

**Applied Research Branch
Strategic Policy
Human Resources Development Canada**

**Direction générale de la recherche appliquée
Politique stratégique
Développement des ressources humaines Canada**

**Risk and Resilience in Six- and
Ten-Year-Old Children**

W-98-23E

by

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October 1998

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Abstract

Resilience is a life skill that is developed through the handling of stress with positive patterns of coping. It is important to understand the interplay of risk and protective factors in the development of resilience in children.

Research has shown that the chances of developing behavioural problems increase with the number of risk factors that a child experiences. The risk factors considered in this study were: low income, alcohol abuse by the mother or the father, marital dissatisfaction, depression in the primary caregiver (usually the mother), large family size, teenage pregnancy, hostility in the parent-child relationship, divorce of parents and a learning disability in the child. A risk index was constructed for each six and ten year old child in the survey. Only four per cent of children experienced four or more risks in their lives. Children not exposed to any risk factors showed a rate of difficult behaviours of approximately 10 per cent while children exposed to four or more risk factors had a rate five times higher, about 50 per cent.

Although children exposed to multiple risks in their lives have a high chance of developing behavioural problems, protective factors often buffer them and reduce the odds of such behaviours. Children who lived in stressful environments, but had close affectionate relationships, seemed to be able to cope with the difficulties they face. Their levels of problem behaviours were comparable to those for children living in low risk environments. In the absence of good relationships with people other than parents - i.e., siblings, teachers, and peers - children in multiple risk situations showed high levels of difficult behaviours.

The number of good relationships children had was found to correlate strongly with resilience. Among six-year-olds, one good relationship was as advantageous as three in moderating the chances of developing externalizing behaviours such as conduct disorder, hyperactivity, inattention and indirect aggression. For ten-year-olds, more than one good relationship was necessary for a protective effect.

Stressful situations may be more critical for boys than girls. Boys were less likely than girls to form close relationships and they were also more likely to exhibit externalizing behaviours. For girls, friendships played a protective role at both high and low risk. Both boys and girls were protected by good sibling relationships. Though a good relationship with a teacher was more common among girls than boys, the relationship was important for boys at all levels of risk but only in high risk situations for girls.

The quality of children's social relationships is critical in allowing them to deal with stresses in their lives. The study points to the need for a focus on relationships in any intervention or prevention strategies for children and families in high risk situations. Furthermore, because children with behavioural difficulties are not likely to recover spontaneously, it is important to intervene early before the problem is entrenched.

Résumé

La flexibilité est une aptitude fonctionnelle qu'on acquiert en faisant face au stress avec des capacités d'adaptation positives. Il est important de comprendre l'interaction des facteurs de risque et des facteurs de protection dans l'acquisition de la flexibilité chez les enfants.

Certaines recherches ont montré que les possibilités que l'enfant éprouve des problèmes de comportement augmentent avec le nombre de facteurs de risque auxquels il est exposé. Les facteurs de risque examinés dans cette étude sont les suivants : faible revenu, abus d'alcool par la mère ou le père, insatisfaction conjugale, dépression chez le principal fournisseur de soins (habituellement la mère), famille de grande taille, grossesse d'une adolescente, hostilité dans la relation parent-enfant, divorce des parents et difficulté d'apprentissage chez l'enfant. Un indice des risques a été construit pour chaque enfant de six ans et de dix ans visé par l'étude. Seulement 4 % des enfants faisaient face à quatre facteurs de risque ou plus dans leur vie. Les enfants qui n'étaient exposés à aucun facteur de risque affichaient un taux de comportement difficile d'environ 10 %, tandis que chez les enfants exposés à quatre facteurs de risque ou plus, le taux était cinq fois plus élevé, soit environ 50 %.

Même si les enfants exposés à des risques multiples dans leur vie sont plus susceptibles d'acquérir des problèmes de comportement, il arrive souvent que des facteurs de protection entrent en jeu pour les mettre à l'abri et réduire les risques de tels comportements. Les enfants qui vivent dans des environnements stressants mais qui ont d'étroites relations d'affection semblent capables de s'accommoder des difficultés auxquelles ils font face. Leurs niveaux de comportements problèmes étaient comparables à ceux des enfants qui vivent dans des environnements où les risques sont peu élevés. En l'absence de bonnes relations avec des personnes autres que les père et mère par exemple, des frères et sœurs, un enseignant, des amis les enfants aux prises avec des situations de risques multiples affichaient des niveaux plus élevés de comportements difficiles.

On a constaté qu'il existe une solide corrélation entre le nombre de bonnes relations de l'enfant et sa flexibilité. Chez les enfants de six ans, une bonne relation était aussi favorable que trois bonnes relations lorsqu'il s'agissait d'atténuer les risques d'afficher des comportements d'extériorisation tels les troubles de conduite, l'hyperactivité, l'inattention et l'agression indirecte. Chez les enfants de 10 ans, il fallait plus qu'une bonne relation pour que cet effet de protection se manifeste.

Il se peut que les situations stressantes jouent un rôle plus critique chez les garçons que chez les filles. Les garçons étaient moins susceptibles que les filles d'avoir d'étroites relations et ils étaient également plus susceptibles d'afficher des comportements d'extériorisation. Chez les filles, les amitiés jouaient un rôle de protection, que le niveau de risque soit élevé ou faible. De bonnes relations avec les frères et sœurs jouaient le même rôle de protection chez les garçons que chez les filles. Même si une bonne relation avec un enseignant était plus courante chez les filles que chez les garçons, la relation était importante pour les garçons à tous les niveaux de risques, mais pour les filles, seulement aux niveaux élevés.

La qualité des relations sociales des enfants joue un rôle critique lorsqu'il s'agit de les aider à s'accommoder des stress de la vie. L'étude montre qu'il est important de mettre l'accent sur les relations dans toute stratégie d'intervention ou de prévention auprès des enfants et des parents qui présentent des risques élevés. De plus, comme les enfants qui ont des problèmes de comportement ne sont pas susceptibles de s'en rétablir spontanément, il est important d'intervenir rapidement, avant que les problèmes ne s'enracinent.

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1. Introduction

We know from much of the work in developmental psychopathology over the last thirty years that when children live in adverse environments they are much more likely to develop emotional and behavioural problems than when they live in less stressful environments. One of the important observations, however, about children living in adverse circumstances is that some children seem to be able to withstand even high levels of adversity, without their functioning becoming impaired. In this report our aim was to create an index of adversity so that we could identify the children who were most at risk in their development. We were then in a position to examine the factors in the lives of children that contributed to more optimal development. The National Longitudinal Study of Children and Youth (NLSCY) provides an excellent opportunity to examine risk and resilience in different age groups of children.

The data that are presently available from the NLSCY are cross-sectional. Questions relating to risk and resilience in children are most optimally addressed using longitudinal data. A child whose development is not compromised at one point in time, may be developing an adaptation strategy that leaves them vulnerable to future adversity. Similarly, a child who shows symptomatic behaviour at one point in time may be struggling to adapt to difficult stresses in his or her environment, such that at future points in their development they are more able to withstand adversity (Masten and Coatsworth, 1998). The data presented in this cross-sectional analysis, however, allow for an initial formulation and examination of issues related to environmental adversity and factors in children's lives that enable them to cope effectively with such adversity.

1.1 Adversity and Children's Development: Factors That Are Associated With Increased Psychological Disorder in Children

Through epidemiological studies it has been possible to establish those factors that are associated with increased psychiatric problems in children. Rutter *et al.*(1975) using data from the Isle of Wight study found that parental psychiatric disorder, large family size, overcrowding in the home, marital conflict/divorce, and parental criminality were all factors that increased the likelihood that children would show psychiatric disorder.

Since this early work many studies have replicated the increased risk of psychiatric disorder that is associated with these environmental risks. Marital conflict and particularly the open expression of anger and hostility have been found to increase the likelihood that children will show externalizing problems (Cummings and Cummings, 1988; Jenkins and Smith, 1991). Divorce shows a similar association with children's psychopathology (Cherlin, Furstenberg, Chase-Lansdale, Kiernan and Robins, 1991). Several different kinds of psychiatric disorder among parents have been shown to be associated with an increased risk of psychiatric disorder among children. Parental depression (usually maternal) is most strongly associated with internalizing outcomes in children, but it is also associated with an increased risk in externalizing problems (Hammen, Burge, Burney and Adrian, 1990). Parental alcohol abuse has been shown to be associated both with internalizing and externalizing outcomes in children (von-Knorrning, 1991).

Other environmental factors have also been found to be associated with poor developmental outcomes in children. When children are born to teenaged mothers they are more likely to have emotional and behavioural problems in their early childhood (Hetherington, 1997). Poverty and low socio-economic status play an important role in how children manage over the course of their development (Dodge, Pettit and Bates, 1994; Sampson and Laub, 1994). Using data from the NLSCY study, Offord and Lipman (1996) reported an inverse relationship between income adequacy and behavioural problems. As income decreased, behavioural problems increased. Children who show cognitive impairment, even to a relatively small degree, are more likely to show emotional and behavioural problems than children who do not show such compromised cognitive development (Rutter, Tizard and Whitmore, 1970; Werner and Smith, 1982; Anderson *et al.*, 1989). Hostility in the parent child relationship repeatedly emerges as a very strong predictor of emotional and behavioural problems in children. Dodge, Bates and Pettit (1990) investigated the relationship between harsh discipline and aggression among children in the general population. Six months before children entered school their parents were interviewed about the frequency and severity with which they gave physical punishment to their children. On entering school the children's aggression with peers was assessed. Frequency and severity of harshness predicted aggression in school. Such relationships have been reported in several different studies (Simons, Whitbeck, Conger and Chyi-In, 1991; Sternberg *et al.*, 1993).

Although for all these factors there is strong empirical evidence to show they are associated with poor outcomes in children, it may be that such effects occur when multiple risks occur together. Rutter (1979) reported that the presence of an isolated adverse factor in a child's life did not raise the risk of disorder but it was only when risks occurred together that children showed an increase in behavioural problems. He found that children with one risk were not more likely than children with no risks to show disorder. Five percent of children with two risks showed serious disorder compared to 20 percent of children with four or more risks. Sameroff, Seifer, Bartko (1997) have also found that it is when several risks occur together that development is most compromised.

The NLSCY data set provides an excellent opportunity to examine whether children with single risks in their lives show more emotional and behavioural problems than children who are not exposed to any such risks. It also allows us to examine how rates of disturbance increase with the number of risks in a child's life. Are there levels of risk above which most children show disorder? These questions have important policy implications for service delivery. If high levels of disturbance are only evident when children are exposed to multiple risks, there may be a greater argument for targetting interventions to those children experiencing multiple risks in their lives. Such a pattern would suggest that children can cope adequately with small amounts of stress, but that as stress increases they reach a point beyond which they can not respond adaptively.

1.2 Resilience in Children

Factors have been identified in the lives of children and adults that help them to withstand adversity and develop positive patterns of coping (Rolf *et al.*, 1990; Luther, 1993; Stouthamer-Loeber, Loeber, and Farrington, 1993; Werner, 1993). Rutter (1987) has stressed the importance of making distinctions between different kinds of processes that are associated with better coping in children. He points out that risk research carried out over the last fifty years has told us about factors in children's lives that compromise development. Early resiliency studies simply found the opposite of risk research. When the negative end of the factor is found to be absent in a child's life, the child is resilient. For instance we know that having a poor parent child relationship is a risk in a child's life. It has been argued that having a good parent child relationship when the child is under stress makes for 'resilience'. Rutter suggests that for the

study of resiliency to tell us anything different from what the study of risk has revealed, we have to examine the statistical interactions between the risk variable and the putative protective factor. A protective factor is a variable that is found to have a different effect on outcomes at different levels of risk. As Rutter describes: “The essential defining feature... (of a protective factor) is that there is a moderation of the person’s response to the risk situation” (Rutter, 1987, p. 317). When a putative protective factor operates to lower disturbance in children exposed to high levels of risk, and has little effect on children at low risk, it tells us something specific about how children in the risk circumstance cope with that risk. He argues that protection involves not the evasion of risk (as in the absence of a risk factor) but in the successful coping with problematic events. We are interested in the processes that are involved in children experiencing high levels of risk being able to negotiate these risks so that development is not impaired.

1.3 The Role Of Social Relationships

One of the consistent factors to be associated with protection, or people’s ability to cope with stressful circumstances, is the social support that a person has available to them. For adults experiencing major and traumatic life events, the likelihood of experiencing a depressive breakdown is significantly reduced if the person has someone in their lives in whom they can confide (Cohen and Wills, 1985; Brown and Harris, 1978; Brown *et al.*, 1986). For children the quality of social relationships has also been found to be important in helping to buffer the child from environmental adversity (Werner, 1995). For instance Jenkins and Smith (1990) found that children experiencing high levels of marital disharmony showed lower levels of psychopathology if they had a close relationship with an adult outside the nuclear family, usually a grandparent. We also found that a close relationship with a sibling was associated with lower levels of disturbance in children exposed to marital conflict but not associated with disorder among children who were not exposed to such stress (Jenkins, 1992). Cicchetti and Nurcombe (1997) found that social relationships were protective for low income children. Interestingly, they also found that more compromised youngsters, those who were from low income homes and were maltreated, showed less evidence of being protected by positive social relationships. These children were more protected by attributes of their personalities.

The way in which social support operates to lessen risk in children and adults is not entirely clear. Different theoretical explanations have been put forward. Being in a close relationship in

which the person can talk about problems appears to be beneficial and may relate to developing a metacognitive structure that allows the individual to think differently about adverse events in their lives such that the events do not elicit such distress reactions (Gottman, Fainsilber Katz and Hooven, 1996; Oatley and Jenkins, 1996). Or it may be that social support provides the individual with a social role through which an identity is constructed and maintained (Durkheim, 1905; Oatley and Bolton, 1985; Scheff, 1997). The individual feels part of a community, connected to others and engaged in cooperative action. When children's environments are negative this sense of being part of a community and engaged in cooperative and meaningful activity may be more difficult to achieve.

Three sources of extra-parental affectionate relationships will be examined using NLSCY data: the presence of good sibling relationships, friendships and a close relationship with a teacher. The hypothesis to be tested is that children experiencing high levels of adversity will show low levels of psychopathology in the presence of one or more affectionate relationships. A statistical interaction is hypothesized between the environmental risk variable and the presence of an affectionate relationship. As part of these analyses we will examine whether having one affectionate relationship is as effective in helping a person cope as having several affectionate relationships.

1.4 Teacher Monitoring and Class Climate

The second kind of buffering effect to be examined is a school effect. High quality schooling has been found to be associated with lower risk of disorder in children. Some of the types of schooling factors associated with the lowering of risk are having teachers who set and monitor work, provide children with opportunities to behave responsibly and to be praised for this, as well as a positive social climate in the classroom and the school (Mortimore and Stoll, 1988; Rutter, Maughan, Mortimore, and Ouston, 1979).

School processes that contribute to resilience may also be explained by creating an environment in which children can experience a sense of belonging and cooperation. High risk children may feel a sense of lack of connection in aspects of their lives when home environments are characterized by hostility, depression, alcohol abuse, etc. Within an organized and supportive school a sense of cooperation and coherence may be achieved.

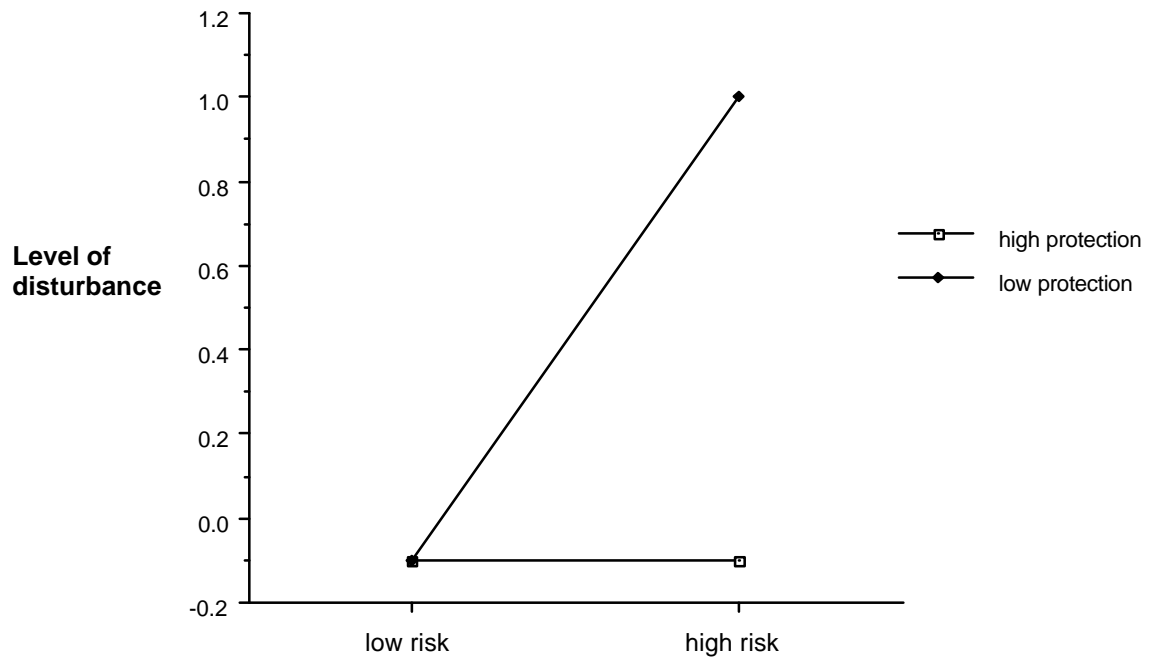
Or it may be that the protective effect of schools really lies in their ability to provide more of a monitoring and supervisory function for children who are not experiencing such structures elsewhere in their lives. One of the high risk factors for children in developing externalizing disorder is a lack of parental monitoring and supervision (Patterson, Dishion, and Reid, 1993) and this has also been found to be associated with lower school achievement (Ho Sui-Chu and Willms, 1996). It is possible that when parents do not provide this monitoring and supervisory function for children that teachers and the classroom setting can provide this function.

Here the role of the school in providing a cooperative social environment and the supervisory and monitoring function in high risk children has been examined.

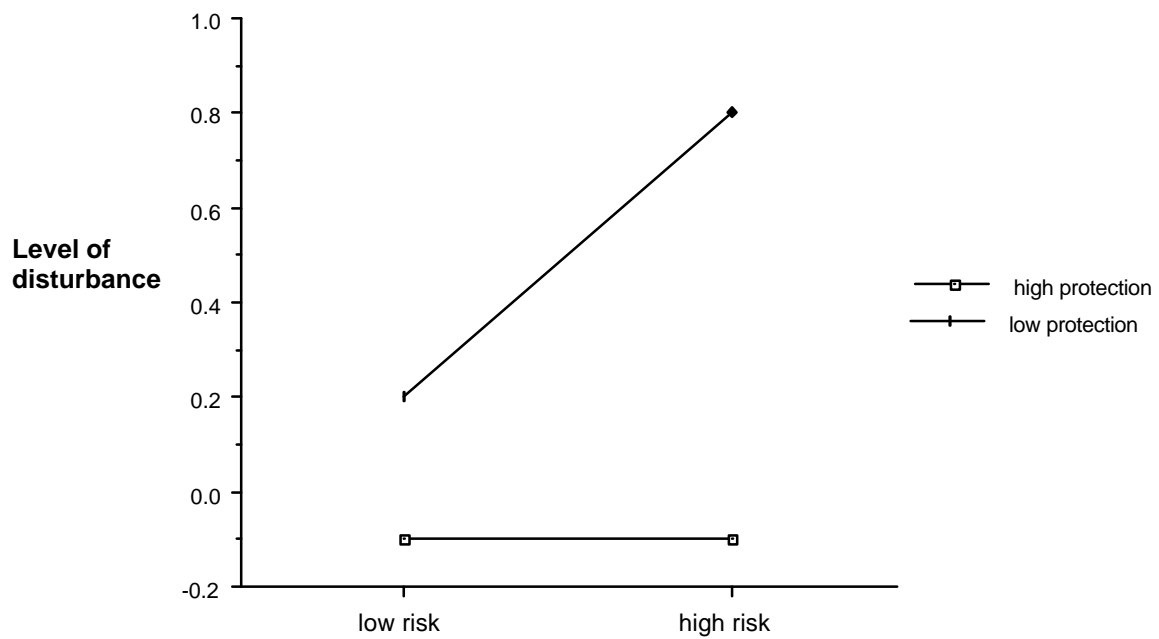
1.5 General Issues In Resilience Research

Luther (1993), Cohen and Wills (1985) and Rutter (1987) have distinguished between different kinds of resilience effects. One kind of protective factor exists when the presence of the putative protective factor is associated with reduced levels of psychopathology in children living in very adverse circumstances but the factor is not associated with levels of psychopathology in non-stressful environments. This is assessed by the presence of a statistical interaction between the index of risk and the putative protective factor, and the absence of a significant relationship between the protective factor and the outcome variable in the low risk group (Cohen and Wills, 1985). This type of pattern can be seen in Figure 1. We shall refer to putative protective factors that combine with a risk variable in this way as “Model A-Protective high risk”. Sometimes a putative protective factor is associated with reduced levels of psychopathology in children at high and low risk, but the association is much stronger in the high risk groups than the low risk group. With this kind of pattern the association between the putative protective factor and the outcome variable is significant in the low risk group, and the interaction between the risk factor and the putative protective factor is also significant (Cohen and Wills, 1985). See Figure 2 for a graphical depiction of this pattern that we refer to as “B-Protective high and low risk”.

**Figure 1. Protective Factor Model A:
Protective at high risk only**

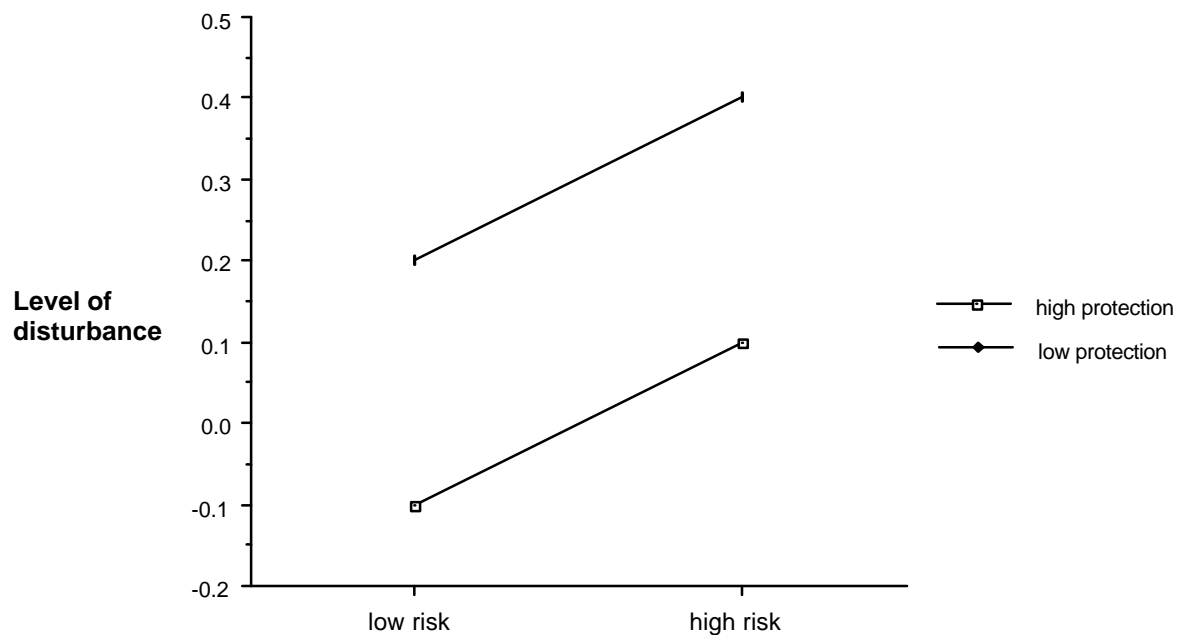


**Figure 2. Protective Factor Model B:
Protective at low and high risk**



The final pattern to be described is not a protective pattern. It is generally referred to as a main effect model. The “putative protective factor” is associated with psychopathology both when children are living in adverse circumstances and when they are not (see Figure 3). This type of pattern is indicated by a significant main effect for the putative protective factor, but no significant interaction between the risk and protective factor. This is the type of factor that Rutter refers to as the opposite of risk (see “Resilience in children”). The reason that this is not generally referred to as a protective factor is that its absence is associated with psychopathology irrespective of whether the child is experiencing high risk. For an example of such a factor in relation to risk, Jenkins and Smith (1990) found that the quality of the mother-child relationship was associated with psychopathology when children lived with parents who had highly conflictual marriages and when they did not live in such stressful environments.

Figure 3. No protection: Main effects model



2. Methods

2.1 Sample

The National Longitudinal Study of Children and Youth is a survey of the health and well-being of approximately 22,800 children across Canada. This is a representative sample of children from newborn to 11 years old. Children will be followed up every two years. At present only cross-sectional data are available. The Person Most Knowledgeable about the child is referred to as the PMK and this person has provided the bulk of the information about the child. Information is also collected from teachers and school principals. Children who are age ten and over have also been interviewed.

2.2 Age of Children

The analyses have been carried out separately on 6-year-old children and on 10-year-old children. The reason for this is that the sampling design included multiple children per family. In order not to have multiple children per family in one analysis, thereby creating a situation in which non-independence of the observations exist, separate analyses were run for each of the age groups.

The number of 6-year-old children was 1685, and the number of 10-year-olds was 1660 (unweighted). The response rate for the teacher questionnaire was approximately 50 percent so that analyses including teacher data have approximately half the number of children represented as those that do not involve teacher data. Only children 10 years old and older were interviewed in the NLSCY and consequently no child data exist for 6-year-old children. All analyses were performed using weighted data.

3. Measures

3.1 Risk Index

This was a summed score made up of the presence of alcohol abuse in the mother and in the father, marital dissatisfaction, low income, the presence of depression in the PMK, large family size, teenage pregnancy, hostility in the parent-child relationship, parents having divorced and the presence of a learning disability in the child.

Sometimes determining whether a risk was present in a child's life was straightforward given how this risk has been defined in the literature. For instance the mother was either a teenager at the time of the birth of the child or she was not. When risks were assessed on a continuous measure, however, the presence or absence of the risk had to be decided on the basis of a chosen cut-off point. In order to establish a group of children in which the risk was present for those variables based on continuous measurement we targeted the top 10-15 percent of the sample taking into account the natural break point in the distribution.

3.1.1 Depression

Depression was measured using a modified version of the CES-D (Radloff, 1977). There are 12 items in the scale. The range is from 0-36. The internal consistency of the scale was $\alpha=.82$. A cutoff point of 10 was established for the presence of depression. This represented 15 percent of the sample.

3.1.2 Family Size

Families with four or more children were rated as large, following the cut-off established in the Isle of Wight Study (Rutter *et al.*, 1970). This represented 12 percent of families.

3.1.3 Income

The PMK provided data on annual family income and the household size. From this a five point scale of income adequacy was constructed by Statistics Canada: lowest, lower middle, middle, upper middle, highest. Families in the lowest and lower middle category (17 percent) were considered to have inadequate means.

These categories were defined as follows:

- Lowest: Families with incomes of less than \$10,000 and a household size of 1-4 persons or an income of less than \$15,000 and a household size of 5 or more persons.
- Lower middle: families with a household income of \$10,000 to \$15,000 dollars and a family size of 1-2 persons, or a household income of \$10,000-\$19,000 and a household size of 3-4 persons or an income of \$15,000-\$30,000 and a household size of 5 or more people.

3.1.4 Hostility In the Parent-Child Relationship

In the NLSCY the PMK was asked to rate themselves on a five point scale on a range of parenting variables describing affection in the parent child relationship, positive interaction, punishment and hostility. This was factor analysed and three factors emerged: hostile/ineffective, consistency and involvement. The hostile/ineffective scale was used for the assessment of harshness. This was made up of the following items: annoyance, anger, disapproval, lack of praise, difficulties managing the child, parental moodiness affecting punishment and ineffective punishment. Internal consistency of this scale was good $\alpha=.71$. A cutoff of 13 representing 16 percent of the sample was established.

3.1.5 Marital Dissatisfaction

Unfortunately there was no assessment in the NLSCY of marital conflict *per se*. The only measure that came close to this construct was a question asking the PMK about their marital satisfaction which was worded as follows: All things considered, how satisfied or dissatisfied are you with your marriage or relationship with your partner? Other studies have found a relationship between marital satisfaction and child psychopathology although this relationship is generally substantially weaker than the relationship between anger-based marital conflict and psychopathology (Fincham, 1994; Jenkins and Smith, 1991). Responses were rated on an 11 point scale from completely dissatisfied to completely satisfied. A cut-off at seven was established representing 12 percent of the distribution.

3.1.6 Teenage Parenting Status

The PMK provided information on the ages of both parents when the child was born. Teenage parenting status was counted when the mother was 19 years of age or less at the time of the child's birth. This applied to 3.5 percent of the sample.

3.1.7 Learning Disability

The PMK was asked if the child had been diagnosed with a learning disability by a professional. The PMK answered affirmatively for 3.6 percent of children.

3.1.8 Divorce

A derived variable was constructed to determine the presence of divorce in a child's life. The variable child's parents' status and who the child lives with (ADMCD03) was recoded. Divorce included the following codes: biological mother and step father, biological father and step mother, 1 biological parent and one adoptive parent, 2 step parents, 1 adoptive parent and one step parent, biological mother and no father, biological father and no mother, single parent-other: 1 female non-biological parent, single parent- other: 1 male non-biological parent. Children were excluded from this coding if they had experienced the death of one parent and/or their biological parents had not been a couple at the time of the child's birth. Nineteen percent of children had experienced a divorce.

3.1.9 Presence of Alcohol Abuse

Three questions for each of the parents were used to establish this variable. The PMK was asked to rate their endorsement of the following statement on a four point scale: drinking is a source of tension in the family. Those PMKs who endorsed agree or strongly agree (6%) were coded presence of tension.

The PMK was also asked to report on their own and their spouses' drinking behaviour: how many times they and their spouse had had more than five drinks at one time in the previous year (five or more) and the maximum number of drinks (max drinks) that they had had. A cut off point of the top 25 percent of the distribution for each variable for the PMK and spouse was made. (This cut-off was established at this high a level because otherwise, when combined with the presence of tension variable, the number of people obtaining a score of alcohol as a risk, was

unacceptably small). PMKs who drank more than five drinks on one or more occasions in the last year, and those who had ever drunk more than four drinks at once (max drinks) were above the cut off point. Spouse's who drank more than five drinks on three or more occasions in the last year, and those who had ever drunk more than seven drinks at once (max drinks) were above the cut off point.

Abnormal drinking was coded as present separately for the PMK and the spouse if there was tension in the family AND they were above the cut-off point on either five or more drinks OR the maximum drinks. This resulted in 3 percent of spouses and 2 percent of PMK's being coded as having an alcohol problem. These percentages are still rather low given that for most risks higher cut-off points were used but it was important to combine the drinking as a source of tension variable with the behavioural variables, given that definitions of substance abuse involve impairment of functioning (indexed through tension in the social context) (American Psychiatric Association, 1994).

3.1.10 Summary

The summed score ranged between 0-6. Twenty-two percent of the sample had at least one of the 10 risk variables missing. In order not to lose all these families from analysis we calculated a prorated score based on the number of risks present in relation to the number of risks for which we had information, multiplied by 10 and rounded down to the nearest whole number. For example a prorated score of 5.6 was counted as 5 risks. Data were analysed using this prorated score and compared to a series of analyses in which we calculated the summed score based on seven or more risks being present. Results for these two methods were equivalent. We present data for the prorated score as this resulted in the smallest amount of missing data across analyses. There were very few children living in circumstances in which they experienced more than 5 risks (N=5) and consequently data were combined for this final category and called 5+ risks.

3.2 Outcome Variables

Factor analyses were carried out by Statistics Canada on behavioural variables for children from four to eleven years of age. The following factors emerged for parents, teachers and children's reports: conduct disorder, hyperactivity/inattention, indirect aggression and emotional disorder.

Externalizing and internalizing disorder are superordinate constructs in child psychopathology. Externalizing disorder includes conduct disorder, hyperactivity/inattention and indirect aggression. Internalizing disorder is synonymous with emotional disorder. We examined the correlations between the externalizing disorders. They were found to be correlated with one another to a moderate degree, between $r=.43$ and $r=.54$ for children's reports and $r=.34$ and $r=.51$ for parents' reports. In order to reduce the number of analyses and the complexity of the data presentation we formed a composite variable for externalizing disorder combining the items from conduct disorder, hyperactivity and indirect aggression for each informant separately. Ranges, means and standard deviations can be seen for these variables in Table 1.

Table 1
Range, Mean and SD for PMK's, Teacher's and Children's Reports of Internalizing and Externalizing Psychopathology

	6-Year-Olds			10-Year-Olds		
	Range	M	(SD)	Range	M	(SD)
PMK report, externalizing disorder	1-2.68	1.39	.30	1-2.79	1.37	.31
PMK report, internalizing disorder	1-2.88	1.32	.30	1-2.88	1.37	.33
Teacher report, externalizing disorder	1-2.94	1.37	.38	1-2.89	1.41	.35
Teacher report, internalizing disorder	1-3.00	1.33	.37	1-2.88	1.34	.39
Child report, externalizing disorder				1-2.74	1.38	.30
Child report, internalizing disorder				1-3.00	1.50	.37

Internal consistency (assessed by Cronbach's alpha) for the PMKs' report of externalizing behaviours was $\alpha=.88$, for teachers' report it was $\alpha=.90$, and for children's reports' it was $\alpha=.84$. Internal consistency for the internalizing score for the PMK was $\alpha=.76$, for teachers' report it was $\alpha=.86$, and for children's reports' it was $\alpha=.77$.

The correlations for the PMK, teacher and children's reports of internalizing and externalizing behaviours, with age groups combined, are displayed in Table 2.

Table 2
Correlations of PMK, Teacher and Child Ratings of Internalizing and Externalizing Psychopathology

	1	2	3	4	5	6
PMK report, externalizing disorder		.58	.44	.23	.38	.29
PMK report, internalizing disorder			.12	.26	.17	.32
Teacher report, externalizing disorder				.38	.43	.19
Teacher report, internalizing disorder					.21	.26
Child report, externalizing disorder						.52
Child report, internalizing disorder						-

Note: All significant at $p < .001$

3.3 Rates of Disurbance Among Children

Childhood disturbance as rated by PMK's (Disturbance-PMK report), teachers (Disturbance-Teacher report) and 10-year-old children (disturbance-child report) was used to develop rates of disturbance among children. In order to examine the relationship between overall disturbance in children and the risk index (and to compare our findings with previously published findings) a prevalence rate of overall disturbance was established. Children who scored in the top 10 percent

of the distribution on either internalizing or externalizing symptoms within that informant's report, were designated as showing disturbance. This resulted in the following rates of disturbance: 16 percent of 6- and 10-year-olds based on PMK report, 17 percent of 6-year-olds and 19 percent of 10-year-olds based on teacher report and 15.4 percent of children based on children's report. (It should be noted here that using a 10 percent cut-off score for externalizing and internalizing disorders, within each age group, mitigates against the examination of age differences in the prevalence of disorders). Other studies report prevalence rates between 17 and 22 percent (Costello, 1989).

3.4 Putative Protective Factors

3.4.1 Teacher Monitoring

Teachers were asked about their setting and monitoring of homework. Five items were originally included in the scale and one was dropped because it lowered the internal consistency of the scale. The following variables were included in the final scale: How often do you monitor homework in the following ways: by keeping records of who turned in assignments, by returning assignments with corrections or grades, by discussing homework in class, by having parents/guardians sign a homework book/note. These behaviours were rated by teachers on a five point scale. Cronbach's alpha was $\alpha = .60$. This is at the low end of acceptability and consequently analyses using this variable must be viewed cautiously.

3.4.2 Class Climate

This scale was used in the Ontario Tri-Ministry project. Teachers were asked about how well the class worked together as a whole. The items were as follows: "Overall with the exception of a few individual students, the class as a whole a) moves smoothly from one classroom activity to another, b) is easily distracted by the disruptive behaviour of a few c) works well together on group activities d) misbehaves when I am called to the door or must attend to other interruptions." This scale showed good internal consistency. $\alpha = .77$.

3.4.3 Relationship With Friends, Sibling and Teacher

The PMK was asked about the quality of the child's relationship with their friends, with a sibling and with their teacher. The wording of the questions were as follows: During the past 6 months how well has NAME gotten along with other kids, such as friends or classmates (excluding

brothers or sisters)? Since starting school in the fall, how well has he/she gotten along with his/her teacher(s) at school? During the past six months how well has he/she gotten along with his/her brother(s)/sister(s)? Each of these questions was rated on a five point scale, from very well, no problems, to not well at all, constant problems. These items were used in the Ontario Health Study (Sanford *et al.*, 1992).

Ten-year-old children were asked the same question about the quality of their sibling relationships and the quality of their friendships and replies were coded on the same scale as that outlined for the PMK. Children were not asked the same question as their parent about the quality of their relationship with their teacher.

One of the ways of establishing the validity of these measures is to examine the cross informant agreement on the constructs. Consequently the relationship between the PMK's report of the sibling, teacher and peer relationships and the 10-year-old child's report of the same was examined. Parental and child reports of the sibling relationship were significantly correlated with one another, [$r(1660)=.26, p<.001$]. Relationship with friends as reported by the PMK was found to be significantly correlated with Relationship with friends as reported by 10-year-old children, [$r(1616)=.30, p<.001$].

4. Results

4.1 Risk Index and Children's Disturbance

In graphs in which prevalence rates of disturbance are shown a top category of 4+ risks is displayed. This is because for teacher data (when a response rate of approximately 50 percent was obtained) there were too few children in the top category to reliably show the percentage of children who were disturbed. In order to retain comparability across informant reports risks above four were combined. Figure 4 shows the relationship between the number of risk in the child's environment and the percentage of children showing disturbance based on the PMK report. Results using the teacher report (Figure 5) and the children's report (Figure 6) are also displayed.

Figure 4. Percentage of six- and ten-year-old children with disturbance (based on the PMK report) as a function of the number of risk factors in children's lives

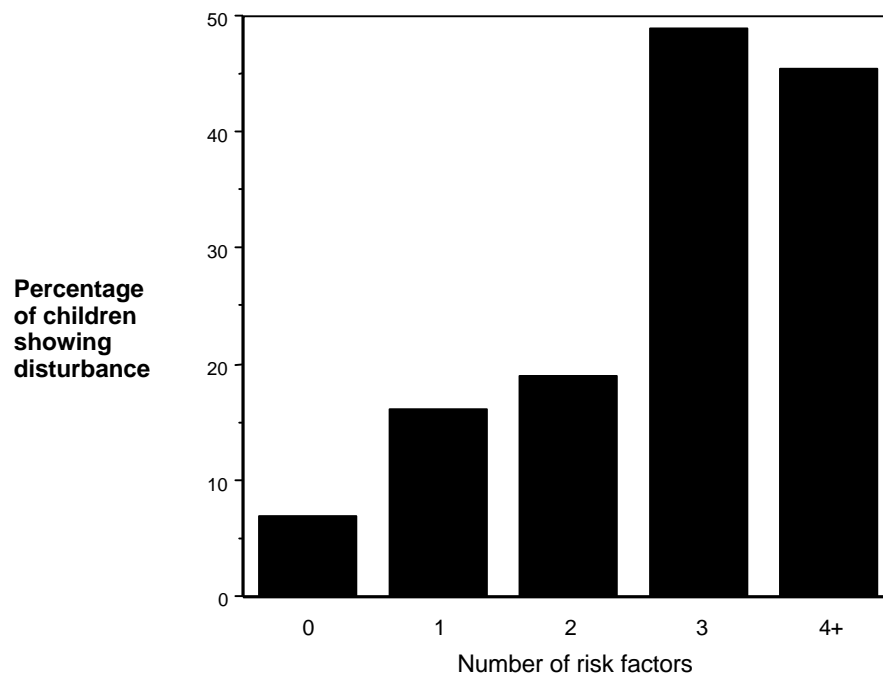


Figure 5. Percentage of six- and ten-year-old children with disturbance (based on teacher report) as a function of the number of risk factors in children's lives

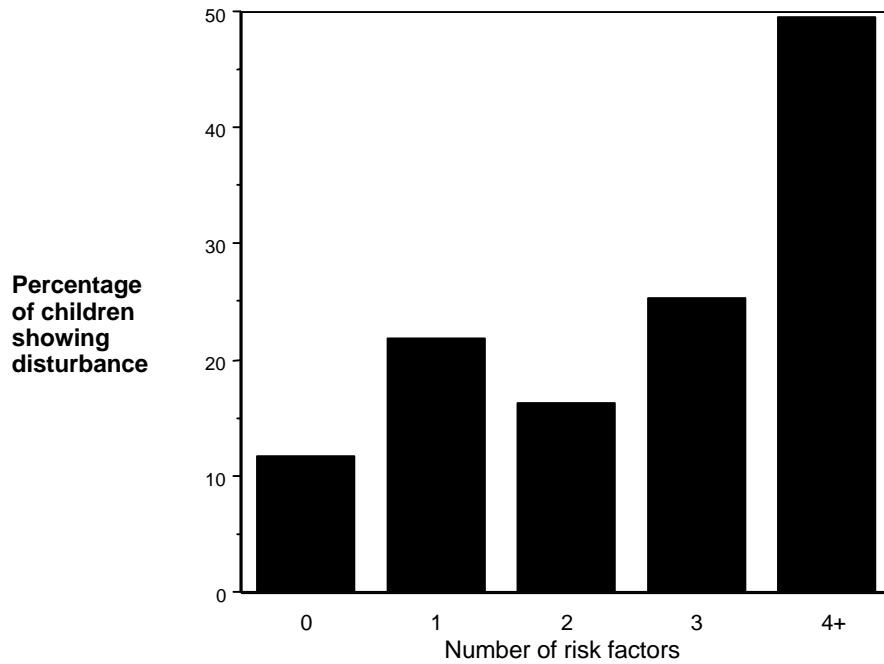
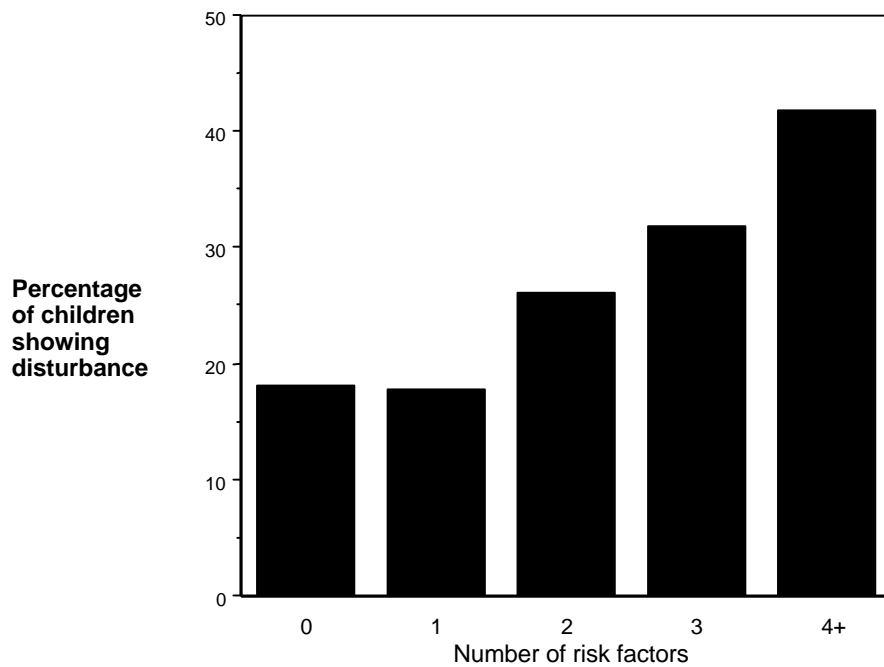


Figure 6. Percentage of ten-year-old children with disturbance (based on children's reports) as a function of the number of risk factors in children's lives



It is evident from these three figures that the presence of disorder rises steadily with the number of risks in children's lives. Based on the PMK's and teachers' reports there does appear to be a modest increase in the chances of disorder when children experience one or two risks in their lives compared to when they experience none. This is less marked using children's reports. The odds of disorder associated with the presence of three or more risks in children's lives, when compared to one or two risks are substantial. Depending on the informant's report the chances of disorder are increased by approximately 1.5 to 3 times when a child is exposed to three or four risks compared to when they are exposed to one or two risks.

When children are in the top category of the risk index using either the teacher or PMK report of psychopathology, 47 percent of children show disorder compared to approximately 8.6 percent of children (averaging across the teacher and PMK accounts) when children are not exposed to any risks. The chances of disorder in the top category are over five times the chances of disorder in the bottom category. Approximately 4 percent of children in this population were found to experience 4 or more risks in their lives.

This relationship between the number of risks in a child's life and disorder is not as marked when examining the children's data. 18.2 percent of children with no risks in their lives showed disorders compared to 41.9 percent of children with four or more risks. The discrepancy in results using adult versus child report is not surprising and has been found in many other studies (see Kolko and Kazdin 1993 for review). Children have been found to be less reliable in their reports of psychopathology than adults (Edelbrock, Costello, Dulcan, Kalas and Conover, 1985). Although some have argued that children give more valid accounts of internalizing symptomatology (Herjanic and Reich, 1982), this has to be weighed against decreased levels of reliability as assessed by internal consistency and test-retest reliability, that they demonstrate. Epidemiological surveys have traditionally relied more strongly on parent and teacher report than children report when establishing the diagnosis of a child (Rutter *et al.*, 1970).

4.2 Examination of Protective Effects

As all of the analyses concerning relationships as the putative protective factor involved the use of teacher report for the outcome measures, and only 50 percent of teacher questionnaires had been returned, we examined the difference between children for whom we had no data and those

for whom we had data from teachers (responders). Only a couple of key variables used in this study were examined: risk index, income adequacy, externalizing and internalizing disorder as reported by the PMK. Among 10-year-olds, children for whom we had teacher data differed from children for whom we had no data only on income adequacy. Teacher responders taught children with higher levels of income than non-responders [$F(1, 1990) = 5.23, p < .03$]. For 6-year-old children, teacher responders taught children with more internalizing disturbance (based on parent report) than non-responders [$F(1, 1831) = 11.24, p < .001$]. This means that for 10-year-olds, our analyses concern children whose families had slightly higher incomes than the whole sample and for 6-year-old children, our analyses concern children who are somewhat more anxious than the whole sample.

Having established that exposure to multiple environmental risks is associated with marked increases in the likelihood of children showing psychopathology we turn to our next question of interest. What are the factors that are associated with some children managing well in spite of the fact that they are exposed to environmental risk? What are the processes that children draw on to enable them to cope effectively with these risks?

In order to examine putative protective factors hierarchical regression analyses were carried out. Each variable or interaction term was entered as a separate step. The risk index was entered first into the equation, followed by gender, followed by the putative protective factor, followed by the two-way interaction term: putative protective factor x risk index. For the assessment of the protective factor model we were interested in the interaction between risk and protective factor. Individual regression analyses were run for each of the five putative protective factors, separately for internalizing and externalizing disorders. The regression coefficients in Table 4 to Table 8 are the coefficients at entry into the equation. In order to distinguish between Model A and Model B we carried out a further step in the analysis. When a significant interaction occurred between risk and protective factor we followed up with an analysis to determine whether there was a significant association between the putative protective factor and the outcome variable at low risk. We carried out a median split on the risk variable. Children with no risks were designated as the low risk group (6-year-olds, $N=388$; 10-year-olds, $N=469$) and children with one or more risks were designated as the high risk group (6-year-olds, $N=550$; 10-year-olds, $N=551$). In order to determine whether there was a significant association between the putative protective factor and the outcome variable at low risk we examined the correlation between these two variables

for the low risk group. When the association was not significant for the low risk group the data conformed to Model A. When the association was significant in the low risk group, the data conformed to Model B. We also found some instances when the interaction occurred because the putative protective factor was associated with the outcome variable in the opposite direction in low and high risk groups. This pattern was not hypothesized and was not counted as a protective effect, although some researchers have argued that factors may be protective at high risk and have the opposite effect at low risk (Rutter, 1987).

Gender was included in these analyses in order to determine whether protective effects were different in boys and girls. For the majority of analyses the interaction between gender, risk and the putative protective factor was not significant, nor were the other interaction terms involving gender. In order to reduce complexity in the presentation of results when the three way interaction term was not significant we have presented results based on the regression equations outlined in the previous paragraph in Tables 4 through 8. When the three way interaction term was significant we present results in Tables 4 through 8 based on the following regression analysis. The risk index was entered first into the equation, followed by gender, followed by the putative protective factor, followed by the two-way interaction terms in the following order: gender by putative protective factor, gender by risk and putative protective factor x risk. The three way interaction between gender, risk and the putative protective factor was entered on the final step. When the three way interaction was significant we followed this up with further analyses to determine whether protective effects were evident. We carried out hierarchical regressions for boys and girls separately. Risk was entered first into the equation, followed by the putative protective factor, followed by the interaction term: risk by putative protective factor. If a significant interaction between the risk variable and the putative protective factor within gender was found, we investigated the nature of the interaction, by examining the correlation between the putative protective factor and externalizing or internalizing disturbance in the low risk group, in order to determine whether it conformed to Model A, Model B or did not show a protective effect.

When the interaction between the putative protective factor and the risk index, or the three way interaction, was found to be significant, cell means as a function of the putative protective factor and the level of risk are presented in graphs. Because we had small numbers of children in the worst categories of risk and the negative end of the putative protective factors, in order not to

have low numbers in any cell we collapsed the bottom categories together only for the graph presentations. These graphs are presented only as a way of illustrating the interaction effect. Obviously the regressions are more accurate than the graphs, because information is lost in the collapsing of categories. Consequently the size of the effect should not be compared using the graphs, but only using the information in the tables.

One of the strengths of this dataset is the use of multiple informants for constructs. We had to establish a principle for determining which informant reports to use and how to combine them within analyses. Across all analyses two informant reports were used within one analysis in order to reduce the likelihood that positive relationships would be the result of informant bias. Consequently, when the putative protective factor was reported by the mother, the teachers' account of children's psychopathology was used as the outcome variable. When the putative protective factor was reported by the teacher (as was the case for the school putative protective factors), the PMKs' account of children's psychopathology was used as the outcome variable.

When two informants, e.g. PMK's and children, provided information on putative protective factors, the PMK was treated as the respondent. The reason for this was that we only had information on putative protective factors from children themselves when they were at least ten years old, and in order to investigate the phenomena of interest in younger children we were reliant on parent report. This decision was also made on the basis of a large body of evidence suggesting that children are less reliable informants than their parents. This combination of informant reports, within analyses, are displayed in Table 3.

Table 3
Informant Sources for Protective Factors and Outcome Variables

Type of Putative Protective Factor	Informant Source for Putative Protective Factor	Informant Source for Childhood Disorders
Class climate	Teacher report	Parent report
Teacher monitoring	Teacher report	Parent report
Relationship with sibling	PMK report	Teacher report
Friendship	PMK report	Teacher report
Relationship with teacher	PMK report	Teacher report

4.3 Results Across All Putative Protective Factors

Tables 4 to 7 outline the results for regression analyses in both age groups. We concentrate on the interaction between the risk index and the putative protective factor in the description in the text as it is this relationship that is under investigation. Before going into details on each analysis it is worth describing some patterns that are evident across analyses. Firstly, it is evident that the risk index is significantly associated with internalizing and externalizing disorder using both PMK and teacher report. This confirms the findings discussed in the first section. It is also noticeable that the relationship between risk and psychopathology is stronger for the mothers' report of children's psychopathology than the teachers' report of children's psychopathology and this is expected because associations are generally higher when the same informant has reported on both the risk index and the measure of psychopathology. Boys show higher levels of externalizing psychopathology than girls, across both mother and teacher outcomes. This has been established in many other studies. There is evidence of protective effects for the sibling, teacher and friendship relationships that were hypothesized as protective. There is little evidence to support a protective factor model for the school variables. The significant protective effects (i.e. when the interaction term between risk and the protective factor is found to be significant) account for small amounts of variance in explaining children's internalizing and externalizing behaviour. Significant interaction terms were found to account for between .05 percent and 2.8 percent of the variance in children's psychopathology. Several three way interaction terms were found to be significant. Two of these confirmed to the strict criteria laid down for confirmation of a protective factors model. The three way interactions did indicate that the relationship between risk and putative protective factor in the prediction of childhood disorder was different in girls and boys.

4.3.1 Friendships

Across both internalizing and externalizing disturbance and both ages children's relationships with their peers were a significant predictor of disturbance as can be seen in Table 4. The quality of friendships accounted for 5.5 percent and 5.2 percent (respectively) of the variance in children's externalizing at ages 6 and 10. It accounted for 1.9 percent and 2.2 percent of the variance in children's internalizing at ages 6 and 10. Children who had poorer relationships with peers showed higher levels of internalizing and externalizing symptoms even after accounting for

risk across both age groups. The risk and friendship interaction was found to be significant for internalizing at age 10 and externalizing disorders at both ages.

Results for children's externalizing disorders at both 6 and 10 years old conformed to Model A. At low risk, better friendships were not significantly associated with externalizing problems in 6-year-olds [$r(497)=.07$, $p<.15$, or in 10-year-olds, $r=.06$, $p<.21$]. Results for externalizing disorder in 10-year-olds are graphically depicted in Figure 7. As results for externalizing disorder in 6-year-olds were similar to those seen in Figure 7, these are not displayed.

For internalizing disorder in 10-year-olds there was also a significant three way interaction between risk, friendships and gender, as can be seen in Table 4. Hierarchical regressions were carried out for boys and girls separately. We found a significant interaction between risk and quality of friendships for boys, demonstrating that the association between the quality of friendships and boys' internalizing disorder was different at different levels of risk ($\beta=.50$, R^2 change=.034, F change=21.65, $p<.001$). Among the low risk boys the association between the quality of friendship and internalizing disorder was not significant [$r(267)=.03$, $p<.58$]. The boys' data conformed to Model A: Protective at high risk only. See Figure 8.

For the follow-up regression in girls the interaction term was not significant ($\beta=-.21$, R^2 change=.006, F change=3.13, $p<.08$). It will be evident from Figure 9 that for girls the quality of friendships was most strongly associated with internalizing disturbance in the low risk group. This is not consistent with a protective pattern. In summary, friendships were found to be protective for internalizing disturbance in boys at age 10, but this was not found to be the case in girls. For boys experiencing three or more risks in their lives, the presence of good friendships was associated with reduced levels of internalizing disturbance.

Table 4
Summary of Hierarchical Regression Analyses Examining the Role of Friendship with Peers in Moderating the Effects of Cumulative Risk in Internalizing and Externalizing Disorders Amongst 6- and 10-Year-Old Children

6-year-old children		B	SE_B	β	Change in R²	
Externalizing disorder Teacher report N = 938						
Step 1	Risk	.046	.011	.134	.018	***
Step 2	Gender	-.185	.024	-.242	.058	***
Step 3	Friendship	.133	.017	.242	.055	***
Step 4	Risk * Friendship	.043	.014	.262	.009	**
Internalizing disorder Teacher report						
Step 1	Risk	.040	.010	.127	.016	***
Step 2	Gender	-.017	.023	-.024	.001	
Step 3	Friendship	.070	.017	.141	.019	***
Step 4	Risk * Friendship	-.024	.014	-.160	.003	
10-year-old children						
Externalizing disorder Teacher report N = 1004						
Step 1	Risk	.060	.009	.211	.045	***
Step 2	Gender	-.175	.021	-.248	.061	***
Step 3	Friendship	.114	.014	.234	.052	***
Step 4	Risk * Friendship	.047	.010	.337	.016	***
Internalizing disorder Teacher report						
Step 1	Risk	.088	.010	.276	.076	***
Step 2	Gender	.035	.024	.044	.002	
Step 3	Friendship	.082	.017	.150	.022	***
Step 4	Gender * Friendship	-.047	.034	-.102	.002	
Step 5	Gender * Risk	.007	.020	.019	.000	
Step 6	Risk * Friendship	.033	.013	.208	.005	**
Step 7	Risk * Friendship * Gender	-.121	.026	-.537	.018	***

* $p < .05$

** $p < .01$

*** $p < .001$

Figure 7. Cell means of externalizing behavior (z-scores) in 10-year-old children as a function of quality of friendships and risk status

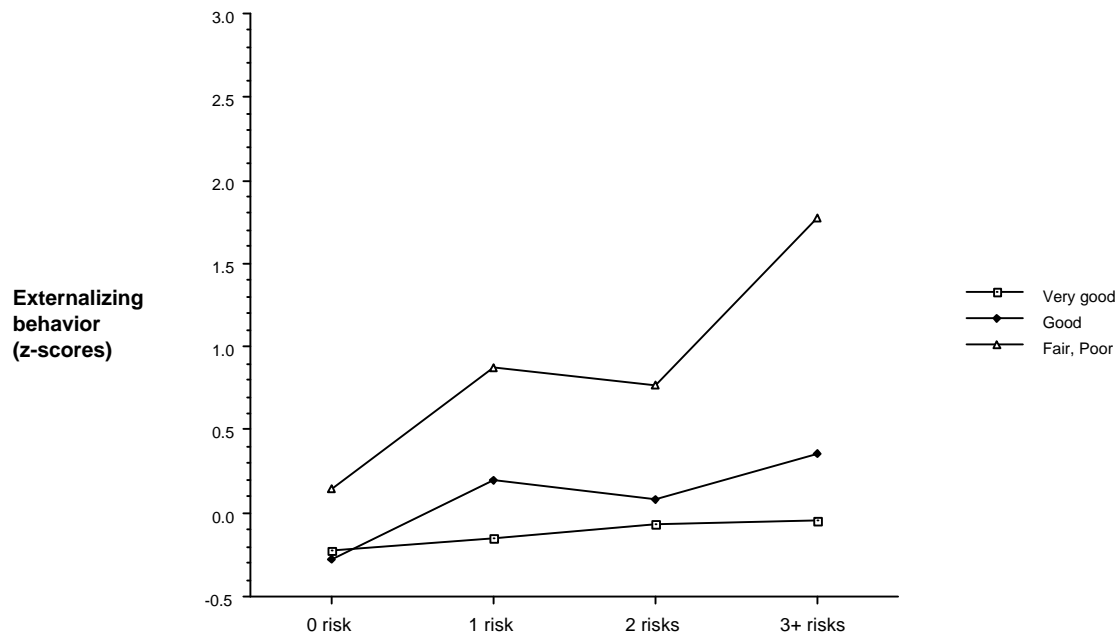


Figure 8. Cell means of internalizing behavior (z-scores) in 10-year-old boys as a function of quality of friendships and risk status

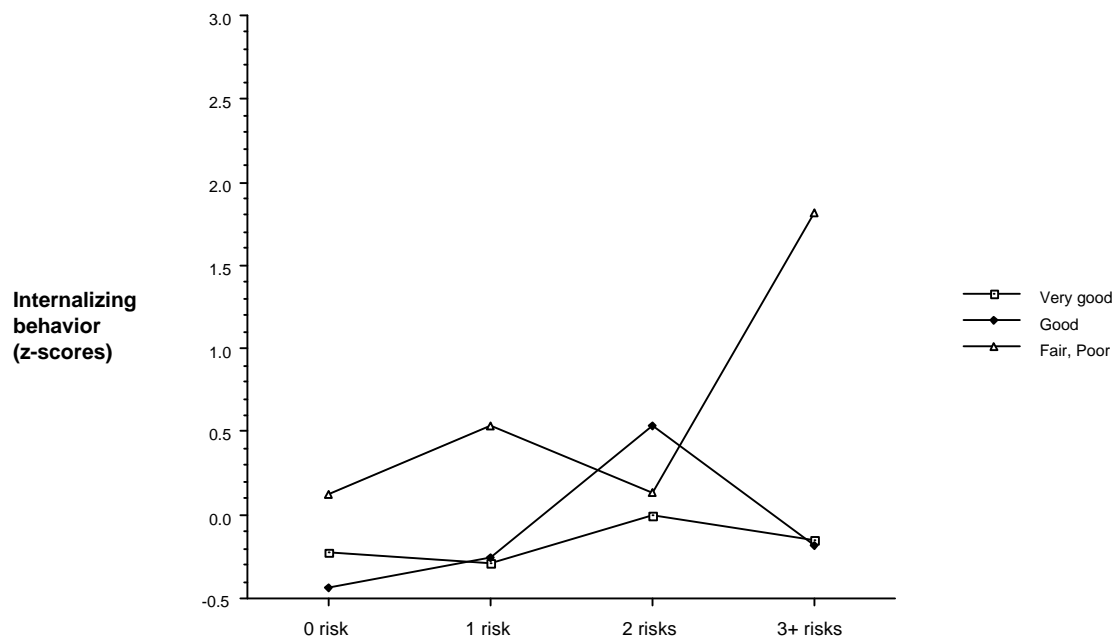
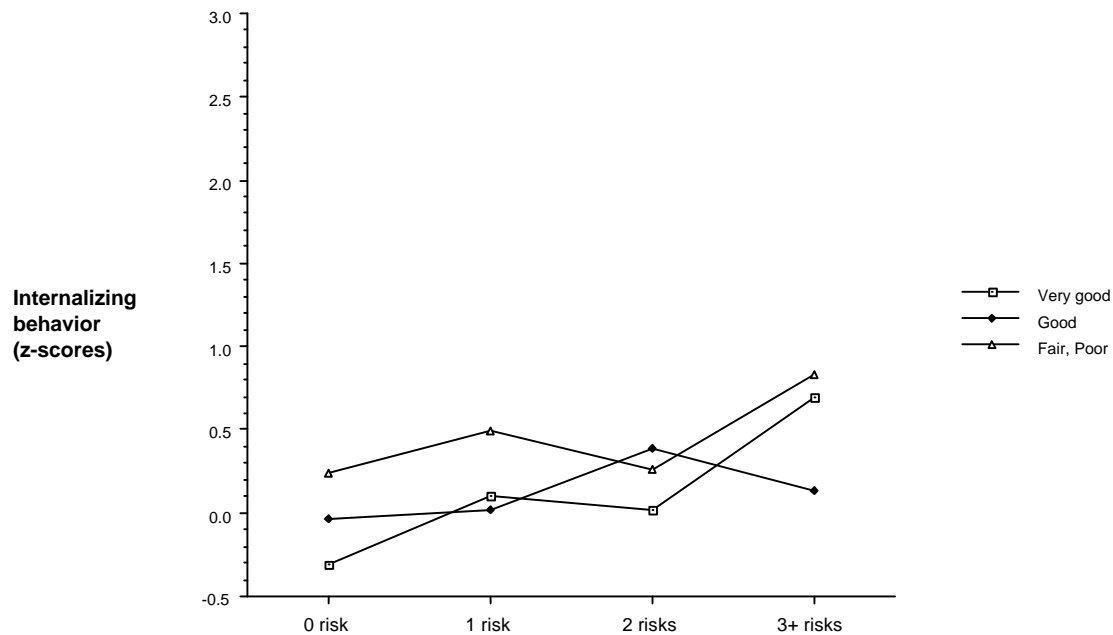


Figure 9. Cell means of internalizing behavior (z-scores) in 10-year-old girls as a function of quality of friendships and risk status



4.3.2 Sibling Relationships

With regard to externalizing disorder in 6-year-olds no significant relationship was found between the quality of the sibling relationship and children's externalizing psychopathology. The risk by sibling relationship interaction term (seen in Table 5) showed a pattern that was not hypothesized. Though the interaction was significant, the sibling relationship had an opposite effect on children's externalizing behaviour in high and low risk circumstances. This did not confirm a protective factor pattern.

Among the 6-year-old children no relationship was found between the quality of the sibling relationship and children's internalizing psychopathology, either as a main effect, or as an interaction with risk.

Table 5
Summary of Hierarchical Regression Analyses Examining the Role of Sibling Relationship in Moderating the Effects of Cumulative Risk in Teachers' Report of Internalizing and Externalizing Disorders Amongst 6- and 10-Year-Old Children

6-year-old children		B	SE _B	β	Change in R ²	
Externalizing disorder						
Teacher report						
N = 769						
Step 1	Risk	.050	.012	.150	.023	***
Step 2	Gender	-.183	.026	-.242	.059	***
Step 3	Sibling Relationship	-.010	.014	-.024	.001	
Step 4	Risk * Sibling Relationship	.033	.012	.266	.009	**
Internalizing disorder						
Teacher report						
Step 1	Risk	.045	.011	.144	.020	***
Step 2	Gender	-.001	.025	-.002	.000	
Step 3	Sibling Relationship	.005	.014	.012	.000	
Step 4	Risk * Sibling Relationship	.003	.012	.029	.000	
10-year-old children						
Externalizing disorder						
Teacher report						
N = 916						
Step 1	Risk	.061	.009	.217	.047	***
Step 2	Gender	-.168	.022	-.240	.056	***
Step 3	Sibling Relationship	.050	.012	.134	.017	***
Step 4	Risk * Sibling Relationship	.020	.009	.209	.005	*
Internalizing disorder						
Teacher report						
Step 1	Risk	.090	.011	.258	.067	***
Step 2	Gender	.040	.027	.049	.002	
Step 3	Sibling Relationship	.013	.014	.028	.001	
Step 4	Risk * Sibling Relationship	.054	.011	.470	.025	***

* p < .05

** p < .01

*** p < .001

Protective effects were, however, evident among the 10-year-old children with regard to internalizing and externalizing behaviour. The main effect of sibling relationship was not significant, but the interaction between risk and sibling relationship was significant, and accounted for 2.5 percent of the variance in children's internalizing behaviour as can be seen in Table 5. The association between the sibling relationship and internalizing psychopathology was not significant at low risk [$r(420) = -.07, p < .13$]. The presence of a significant positive interaction between the risk and protective factor, with no significant association between the protective factor and the outcome variable at low risk corresponds to Model A: protective at high risk. This is illustrated in Figure 10. It is possible to see from Figure 10 that at low risk the quality of the relationship with the sibling makes little difference to internalizing disturbance. When children experience 3 or more risks, however, having a good relationship (or even a slightly problematic relationship with the sibling) is associated with a low level of internalizing disturbance almost equivalent to that seen for low risk children.

The quality of the sibling relationship, as a main effect, was associated with externalizing disorder in 10-year-old children and accounted for 1.7 percent of the variance in children's externalizing behaviour. Children with poorer sibling relationships showed higher levels of externalizing problems. The interaction between risk and quality of the sibling relationship was also significant. In a follow-up analysis there was no significant relationship between the quality of the sibling relationship and children's externalizing in the low risk group [$r(419) = .03, p < .53$]. The presence of a significant interaction between the risk and protective factor, with no significant association between the protective factor and the outcome variable at low risk corresponds to Model A: protective at high risk. This is illustrated in Figure 11.

Figure 10. Cell means of internalizing behavior (z-scores) in 10-year-old children as a function of sibling relationships and risk status

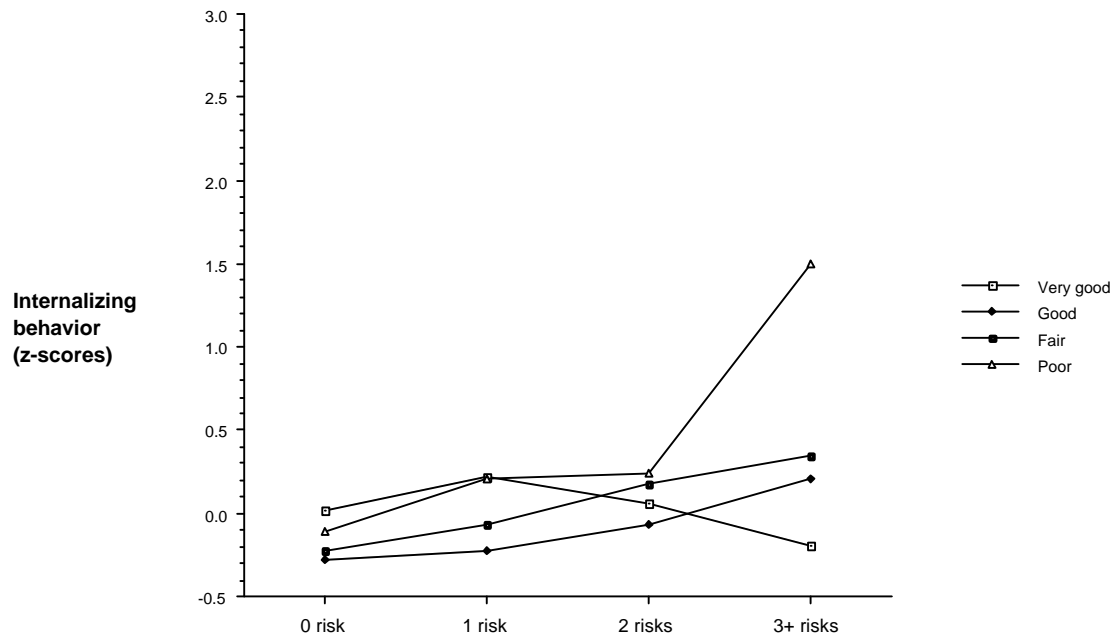
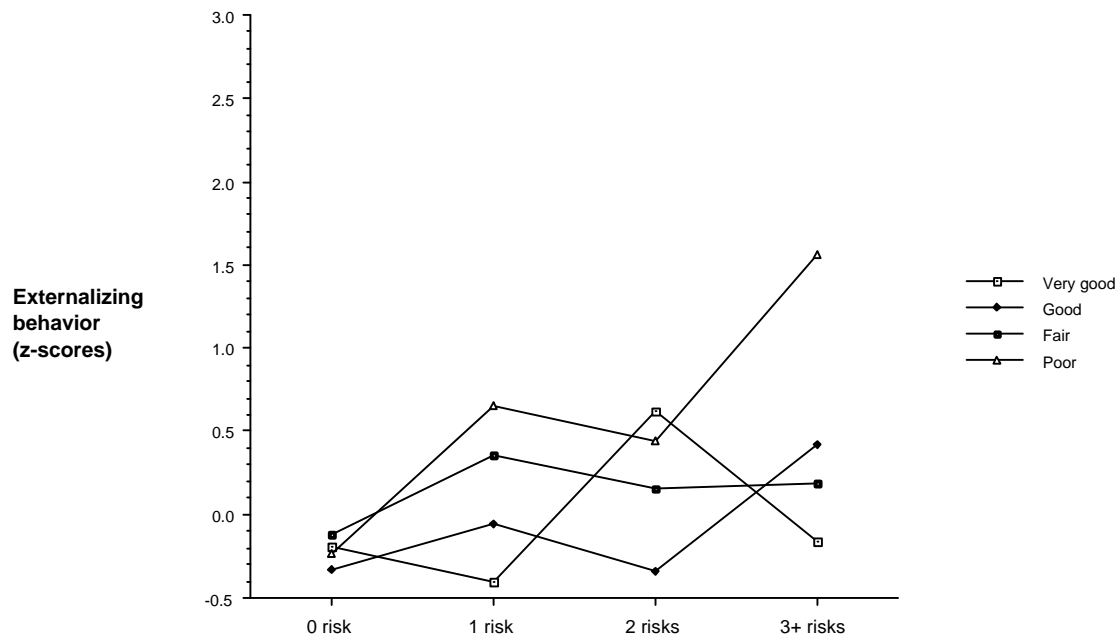


Figure 11. Cell means of externalizing behavior (z-scores) in 10-year-old children as a function of sibling relationships and risk status



4.3.3 Quality of the Relationship With the Teacher

It will be evident from Table 6 that the quality of the relationship with the teacher was strongly associated with externalizing symptoms in children accounting for between 8.7 percent and 9.7 percent of the variance in children's externalizing and 1.3 percent and .07 percent of the variance in internalizing disturbance at ages 6 and 10. The association between relationship with the teacher and internalizing disturbance at 6 and 10- years-old and externalizing disturbance in 6-year-olds did not differ in the high and low risk groups, as indicated by lack of significant interaction between risk and the relationship with the teacher. This conforms to Model C: the Main effect model.

For externalizing disorder in 10-year-olds there were significant three way interactions for risk, relationship with teacher and gender that can be seen in Table 6. On follow-up analyses the risk by relationship with teacher interaction was significant in girls [$\beta=.42$, R^2 change=.023, F change=12.63, $p<.001$] and accounted for 2.3 percent of the variance in externalizing disorder in girls. The quality of the relationship with the teacher was associated with externalizing disorder in girls at low risk [$r(198)=.21$, $p<.003$] and more strongly with girls at high risk [$r(256)=.39$, $p<.001$]. The presence of a significant interaction between the risk and protective factor, and a significant association between the protective factor and the outcome variable at low risk corresponds to Model B: protective at high and low risk. This is illustrated in Figure 12. From this figure it can be seen that the quality of relationship with the teacher has a similar effect at 0, 1 and 2 risks with an increase at 3+ risks in the environment. The risk by relationship with teacher interaction was not significant in boys, when regressions were carried out separately by gender. The quality of the relationship with the teacher had a similar effect on boys at high and low risk. This can be seen in Figure 13.

It is possible that the relationships reported may be somewhat confounded. Although the PMK reported on the quality of the relationship between child and teacher, this rating may in part be based on the teacher telling the parent about the child's difficult behaviour that leads the parent to feel that the child and teacher do not get along well. Therefore, we examined the relationship between the PMK report of the child-teacher relationship and the child's report of their disturbance. The quality of the relationship with the teacher was associated with the child's report of externalizing problems (with a poorer quality relationship being associated with more

externalizing problems), and there was no difference in this pattern of association in the high and low risk groups. This analysis indicates that significant associations found for the PMK and teacher reports are likely due to problems with measurement.

Table 6
Summary of Hierarchical Regression Analyses Examining the Role of the Child's Relationship with the Teacher in Moderating the Effects of Cumulative Risk in The Teachers' Report of Internalizing and Externalizing Disorders Amongst 6- and 10-Year-Old Children

6-year-old children		B	SE _B	β	Change in R ²	
Externalizing disorder Teacher report N = 938						
Step 1	Risk	.046	.011	.134	.018	***
Step 2	Gender	-.185	.024	-.242	.058	***
Step 3	Relationship with Teacher	.222	.022	.307	.087	***
Step 4	Risk * Relationship with Teacher	.028	.017	.143	.002	
Internalizing disorder Teacher report						
Step 1	Risk	.041	.010	.127	.016	***
Step 2	Gender	-.017	.023	-.024	.001	
Step 3	Relationship with Teacher	.080	.022	.120	.013	***
Step 4	Risk * Relationship with Teacher	-.015	.017	-.083	.001	
10-year-old children						
Externalizing disorder Teacher report N = 1010						
Step 1	Risk	.059	.009	.208	.043	***
Step 2	Gender	-.177	.021	-.251	.062	***
Step 3	Relationship with Teacher	.173	.016	.322	.097	***
Step 4	Gender * Relationship with Teacher	.012	.033	.025	.000	
Step 5	Gender * Risk	-.009	.017	-.027	.000	
Step 6	Risk * Relationship with Teacher	.015	.011	.106	.001	
Step 7	Risk * Relationship with Teacher * Gender	.069	.025	.299	.006	**
Internalizing disorder Teacher report						
Step 1	Risk	.082	.010	.249	.062	***
Step 2	Gender	.020	.025	.025	.000	
Step 3	Relationship with Teacher	.054	.019	.087	.007	**
Step 4	Risk * Relationship with Teacher	-.004	.014	.020	.000	
* p < .05						
** p < .01						
*** p < .001						

Figure 12. Cell means of externalizing behavior (z-scores) in 10-year-old boys as a function of relationship with teacher and risk status

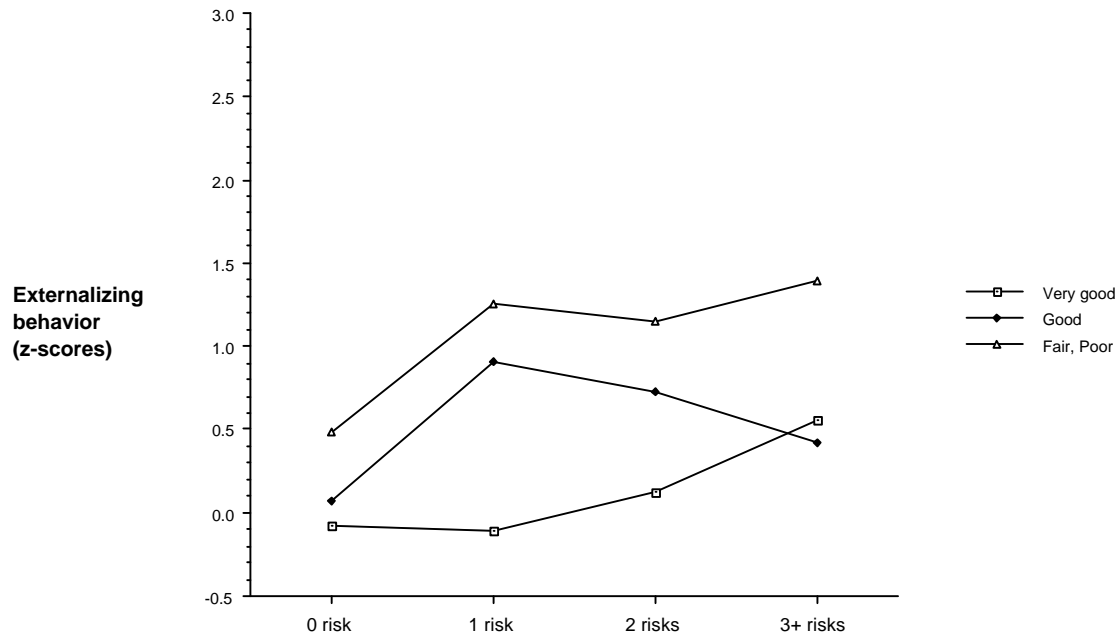
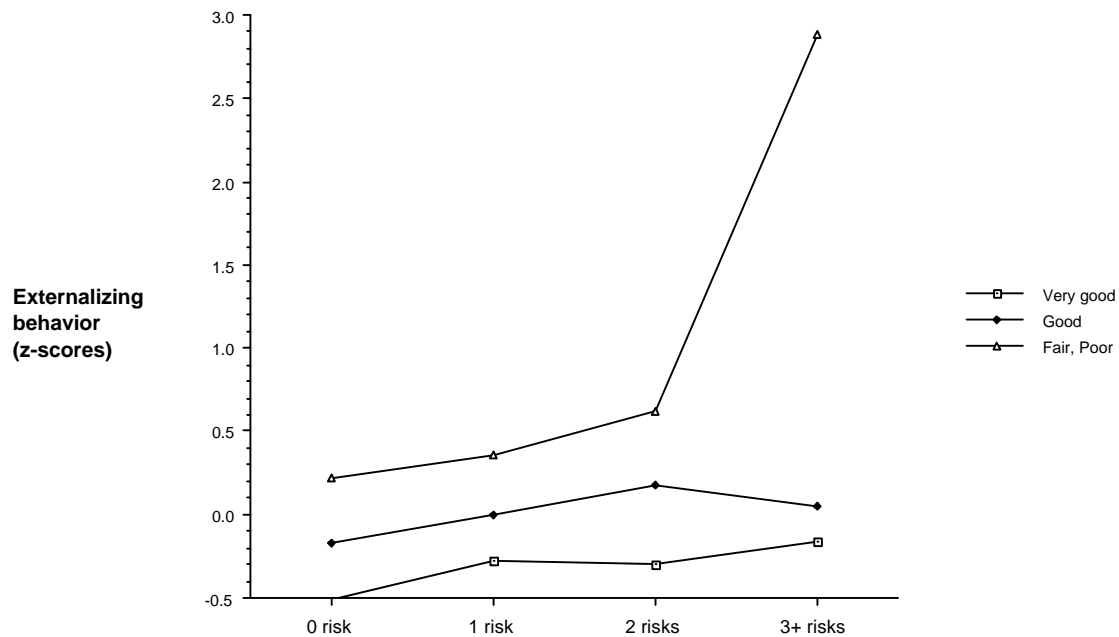


Figure 13. Cell means of externalizing behavior (z-scores) in 10-year-old girls as a function of relationship with teacher and risk status



In summary, the quality of the child's relationship with the teacher is strongly associated with children's externalizing problems and to a lesser degree internalizing problems. The better the relationship the lower the disturbance. The evidence of a buffering or protective effect was found for 10-year-old girls in relation to externalizing disorder. When girls had a better relationship with their teacher they showed lower levels of externalizing disorder both at high and low risk, but this was particularly the case at high risk. This was not evident for 10-year-old boys. Across all levels of risk if boys had a poor relationship with their teacher they showed high levels of externalizing disturbance.

4.4 The School Environment as Protective to Children

The outcome variables for the following analyses are based on PMK reports of children's internalizing and externalizing disturbance.

Results for this variable are displayed in Table 7. Class climate was not found to be associated with internalizing or externalizing disorder at either age. The interaction between risk and class climate was also not found to be significant. There was a significant three way interaction for risk, classroom climate and gender in the prediction of 10-year-old externalizing disturbance. The association between risk and classroom climate in the prediction of externalizing disorder was different in boys and girls. The risk by classroom climate interaction was not significant for boys, but it was significant for girls [$\beta=1.04$, R^2 change=.029, F change=17.41, $p<.001$]. The pattern seen, however, did not strictly conform to a protective factor model. The interaction was caused by class climate being associated with externalizing disturbance in different directions at high and low risk. At high risk a good class climate was associated with lower levels of disturbance [$r(258)=.22$, $p<.001$] and at low risk a good class climate was associated with higher levels of disturbance [$r(198)=-.13$, $p<.07$]. This did not confirm a protective factors model.

Table 7
Summary of Hierarchical Regression Analyses Examining the Role of Class Climate in Moderating the Effects of Cumulative Risk in the PMK's report of Internalizing and Externalizing Disorders Amongst 6- and 10-Year-Old Children

6-year-old children		B	SE _B	β	Change in R ²	
Externalizing disorder PMK report N = 938						
Step 1	Risk	.083	.009	.287	.083	***
Step 2	Gender	-.114	.020	-.180	.032	***
Step 3	Class Climate	-.013	.019	-.022	.000	
Step 4	Risk * Class Climate	-.004	.016	-.053	.000	
Internalizing disorder PMK report						
Step 1	Risk	.062	.009	.227	.051	***
Step 2	Gender	-.013	.019	.022	.000	
Step 3	Class Climate	-.019	.018	-.033	.001	
Step 4	Risk * Class Climate	-.034	.016	-.447	.005	
10-year-old children						
Externalizing disorder PMK report N = 1019						
Step 1	Risk	.086	.006	.366	.134	***
Step 2	Gender	-.086	.017	-.145	.021	***
Step 3	Class Climate	.020	.015	.040	.002	***
Step 4	Gender * Class Climate	.018	.030	.108	.000	
Step 5	Gender * Risk	.005	.014	.018	.000	
Step 6	Risk * Class Climate	.019	.012	.282	.002	
Step 7	Risk * Class Climate * Gender	.083	.023	1.058	.010	***
Internalizing disorder PMK report						
Step 1	Risk	.084	.008	.314	.099	***
Step 2	Gender	.007	.020	.011	.000	
Step 3	Gender * Risk	-.008	.017	-.014	.000	
Step 4	Risk * Class Climate	.017	.014	.233	.000	
* p < .05						
** p < .01						
*** p < .001						

4.5 Teachers' Homework Monitoring

Over one third of teachers who did respond to the teacher questionnaire answered not applicable to these questions about monitoring homework. This means that a large proportion of teachers felt that homework was inappropriate at age six. Because the teachers who answered these questions may not be representative of teachers as a whole we omitted these analyses for 6-year-old children.

Homework monitoring was not found to be significant as a main effect in the hypothesized direction. For 10-year-old children higher levels of homework monitoring were associated with more externalizing disturbance, a finding that was opposite to that hypothesized as can be seen in Table 8. Although one three way interaction was significant for internalizing disorder in 10-year-old children, this did not conform to any of the protective patterns under investigation.

Table 8
Summary of Hierarchical Regression Analyses Examining the Role of Monitoring of Homework in Moderating the Effects of Cumulative Risk in the PMK's Report of Internalizing and Externalizing Disorders Amongst 6- and 10-Year-Old Children

10-year-old children		B	SE _B	β	Change in R ²	
Externalizing disorder PMK report N = 946						
Step 1	Risk	.085	.007	.363	.131	***
Step 2	Gender	-.092	.018	-.155	.024	***
Step 3	Teacher Monitor	-.049	.014	-.109	.012	***
Step 4	Risk * Teacher Monitor	-.020	.012	-.338	.002	
Internalizing disorder PMK report						
Step 1	Risk	.081	.008	.308	.095	***
Step 2	Gender	.000	.020	.000	.000	
Step 3	Teacher Monitor	.002	.016	.005	.000	
Step 4	Risk * Teacher Monitor	-.013	-.014	-.213	.001	

* p < .05

** p < .01

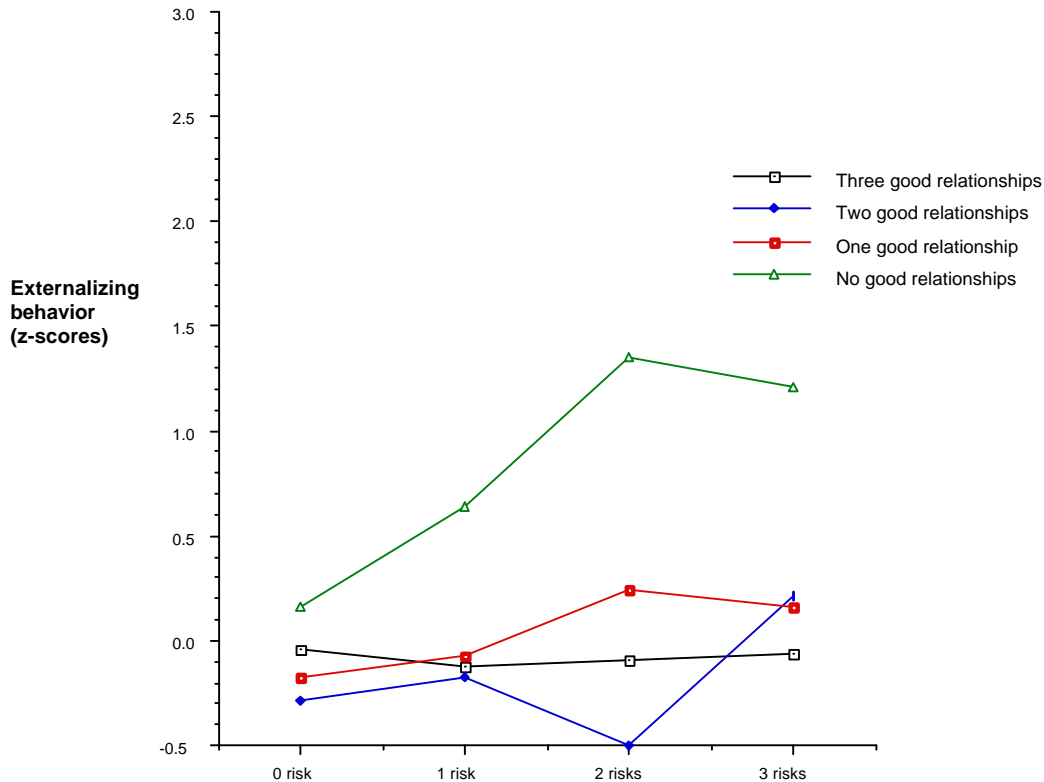
*** p < .001

4.6 Number of Relationships

Given the evidence that some relationships are protective for certain types of problems in children we were interested in examining the differential effect of having one good relationship versus having several as a function of risk. In order to examine this we created a new variable which represented how many good relationships the child had. For friendships and children's relationships with their teacher we treated the categories of "very well, no problems" and "quite well, hardly any problems" as having a good relationship. For siblings we also included the category "pretty well, occasional problems" as PMKs rated sibling relationships more negatively than children's other relationships and this allowed for a better balance across variables. We created a summed score of the number of good relationships that the child had.

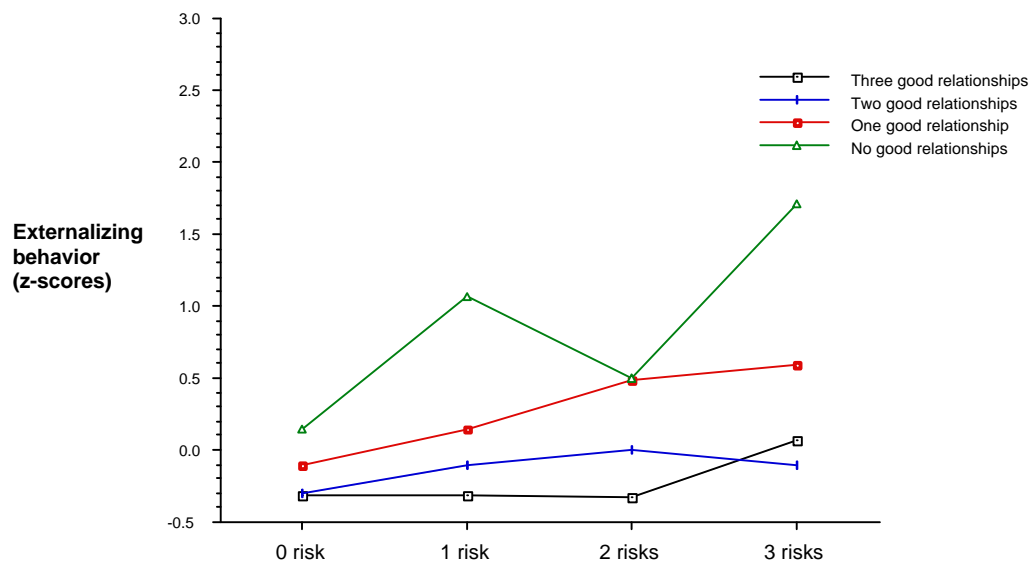
A two way anova was carried out with risk status (0 risks, 1 risk, 2 risks and 3+ risks) and number of good relationships (three good relationships, two good relationships, 1 good relationship, no good relationships) as factors. In 6-year-olds, the number of good relationships was significantly associated with externalizing disorder [$F(3,753) = 18.78, p < .001$]. The interaction between the number of good relationships and risk was also significant [$F(9, 753), = 2.52, p < .008$]. Results of this analysis can be seen in Figure 14. Among children experiencing 0, 1 or 2 risks, the number of good relationships that a child had was less strongly associated with externalizing disorder than when children experienced 3+ risks. This is indicated by the presence a significant interaction between risk and the number of good relationships that the child had. *Post-hoc* analysis in the 3+ risk group using Tukey's Honestly Significant Difference Test demonstrated that children with one, two or three good relationships showed similar levels of externalizing disturbance to one another and only differed from children who had no good relationships. Thus one good relationship was enough to offset the increased likelihood of disturbance for these children at high risk.

Figure 14. Cell means of externalizing behavior (z-scores) in 6-year-olds as a function of the number of good relationship in a child's life and risk status



A slightly different pattern was seen for 10-year-olds as can be seen in Figure 15. Again the number of good relationships was significantly associated with externalizing disorder [$F(3, 894) = 41.85, p < .001$]. The interaction between number of good relationships and risk was also significant [$F(9, 894) = 3.22, p < .001$]. The presence of a significant interaction between risk and the number of good relationships that the child had, indicated that the number of good relationships was more strongly associated with externalizing disorder at higher levels of risk. Post-hoc analysis in the 3+ risk group using Tukey's Honestly Significant Difference Test demonstrated that children with three or two good relationships in their lives did not differ significantly from one another but they were significantly different from children with only one good relationship. Children with one good relationship also differed significantly from children with no good relationships. It seems, therefore, that although one good relationship is sufficient to moderate the impact of risk in 6-year-olds, this is not the case in 10-year-olds.

Figure 15. Cell means of externalizing behavior (z-scores) in 10-year-old children as a function of the number of good relationships in a child's life and risk status



In relation to internalizing disorder, the number of good relationships that the child had was found to be significantly associated with internalizing disturbance in 6-year-olds [$F(3, 753) = 4.00, p < .008$ and in 10-year-olds $F(3, 894) = 5.26, p < .001$]. The interaction between number of good relationships and risk was not significant in either 6- or 10-year-olds.

We compared boys and girls on the quality of their relationships, based on PMK report. At age 6, boys were found to have significantly poorer relationships with their siblings [$t(1559) = 2.4, p < .02$ and their teachers $t(1823) = 4.4, p < .001$]. At age 10 they were found to have significantly poorer relationships with friends [$t(1989) = 2.02, p < .05$] and teachers [$t(1985) = 4.1, p < .001$]. One of the possible reasons why boys are more at risk in their development than girls is that they are less likely to be in affectionate relationships than girls. Thus even when relationships act protectively to boys, as we found to be the case for friendships and sibling relationships, fewer boys than girls are likely to have these affectionate relationships.

5. Conclusions

Children exposed to multiple risks in their lives are much more likely to show psychopathology than children who are not exposed to such risks. A risk index was calculated. The risks included in this index were alcohol abuse in the mother and in the father, marital dissatisfaction, low income, the presence of depression in the PMK, large family size, teenage pregnancy, hostility in the parent-child relationship, parents having divorced and the presence of a learning disability in the child. Children not exposed to any risks showed a rate of psychiatric disorder of approximately 10 percent. Children exposed to four or more of these risks showed a rate of disorder of approximately 50 percent: a fivefold increase in the rates of disorder. This finding was evident across the PMK and the teacher reports of disorder. The association between risk and disorder was less strong when disorder was assessed through child report, although still evident. According to child reports there was over a twofold increase in the likelihood of children showing disorder when they were exposed to four or more risks in their lives compared to no risks. The less strong association between risk and disorder when using children's reports of psychopathology is likely to be because of the lower level of reliability and validity in children's own assessments of psychopathology.

Although children exposed to multiple risks in their lives are at much higher risk of disorder, there are factors occurring naturally in their environments that are associated with a lowered risk of disorder. It may be that such factors in children's lives act as "natural interventions".

There was strong evidence that the presence of good relationships in children's lives is important to their development at 6 and at 10 years of age. We also found evidence for compensatory processes in development. When children are experiencing adverse environments they may draw on other aspects of their environment to provide support and help in the face of adversity. Most of the factors that showed protective effects conformed to Model A: protective at high risk only. In the absence of good sibling relationships, friendships and good relationships with teachers, children in high risk circumstances showed very high levels of disorder. When they had such relationships their levels of disturbance were lower and more comparable to children in low risk environments. These relationships had much less of an impact on children's disturbance when the children lived in low risk circumstances. In the low risk circumstance whether a child had a

good relationship with a sibling or friends showed little association with disturbance, indicating that these relationships are not essential to well-being when children are not experiencing adversity. It is clear that children in high risk circumstances draw support from their relationships with other people. Even though some children live in highly stressful environments having close relationships with others may help them to cope with the difficulties that they face.

The number of good relationships that a child has was found to be strongly related to resilience. For 6-year-olds having one good relationship was sufficient to moderate the impact of risk on the development of externalizing disorder. For 10-year-olds this was not the case as children with only one good relationship in high risk circumstances were more at risk than children with two or three good relationships. Another way of expressing this is that for 10-year-olds, having more good relationships provided more protection. For 6-year-olds, having one good relationship was as advantageous as having three. We also found that boys were less likely than girls to have good relationships. The increased vulnerability that we see in boys may in part be related to less protection from close relationships. Boys may start with more problematic behaviour than girls (showing higher levels of activity, aggressive play etc.) making it harder for people in their environment to respond affectionately, which in turn may make it harder for boys to feel confident and untroubled.

At this point when we have only cross sectional data it is difficult to know about the direction of effect of these findings. One possibility is that when children are experiencing a lot of stress in their lives they are helped by having a close relationship with a friend, sibling or teacher. Such a relationship may help them to feel that they are integrated into a community of people. A number of theorists in the area of social support and mental health have talked about this sense of integration with a community as being a central element of people's sense of well being. Their argument is that when people feel that they have an important place in the lives of others (a social role within a community) that this leads to a sense of well being and purposive activity (Durkheim, 1905; Oatley and Bolton, 1985; Scheff, 1997). It is also possible, however, that the effect goes in the opposite direction. Children who are less compromised in their development can reach out to others and pull them into their world. Children in high risk circumstances show better relationships with others because they are less disturbed. This explanation does not explain why the quality of relationships is strongly associated with disturbance in children experiencing

high risk and less strongly associated with disturbance in children experiencing low risk. It will not, however, be possible to untangle issues of causality until longitudinal data are available. It will then be possible to look at how the presence of protective factors in children's lives at time 1 predict changes from time 1 to time 2 in children's externalizing and internalizing symptomatology.

There were significant differences in the buffering effects of some putative protective factors among 10-year-old boys and girls. These significant three way interactions accounted for relatively small amounts of variance, between .06 percent and 1.8 percent of the variance depending on which outcomes and which protective factors were at issue. The presence of friendships was associated with reduced levels of externalizing difficulties for both boys and girls, but boys responded even more than girls to the presence of friendships. For girls friendships were important to well-being at both low and high risk. This may relate to the importance that girls attach to social relationships throughout their lives (Golombok and Fivush, 1994), both when they are struggling in their lives and when they are not. Girls were more likely to be buffered from the deleterious effects of a high risk environment by good relationships with their teacher than boys. The quality of the relationship with the teacher was important for boys at all levels of risk, whereas for girls this only became very important to development in high risk circumstances. This may be because schools and school routines are more difficult for boys across all levels of risk. Schools require low activity levels, low distractibility, high verbal skills, aspects of behaviour and temperament that may come less naturally to boys. Both boys and girls at high risk were protected by good sibling relationships. This confirms previous work by one of the authors in which siblings found comfort from one another when the parental marriage was poor (Jenkins, 1992).

Across all analyses it is of interest that we were able to account for more variance in externalizing behaviour than internalizing behaviour. There are a number of possible explanations for such a finding. It may be due to measurement error. Internalizing disorder has been found to be harder to assess than externalizing disorder (Herjanic and Reich, 1982; Kolko and Kazdin, 1993) If there is more error in the measurement of internalizing disorder the possibilities of finding significant main effects and interactions are less likely. In other studies, externalizing disturbance has been found to be more strongly predicted by environmental risks than internalizing disturbance (Costello, 1989) It may be that internalizing disturbance is more

strongly related to constitutional elements within the child, such as temperamental behavioural inhibition (Kagan, Reznick and Snidman, 1988; Rubin, 1993) with environmental factors playing less of a role in the etiology and maintenance and internalizing disturbance.

6. Policy Implications

Although relatively few children are exposed to four or more risks in their environment, for those that are exposed to this level of risk, one in two develop serious difficulties. These data also make it clear that boys are more at risk than girls, particularly for externalizing disorders. Boys are also less likely to experience positive relationships with their teachers, friends and siblings, factors that reduce the likelihood that they will develop disorder in high risk circumstances. Thus boys experiencing multiple risks in their lives who do not have satisfactory relationships that might act as a buffer are especially at risk. Consequently it is worth considering the role of targetted interventions for this relatively small group of children for whom the likelihood of problematic development is particularly high.

Early intervention and prevention is strongly indicated for children and families who are likely to fall into this high risk group. There is cross sectional evidence from other studies that risks potentiate one another. When someone becomes unemployed, their risk for depression increases (Bolton and Oatley, 1987). Depressed people are more likely to experience marital conflict (Coyne, Burchill and Stiles, 1991). Marital conflict is associated with increased problems in the parent-child relationship (Jenkins and Smith, 1991). The potentiation of risk must be investigated longitudinally, but if the longitudinal data confirm cross sectional data, risks may lead from one to another increasing the vulnerability of children. Intervention providing support to families before risks have multiplied will reduce the morbidity in children. Another argument for early intervention with families is that externalizing disorders show a high level of continuity over time. Children with externalizing disorders are not very likely to recover spontaneously, suggesting the need for early intervention before externalizing problems become entrenched (Patterson, Capaldi and Banks, 1991).

The data presented in this series of analyses makes it clear that relationships are central to children's well-being. Problematic relationships are associated with increased difficulties for children. Good relationships with siblings, friends, teachers and classmates at school can all help children develop modes of behaviour that are less problematic for them and those in their environment. These findings strongly suggest the need for a focus on relationships in any intervention. A number of early prevention studies with high risk mothers have been carried out (see Ramey and Landesman Ramey, 1998 for review). Results from these suggest that working

with mothers to help them interact with their children in an affectively positive way can promote longterm positive outcomes. It is also clear, however, that programs targeted to helping children develop positive relationships with other people apart from parents may also be very beneficial. In classroom settings encouraging interventions in which children learn how to negotiate difficult issues in relationships and provide one another with support may be very beneficial. Many school intervention programs are geared to teaching instrumental skills such as conflict resolution in the management of relationships. There may be another element of relationships that is even more important for children: a sense of cooperation, interdependence and trust. At the core of the ability to build successful relationships may be the desire for interdependence and cooperation (Jenkins and Greenbaum, 1998). Creating circumstances of interdependence in which children rely on others to have their own goals met may foster a desire for cooperation and a sense of trust that has been previously lacking in their lives. Helping teachers build positive relationships with their most difficult children could also be encouraged. Teachers are most stressed by those children with externalizing disorders who take up much of their time and resources. They can feel guilty about devoting disproportionate amounts of time to these children to the detriment of better functioning children in their classrooms. Supporting classroom teaching so that teachers have time to build positive relationships with those children who are emotionally challenging and difficult may provide children with an experience that is ultimately beneficial. The beneficial impact of sibling relationships found for children at high risk, suggests the importance of building on these relationships as a preventative strategy. In therapeutic interventions with children and their families the focus is often on the parental marriage and the parent-child relationship (Nichols and Schwartz, 1995). It may be beneficial for therapists to focus more attention on the development of positive interactions in the sibling relationship as a means of providing children with relationships that may buffer future stress.

Although programs in early prevention at the family and the school level are likely to be exceptionally important in lessening psychopathology in children, the macrocontext within which families live should not be ignored. Societies in which the differential between the wealthy and the poor is greater show poorer scholastic, health and behavioural outcomes (Keating and Hertzman, in press). We can support our families that live in poverty through financial supplements, subsidized daycare, and educational opportunity. Successful early prevention programs have not just concentrated on helping families with parenting. They have

also helped mothers deal with their problems by obtaining financial support, planning for their own return to education, reducing sources of marital conflict, etc. As a society we can put in place those structural supports that make family life easier, an intervention that would reduce the likelihood that children would be exposed to high levels of risk in their lives.

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