent studies with at risk samples (e.g., Morales & Guerra, 2006) demonstrate a leveling-off rather than a marked jump in the effects of stress beyond a certain level (typically beyond three stressors). Resolving the issue of the gradient of risk is important as it has implications for identifying candidates for intervention (e.g., if children with four or more risk factors are at significantly increased risk of behavior problems). In addition, the effect of the timing of cumulative risk on psychopathology is still unclear (Burchinal et al., 2008, for a review), and, related to this, it needs to be established if there is an interaction between distal and proximal risk on child

psychopathology as it is possible that the effect of one 'type' of risk on psychopathology is conditional upon the value of the other. At the same time, however one must acknowledge that risk indicators underlying the development of problem behavior in one child adjustment domain may not underlie the development of problem behavior in another child adjustment domain (Shanahan et al., 2008). In other words, the importance of testing for specificity should, equally, not be underestimated (McMahon et al., 2003).

The present study

The present study was designed to address these issues. In so doing it extended in several ways prior work on the role of contextual risk in child psychopathology. Firstly, it used a well-validated measure of cumulative risk. This is important as the variability in cumulative stressor measurement is often such that makes comparisons of studies almost meaningless. According to Grant et al. (2003) less than 10% of studies that explore cumulative risk use well-validated measures, 45% report that they developed their own measure, and the remaining ones use one of the approximately fifty currently available measures of cumulative risk. What is more, psychometric data on most of these measures are not provided, and only few of the authors who developed their own scales provide any information about their method of measurement development or even items included in their scales.

Secondly, it explored if proximal or distal cumulative risk is a better predictor of psychopathology. Few other studies have examined appropriately the effect of the timing of cumulative risk on child outcomes, but these were carried out with either very young (e.g., Ackerman, 2004) or very old children (e.g., Flouri & Kallis, 2007).

Thirdly, it compared the cumulative risk model with the specific risks model in order to test for risk specificity.

Fourthly, it searched for an appropriate functional form of the effect of contextual risk on psychopathology.

Fifthly, it tested for the presence of an interaction effect between proximal risk and distal risk on child psychopathology.

Finally, it explored the link between contextual risk and specific psychopathology (i.e., emotional symptoms, peer problems, hyperactivity, conduct problems, and prosocial behavior) as it considered contextual risk-specific psychopathology models alongside contextual risk-broad psychopathology models.

Methods

Participants and Procedure

For the purposes of this study questionnaire data from 203 (of whom 125 female) children, aged 11-18 were used. All children attended the same secondary school in London. The area of the school, using A Classification Of Residential Neighbourhoods (ACORN), a geodemographic information system categorizing all UK postcodes into various types based on census data and other information such as lifestyle surveys, is known as 'type 52'. ACORN groups the UK neighborhoods into five broad categories. Category 1 neighborhoods are the most affluent in the UK, and are characterized by high incomes, large single-family houses, and access to many amenities. Category 5 (‘Hard Pressed’) neighborhoods are the most deprived in the UK, and are dominated by government-subsidized housing estates, low incomes, high unemployment, and single parents. Each category is further subdivided into various types, and ‘type 52' is one of the subdivisions of this last category. In particular, Type 52 neighborhoods comprise of families and single parents living in council flats. The population is young and there are many school age children with young parents. The proportion of single parents is one of the highest in the country at 21%. Many women are fully occupied looking after their children. Unemployment levels are high, with many being long-term unemployed. Those that are working are in routine factory, manual or retail occupations, and overall income levels are amongst the lowest in the

country. In all, 101 (50%) of the 203 children of the study had been eligible for free school meals at some point during their school years, and 21.7% lived in single mother families.

The questionnaires were administered during regular school hours with a teacher and research assistant present throughout the survey process. Ethical approval for the study was obtained from the Departmental Ethics Committee. The school acted in loco parentis in this study, and parents were allowed to opt out their child from the study. Children were also told that they could opt out of the study at any point, were reassured that the questionnaires were anonymous and confidential, and were informed of the process of the questionnaire administration.

The aim was to cover all school years. In total there were 3 classes in Years 7, 8 and 10, and 5 classes in Year 11. Year 9 was away on the day of the questionnaire administration. The participants of this study had diverse ethnic backgrounds. Of the 203 children 102 were white, 51 black, 24 'Other', 15 'Mixed', and 11 'Asian'.

Measures

Demographics and socio-economic status (SES)

The first section of the questionnaire asked children to provide information about their gender, age (in years), and family SES which was measured by their mother's educational attainment. Children were asked to report if their mother or mother figure had a University degree or not, or did not know.

Psychopathology and prosocial behavior

These were assessed with the Strengths and Difficulties Questionnaire (SDQ), a 25-item 3-point scale (ranging from 0-2) scale measuring four difficulties (hyperactivity, emotional symptoms, conduct problems, and peer problems), as well as prosocial behavior (Goodman, 1994; 1997). Each subscale had five items such as 'constantly fidgeting or squirming' (hyperactivity), 'many worries, often seems worried' (emotional symptoms), 'steals from home, school or elsewhere' (conduct

problems), 'rather solitary, tends to play alone' (peer problems), and 'helpful if someone is hurt, upset or feeling ill' (prosocial behavior). A total difficulties scale is calculated by summing the scores for hyperactivity, emotional symptoms, conduct problems, and peer problems. Cut-off scores for the borderline/abnormal range (the SDQ cut-off score identifies 20% of the population) are 16+ for total difficulties, 6+ for emotional symptoms, 4+ for conduct problems, 6+ for hyperactivity, 4+ for peer problems, whereas the borderline/abnormal range for prosocial behavior is 0-5 (*www.sdqinfo.com*).

Contextual risk

Tiet et al.'s (2001) Adverse Life Events scale was used to measure proximal contextual risk. This scale is composed of 25 possible events occurring in the last year for which children had little or no control over (e.g., 'someone in the family died', 'someone in the family was arrested', 'negative change in parents' financial situation'), and is a modification of the Life Events Checklist (LEC; Brand & Johnson, 1982; Coddington, 1972a, 1972b), which has acceptable validity and test-retest reliability (Brand & Johnson, 1982). The LEC is a measure of exposure to potentially traumatic events developed at the National Center for Posttraumatic Stress Disorder (PTSD) to facilitate the diagnosis of PTSD. To measure distal contextual risk the scale was modified to ask participants if they had experienced any of the 25 events before the last year.

The present study follows Flouri & Kallis's (2007) recent study which also modeled the effect of adverse life events measured with Tiet et al.'s (2001) scale on broad and specific psychopathology in adolescence. However, that study was carried out with late adolescents who were at low risk of emotional and behavioral problems, measured proximal risk by the number of adverse life events experienced in the last month (rather than last year), and, as it measured distal life events by the number of adverse life events experienced in two discrete child ages (i.e., age 10 and age 15), it could not control for total distal risk, or test for the interaction between proximal and total distal risk.

Study sample

The study's main independent variables were the adverse life events scales. None of the initial 203 students had any proximal life events scale items missing. However, three students had all 25 distal life events missing, and one student had all but the first distal life event missing. As the scale was continuous those with 24 or more missing items were excluded from the analysis. All 199 of these students had valid data on the response variable (SDQ) as well as the control variables of age, gender and maternal qualifications. These 199 students were the study sample size.

In all, 62.3% of the sample was female, and the median age was 15 (mean=14.05; SD=1.92) years. Although 23.1% reported that their mother had a University degree and 64.8% reported that their mother did not have a University degree, a sizeable proportion (12.1%) did not know. In general, the study sample was at risk for emotional and behavioral problems as a higher than expected proportion were high scorers in total difficulties (35.7%), emotional symptoms (27.1%), conduct problems (34.2%), and hyperactivity (34.2%), although not in peer problems (19.6%) or in prosocial behavior problems (18.1%). Although approximately 10% of the children had experienced no adverse life events in the last year and 10% had experienced no adverse life events before the last year, only 3 children (1.5%) had experienced no adverse life events in their lives. Adverse life events experienced ranged from 0-18, 0-19, and 0-34, respectively. The median was 4 for both adverse life events in the last year and adverse life events before the last year (mean=4.09; SD=3.07, and mean=4.90; SD=3.89, respectively), and 8 for adverse life events ever experienced (mean=9.00; SD=5.79).

Non-response bias analysis

We tested whether the 4 students excluded from the analysis differed systematically from those included in the final study sample size of 199. Those missing had experienced more proximal adverse events (Mann-Whitney U $z=-2.32$, $p<.05$). However, there was no difference between the groups in the pattern of responses for SES (chi-square=1.82, df:2, $p>.05$), gender (chi-square=2.31, df:1, $p>.05$), age (Mann-Whitney U $z=-.01$, $p<.05$), or risk for total difficulties (chi-square=.35, df:1, $p>.05$), prosocial behavior problems (chi-square=.88, df:1, $p>.05$), emotional symptoms (chi-square=.01, df:1,

p>.05), hyperactivity (chi-square=.44, df:1, p>.05) or peer problems (chi-square=.07, df:1, p>.05). However, those excluded were at higher risk for conduct problems than those included in the study (chi-square=7.42, df:1, p<.001).

Results

Table 1 describes the sample. As discussed above a higher than expected percentage of the sample were high scorers in internalizing and externalizing behavior problems and broad psychopathology.

(Table 1 here)

First, we investigated the effect of the timing of cumulative contextual risk (number of adverse life events experienced) on children's total difficulties by fitting two separate baseline ordinary linear regression models. We found that although both proximal contextual risk (b=.47, se=.12) (Model 1) and distal contextual risk (b=.27, se=.09) were related to total difficulties, the effect of proximal contextual risk was the strongest. In the next step the full model was introduced. This added to Model 1 the following variables as possible control variables: distal contextual risk, age, gender, and the dummy variables for maternal education. The effect of proximal contextual risk became slightly smaller (b=.40; se=.13) but remained statistically significant (although at 1% rather than 1‰ level). None of the control variables in the full model had a statistically significant effect on total difficulties.

Next, we compared the effect of the cumulative proximal risk specification on total difficulties to the effect of the specific proximal risks specification on total difficulties controlling for distal risk, age, gender and maternal education. As Table 2 shows none of the specific proximal risks were associated with total difficulties. The only statistical significant predictor (at p<.05) of total difficulties in the specific proximal risks model was distal risk. To compare the goodness of fit of the cumulative risk and the specific risks models we used the Akaike Information Criterion (AIC) (Akaike, 1974) which can be applied with non-nested models. As can be seen in Table 2, the AIC for the cumulative risk

model was much lower than that for the specific risks model. Thus, we conclude that the cumulative risk model specification should be preferred, and therefore this risk specification is used for the remainder of the statistical analysis.

(Table 2 here)

In order to establish the appropriate functional form of the effect of proximal risk on broad psychopathology, we introduced a quadratic term for proximal risk in the full cumulative risk model. Its effect was, however, statistically nonsignificant (b=-.03, se=.02), suggesting that the relationship between proximal risk and total difficulties is linear. Next, we tested for the effect of the interaction between distal and proximal risk on broad psychopathology. The interaction was also statistically nonsignificant (b=-.03, se=.02), suggesting that the impact of proximal risk on total difficulties does not depend on the level of distal risk.

We then examined the effect of proximal risk on the four difficulties (hyperactivity, emotional symptoms, conduct problems and peer problems) and prosocial behavior. As each adolescent provided responses for each of the five SDQ scales, it is possible that responses are correlated. Ignoring this correlation by modeling each of the five SDQ scales separately may therefore lead to erroneous estimated standard errors for the regression coefficients, and so to erroneous statistical inferences. To account for the existence of correlation in each adolescent's responses we employed a multivariate response regression model that allows the error terms of the different models to be correlated. Let us denote by i the subscript referring to an adolescent and by j the subscript referring to the SDQ scale such that y_{ij} is a vector that contains the 5 SDQ scale scores j for each adolescent i. The multivariate response regression model is then defined as

$$y_{ij} = X\beta + \varepsilon_{ij}, \quad (1)$$

where $\varepsilon_{ij} \sim N(0, \Sigma_{\varepsilon})$ with Σ_{ε} denoting the variance covariance matrix between the error terms ε_{ij}, X are the control variables, and β is the set of regression parameters to be estimated. In effect this

model provides an extension to the conventional regression model by allowing the error terms ε_{ij} associated with the model for each SDQ scale to be correlated. Put simply, modeling specific psychopathologies in a multivariate (simultaneous) way offers a more flexible modeling framework as it can accommodate different covariates for the different SDQ subscales as well as allow for the correlation between unobserved factors affecting scores on the different SDQ subscales. To fit model (1) we used the statistical software package MLwiN (Goldstein, 2003).

Initially, two separate baseline models were fitted. We found that although both proximal risk and distal risk were related to hyperactivity (b=.201, se=.052, and b=.106, se=.042, respectively) and conduct problems (b=.190, se=.042, and b=.115, se=.034, respectively) the effect of proximal risk was stronger, and that only proximal risk was related to prosocial behavior (b=-.088, se=.044). In the next step the full model was introduced (see Table 3). This added the following variables as possible control variables: distal risk, age, gender, and the dummy variables for maternal education. The effect of proximal risk was reduced but was still significant on both hyperactivity and conduct problems, and became nonsignificant in predicting prosocial behavior. As with the full model predicting total difficulties distal risk was nonsignificant in predicting hyperactivity, although it was significant in predicting conduct problems. This suggests that distal risk is related to conduct problems in a different way to how it is related to hyperactivity and broad psychopathology.

From Table 4, we can see that the size of the error term correlations suggests that it was advantageous to model the five SDQ scales simultaneously, and that, as expected, there was a moderately strong positive correlation between unobserved factors affecting hyperactivity and conduct problems, and emotional symptoms and peer problems, and a moderately strong negative correlation between unobserved factors affecting prosocial behavior and hyperactivity, and prosocial behavior and conduct problems.

(Tables 3 and 4 here)

To test whether the effect of proximal risk on the specific problem behaviors is linear or non-linear we ran these multivariate response models including a quadratic term for proximal risk. We found that, as with the relationship between proximal risk and total difficulties, the relationship between proximal risk and each of the five SDQ scales was linear. This suggests that linearity is not rejected in favor of a quadratic specification. Next, we tested for the effect of the interaction between distal and proximal risk on the five SDQ scales by fitting these multivariate response models including an interaction between distal and proximal risk. The results showed that, as with the relationship between proximal risk and broad psychopathology, the relationship between proximal risk and each of the five SDQ scales was not a function of the number of distal adverse life events experienced.

Further Analyses

Although using normal probability plots of the model residuals indicated that departures from the normality assumption were not severe, it was important to strengthen our analysis (Burchinal & Clarke-Stewart, 2007). Therefore, we decided to replicate our analyses by modeling the probability of being in the borderline/abnormal range as opposed to the normal range for total difficulties using logistic regression, and also by modeling the probability of being in the borderline/abnormal category as opposed to the normal category for each of the SDQ scales (i.e., hyperactivity, emotional symptoms, conduct problems, peer problems and prosocial behavior) using a multivariate response logistic regression model to account for the potential existence of correlations in each adolescent's responses.

Let us denote by i the subscript referring to an adolescent and by j the subscript referring to the SDQ scale such that π_{ij} denotes the probability that adolescent i is classified as being in the borderline/abnormal range, as opposed to the normal range of SDQ scale j. The multivariate response logistic regression model is then defined as

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = X\beta + \varepsilon_{ij}$$

In general the findings obtained from modeling the binary outcomes replicated those obtained from modeling the continuous outcomes (analyses available from the authors).

Discussion

This study was carried out to explore the role of contextual risk in adolescent psychopathology and prosocial behavior. Assessing with a well-validated measure proximal and distal contextual risk in a community sample of 11-18 year-old children it showed that, although the number of adverse life events experienced in the past (distal contextual risk) did predict broad and externalizing psychopathology the number of proximal (i.e., in the last year) adverse life events experienced (proximal contextual risk) was a better predictor of broad and externalizing psychopathology. Although distal risk became nonsignificant once proximal risk was accounted for in the full model predicting broad psychopathology and hyperactivity, it remained significant in the model predicting conduct problems. This suggests that experience of early contextual risk affects differentially the different types of problem behavior in adolescence. The study also found that neither distal nor proximal risk was significant in predicting emotional symptoms, peer problems or prosocial behavior. Taken together these findings highlight the importance of considering both broad and specific psychopathology when examining the effect of the timing of contextual risk.

In addition, by showing that the most parsimonious model was the cumulative proximal risk model rather than the specific proximal risks model, the study highlighted the importance of investigating the number rather than type of proximal contextual risks when predicting broad psychopathology. This suggests that prevalence estimates or identification of high risk youth may be underestimated if based solely on exposure to a single extreme risk factor. This means that by identifying solely 'extreme' risk on the basis of single risk factors those who may be at higher risk due to experience of multiple medium-level risks are neglected. Clinical assessment of emotional and

behavioral problems should, therefore, include a comprehensive assessment of environmental components.

Furthermore, the tests carried out to model the appropriate functional form of the effect of proximal contextual risk on psychopathology showed that increments in the number of proximal adverse life events experienced have a steady, additive effect on psychopathology, which highlights the importance of protecting adolescents at risk from further risk exposure. Finally, the study showed that distal risk did not moderate the relationship between proximal risk and psychopathology and prosocial behavior. This suggests that the effect of the number of proximal contextual risks on psychopathology and prosocial behavior was not a function of the number of contextual risks experienced earlier in life.

The correlations between the error terms for the various problem behaviors suggest that variables beyond those indexed by distal and proximal contextual risk, gender, age, and maternal education potentially contribute to a shared vulnerability process. We use "potentially" because this correlation could reflect processes other than shared vulnerability, such as shared method variance or reciprocal influences. Put simply, this study showed that any left-out predictors of the adolescent outcomes examined are correlated.

The strengths of this study should be seen in light of its limitations. Firstly, because of the small sample size the power to detect interactions and to compare the cumulative risk model with the specific risks models was limited. Related to this, the sample was not representative of the UK adolescent population as a larger, than expected, percentage of the study sample met at least borderline cut-offs for total difficulties, emotional symptoms, hyperactivity, prosocial behavior problems and conduct problems on the SDQ. Secondly, this study, as the well-known Adverse Childhood Experiences (ACE) Study (e.g., Anda et al., 1999; Chapman et al., 2004; Dube et al., 2001; Whitfield et al., 2005) is a retrospective study of contextual risk. Although retrospective designs may suggest possible risk factors for outcomes, the test of the validity of these hypothetical relationships lies in

prospective designs (e.g., Widom et al., 2004) and experiments (e.g., Costello et al., 2003). On their own, retrospective reports are susceptible to problems in interpretation due to selective memory biases (e.g., highly traumatized individuals experience high levels of dissociative states and impaired memory), which makes the crude distinction between recent vs. not-as-recent events made this study to operationalize proximal vs. distal adverse life events more problematic. Related to this, the threat to reliability and validity of using retrospective reporting of life events becomes an increasing problem as the reporting interval lengthens. This suggests that the measure of distal adverse life events used in this study may be particularly problematic. Thirdly, two items ('family member had drug/alcohol problem' and 'family member had mental/emotional problem') of the Adverse Life Events Scale are likely to be chronic conditions that might also be associated with the genetic basis of the psychopathology of the youth. Fourthly, the checklist of adverse life events used calculates cumulative risk by a simple summation of the multiple risk categories. In other words, the scale chosen did not weigh items for importance. This was for two reasons (Evans, 2003). First, the foundation of cumulative risk theory is that the confluence of risk factors rather than any singular risk, regardless of its context, is what leads to dysfunction because it overwhelms the adaptive capacities of the organism. In this framework, therefore, no one risk factor is seen as more important than another. Second, weighted models do not outperform unweighted models over repeated applications. Fifthly, in this study there was information from a single source, the adolescent. This could falsely raise correlations. This study would have been much stronger if parents had also reported on life events. Finally, the possibility that the direction of effects is not what we specified (e.g., Kim, Conger, Elder, & Lorenz, 2003) cannot be ruled out.

To develop the field further future studies should extend the work on the role of contextual risk in children's psychopathology in several ways. Firstly, to echo Grant et al.'s (2003) suggestion, future studies should aim to use taxonomies of stressors similar to the taxonomies developed for child and adolescent psychopathology. Secondly, studies using a cumulative approach to family contextual risk in particular should disentangle the family-wide from the child-specific risk factors. With few

exceptions (e.g., Ackerman et al., 1999), studies group in the same cumulative risk index both behaviors which can be child-specific (such as parenting or abuse) and family-wide factors such as household dysfunction or poverty. For example, the ACE Study operationalized cumulative contextual risk on the basis of the presence/absence of eight adverse childhood experiences: emotional, physical, and sexual abuse; a battered mother; parental separation or divorce; and growing up with a substance-abusing, mentally ill, or incarcerated household member. Thirdly, they should explore within family and within area effects.

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Table 1: Descriptive statistics (N=199)

Variables	Mean (SD) or %
Number of adverse life events experienced in the last year (0-18)	4.09 (3.07)
Number of adverse life events experienced before the last year (0-19)	4.90 (3.89)
Total number of adverse life events ever experienced (0-34)	9.00 (5.79)
Emotional symptoms (0-10)	3.89 (2.46)
Hyperactivity (0-10)	4.50 (2.33)
Conduct problems (0-8)	2.75 (1.93)
Peer problems (0-9)	2.18 (1.71)
Prosocial behavior (2-10)	7.37 (1.92)
Total difficulties (3-26)	13.33 (5.26)
Borderline/abnormal emotional symptoms	27.1%
Borderline/abnormal hyperactivity	34.2%
Borderline/abnormal conduct problems	34.2%
Borderline/abnormal peer problems	19.6%
Borderline/abnormal prosocial behavior	18.1%
Borderline/abnormal total difficulties	35.7%
Girl (vs. boy)	62.3%
Age (11-18)	14.05 (1.92)
Mother has University degree (vs. ‘don’t know’)	23.1%
Mother does not have University degree (vs. ‘don’t know’)	64.8%

Table 2: Cumulative risk and specific risks model specifications: Total Difficulties

Adverse life events in the last year model specification	Cumulative risk			Specific risks		
Variables	Coeff.	S.E.		Coeff.	S.E.	
Number of adverse life events in the last year	**.40**	**.13**		n.a.	n.a.	
Type of adverse life events in the last year						
Someone in the family died (N=69)	n.a.	n.a.		-.41	.86	
Family member was seriously injured (N=57)	n.a.	n.a.		-.44	.93	
Saw crime or an accident (N=72)	n.a.	n.a.		1.01	.88	
Lost a close friend (broke/split up) (N=78)	n.a.	n.a.		.98	.87	
Close friend was seriously sick or injured (N=37)	n.a.	n.a.		.02	1.14	
Negative change in parent's financial situation (N=42)	n.a.	n.a.		1.05	1.10	
Family had drug/alcohol problem (N=17)	n.a.	n.a.		-1.28	1.49	
Got seriously sick or injured (N=44)	n.a.	n.a.		1.08	1.00	
Parents argued more than previously (N=48)	n.a.	n.a.		1.77	.99	
Mother/Father figure lost job (N=17)	n.a.	n.a.		.99	1.56	
One parent was away from home more often (N=39)	n.a.	n.a.		-1.31	1.10	
Someone in the family was arrested (N=29)	n.a.	n.a.		1.46	1.26	
Close friend died (N=13)	n.a.	n.a.		-1.68	1.69	
Family member had mental/emotional problem (N=22)	n.a.	n.a.		2.07	1.33	
Brother or sister left home (N=23)	n.a.	n.a.		-.08	1.32	
Being a victim of crime/violence/assault (N=17)	n.a.	n.a.		-1.43	1.47	
Parents separated (N=16)	n.a.	n.a.		1.37	2.11	
Parent(s) got into trouble with the law (N=5)	n.a.	n.a.		-3.74	2.63	
Attended a new school (N=43)	n.a.	n.a.		-.08	1.10	
Family moved (N=37)	n.a.	n.a.		.39	1.06	
Parents got divorced (N=7)	n.a.	n.a.		2.85	2.90	
One of the parents went to jail (N=4)	n.a.	n.a.		3.31	3.02	

Got a new step mother or step father (N=12)	n.a.	n.a.		-1.07	1.80	
Parent got a new job (N=45)	n.a.	n.a.		1.11	1.01	
Got a new brother or sister (N=21)	n.a.	n.a.		1.38	1.30	
Age	-.25	.20		-.32	.24	
Girl (ref: boy)	.53	.77		.11	.83	
Mother has University degree (ref. 'don't know)	-.93	1.30		-1.06	1.39	
Mother does not have University degree (ref. 'don't know')	-.55	1.19		-.56	1.24	
Number of adverse life events before the last year	.15	.10		**.25**	**.12**	
AIC (Akaike Information Criterion)	1218.17			1239.04		

Table 3: Adverse life events on specific SDQ scales

	Emotional Symptoms		Hyperactivity		Conduct Problems		Peer Problems		Prosocial Behavior	
Variables	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Girl (ref: boy)	**1.599**	**.350**	-.275	.334	**-.695**	**.265**	-.102	.246	.463	.282
Age	-.027	.094	.121	.089	-.118	.071	**-.221**	**.066**	.071	.075
Number of adverse life events in the last year	.018	.059	**.186**	**.056**	**.142**	**.044**	.048	.041	-.085	.047
Number of adverse life events before the last year	.047	.046	.056	.044	**.077**	**.035**	-.027	.032	-.003	.037
Mother has University degree (ref: ‘don’t know’)	-.429	.596	-.351	.568	.028	.452	-.178	.419	.428	.480
Mother does not have University degree (ref: ‘don’t know’)	-.383	.543	.071	.518	-.034	.412	-.204	.382	.292	.437

Table 4: Correlation matrix of SDQ scales' error terms

Behavior Problem	Emotional Symptoms	Hyperactivity	Conduct Problems	Peer Problems	Prosocial Behavior
Emotional Symptoms	__				
Hyperactivity	.126	__			
Conduct Problems	.025	**.512**	__		
Peer Problems	**.307**	.032	.135	__	
Prosocial Behavior	.076	**-.257**	**-.329**	-.162	__