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RESILIENCE TO CHILDHOOD ADVERSITY: RESULTS OF A 21 YEAR STUDY

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INTRODUCTION

There has been a large amount of research conducted into the contributions of childhood and familial factors to the development of psychopathology in children and young people (for reviews see for example (Farrington et al., 1990; Hawkins, Catalano, & Miller, 1992; Loeber, 1990; Patterson, DeBaryshe, & Ramsey, 1989; Rutter & Giller, 1983)). This research has established that young people reared in disadvantaged, dysfunctional or impaired home environments have increased risks of a wide range of adverse outcomes that span mental health problems, criminality, substance abuse, suicidal behaviors and educational underachievement. Although popular and policy concerns have often focussed on the role of specific factors such as child abuse, poverty, single parenthood, family violence, parental divorce and the like, the weight of the evidence suggests that the effects of specific risk factors in isolation on later outcomes often tend to be modest (Fergusson, Horwood, & Lynskey, 1994; Garmezy, 1987; Rutter, 1979; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). What distinguishes the high risk child from other children is not so much exposure to a specific risk factor but rather life history that is characterised by multiple familial disadvantages that span social and economic disadvantages; impaired parenting; neglectful and abusive home environment; marital conflict, family instability; family violence and high exposure to adverse family life events (Blanz, Schmidt, & Esser, 1991; Fergusson et al., 1994; Masten, Morison, Pellegrini, & Tellegen, 1990; Sameroff & Seifer, 1990; Shaw & Emery, 1988; Shaw, Vondra, Hommerding, Keenan, & Dunn, 1994).

Despite the often strong relationship between exposure to accumulative adversity and developmental outcomes, this relationship is by no means deterministic and it has been well documented that children exposed to extremely adverse environments appear to avoid developing later problems of adjustment (Garmezy, 1971; Rutter & Madge, 1976; Werner & Smith, 1992). Observations of this type have led investigators and theorists to propose that failure to develop problems in the face of adversity is evidence of some (non observed) form of resilience

which protects or otherwise mitigates the effects of exposure to adversity (Garmezy, 1985; Rutter, 1985).

The identification of individuals who exhibit an ability to transcend exposure to adversity, in turn, raises important issues about the processes that lead to this resilience. There have been two general approaches to describing the factors that contribute to resilience. The first approach has been to suggest the presence of various protective factors that act to mitigate the effects of exposure to adversity. The concept of protective factors was first developed systematically by Rutter (1985) who argued that to be meaningful it was necessary for protective factors to be something more than the converse of risk factors. To address this issue, Rutter proposed a conceptualisation of protective factors that implied an interactive relationship between the protective factor, the risk exposure and the outcome. This relationship was assumed to be such that exposure to the protective factor had beneficial effects on those exposed to the risk factor but did not benefit those not exposed to the risk factor.

Although Rutter's conceptualisation of protective factors succeeds in drawing a distinction between risk and protective factors, the over use of this conceptualisation may prove to be a barrier to understanding the origins of resilience since not all factors that contribute to resilience will conform to the interactive model that Rutter implies is a feature of protective factors (Luthar, 1993). To provide a simple illustration of this point, consider a situation in which concerns focus on the question of the factors that distinguish children who escape from the effects of family adversity from those who do not. The available evidence suggests that one such factor is childhood intelligence since research suggests that above average IQ is often a defining feature of children who transcend adversity (eg, Fergusson & Lynskey, 1996; Herrenkohl, Herrenkohl, & Egolf, 1994). While childhood IQ may be a factor that leads to resilience, there is no compelling reason why the relationship between family adversity, child IQ and adverse outcome should be interactive and conform to the definition of protective factors suggested by Rutter. Thus, in discussing the

origins of resilience, it becomes useful to distinguish between two types of processes that may lead to resilience in the face of exposure to a specific risk factor or set of risk factors.

Protective processes in which the exposure to the resilience factor is beneficial to those exposed to the risk factor but has no benefit (or less benefit) for those not exposed to the risk factor.

Compensatory processes in which the resilience factor has an equally beneficial effect on those exposed and those not exposed to adversity.

The essential difference between protective and compensatory processes thus lies with the statistical model that describes the linkages between the resilience factors, the risk factor and the outcome. In the case of protective factors, there is an interactive relationship between the risk factor and the protective factor. In the case of compensatory factors, the data will fit a main effects model in which the compensatory factor is equally beneficial for those exposed and not exposed to the risk factor. In this chapter we use the term “resilience factor” to describe factors that may serve as either protective or compensatory factors.

Beyond the issue of testing for compensatory and protective effects, there is also a need to develop prior theory and evidence to identify those factors and processes that may confer resilience to children who are exposed to childhood adversity. The research literature in this area has suggested a range of family, individual and peer factors that may confer resilience to children reared in high risk environments. These factors have included:

1. Intelligence and problem solving abilities. A finding that has emerged from several studies is that resilient young people appear to be characterized by higher intelligence or problem solving skills than their non-resilient peers (Fergusson & Lynskey, 1996; Herrenkohl et al., 1994; Kandel et al., 1988; Masten et al., 1988; Seifer, Sameroff, Baldwin, & Baldwin, 1992).

2. Gender. There have been a number of suggestions in the literature that gender may influence or modify responses to adversity. Specifically, a number of studies of the effects of marital discord or divorce have suggested that females may be less reactive to family stress than

males (Emery & O'Leary, 1982; Hetherington, 1989; Porter & O'Leary, 1980; Wallerstein & Kelly, 1980).

3. External interests and affiliations. A number of studies have suggested that children from high risk backgrounds who either develop strong interests outside the family or form attachments with a confiding adult outside their immediate family may be more resilient to the effects of family adversity (Jenkins & Smith, 1990; Werner, 1989).

4. Parental attachment and bonding. A further factor that may increase resilience in children from high risk backgrounds is the nature of parent/child relationships. Specifically, it has been suggested that the presence of warm, nurturant or supportive relationships with at least one parent may act to protect against or mitigate the effects of family adversity (Bradley et al., 1994; Gribble et al., 1993; Herrenkohl et al., 1994; Jenkins & Smith, 1990; Seifer et al., 1992; Werner, 1989; Wyman, Cowen, Work, & Parker, 1991).

5. Early temperament and behavior. There has also been some evidence to suggest that temperamental and behavioral factors may be associated with resilience to adversity (Werner, 1989; Wyman et al., 1991).

6. Peer factors. A number of researchers have pointed to the fact that positive peer relationships may contribute to resilience (Benard, 1992; Davis, Martin, Kosky, & O'Hanlon, 2000; Fergusson & Lynskey, 1996; Werner, 1989).

The issues raised by these suggestions clearly require the development of statistical models that describe the linkages between childhood outcomes, exposure to childhood adversity and the resilience factors listed above to examine which of these factors may contribute to childhood resilience and whether the effects of these factors are compensatory (main effects) or protective (interactive).

In the present analysis we use data gathered over a 21 year longitudinal study to examine a series of issues relating to the topic of resilience to childhood adversity. The key issues to be addressed include:

1. To what extent is accumulative exposure to family adversity during childhood (0-16 years) associated with the development of psychopathology in adolescence and young adulthood (16-21 years)?
2. How many young people with high exposure to family adversity avoid developing later psychopathology?
3. What mechanisms underlie this escape from adversity?

METHOD

The data reported here were gathered during the course of the Christchurch Health and Development Study (CHDS). The CHDS is a longitudinal study of an unselected birth cohort of 1,265 children born in the Christchurch (New Zealand) urban region during a four month period in mid-1977. This cohort has been studied at birth, 4 months, 1 year and at annual intervals to age 16 years, and at ages 18 and 21 years. Data have been collected from a combination of sources including: parental interviews; self report; psychometric testing; teacher reports; medical records and Police records. A more detailed description of the study and an overview of study findings has been provided by Fergusson et al (1989), Fergusson & Horwood (2001). The following measures were used in this analysis.

Measures of Psychosocial Adjustment (16-21 years)

At ages 18 and 21 years cohort members were administered a comprehensive mental health interview that assessed various aspects of the individual's mental health and adjustment over the periods 16-18 years and 18-21 years respectively (Fergusson, Horwood, & Woodward, 2001; Horwood & Fergusson, 1998). This information was used to construct the following measures of individual adjustment over the period 16-21 years.

Major depression. At each interview sample members were questioned about their depressive symptomatology since the previous assessment, using items from the Composite

International Diagnostic Interview (CIDI) (World Health Organization, 1993). Using these data, DSM-IV (American Psychiatric Association, 1994) criteria were used to construct diagnoses of major depression for each sample member in each interview period.

Anxiety disorders. Sample members were also questioned using items from the CIDI to assess DSM-IV criteria for anxiety disorders, including: generalized anxiety disorder, simple phobia, specific phobia, agoraphobia and panic disorder.

Conduct/antisocial personality disorders. DSM-IV symptom criteria for these disorders were assessed using a combination of items from the Self Report Delinquency Instrument (SRDI) (Elliott & Huizinga, 1989) supplemented by custom written survey items for the assessment of antisocial personality.

Alcohol/illicit drug dependence. At each interview sample members were questioned about their use of alcohol, cannabis and other illicit drugs since the previous assessment. As part of this questioning items from the CIDI were used to assess DSM-IV symptom criteria for alcohol dependence and illicit drug dependence.

Suicidal behaviors. At each interview sample members were questioned about the frequency and timing of any suicidal thoughts occurring in the interval since the previous assessment. Respondents who reported having suicidal thoughts were also asked whether they had made a suicide attempt during the interval, and about the timing, nature, and outcome of any such attempt(s).

Criminal offending. Young people were questioned concerning their involvement in criminal offending and their frequency of offending using an instrument based on the SRDI (Elliott & Huizinga, 1989). This information was used to construct two measures of criminal offending over the period 16-21 years: (a) *Violent crime*: whether the young person reported committing multiple (two or more) violent offenses including assault, fighting, use of a weapon or threats of violence against a person; (b) *Property crime*: whether the young person reported committing

multiple (two or more) property offenses including theft, burglary, breaking and entering, vandalism or fire setting and related offenses.

Measures of Childhood Adversity (0-16 Years)

To assess the extent of exposure to adverse childhood and family risk factors the following variables were selected from the database of the study. These variables were chosen to span the potential array of risk exposures and also on the basis of prior knowledge of the variables in the database that had been shown to be consistently related to psychosocial outcomes in adolescence.

Measures of socioeconomic adversity. (a) *Family socioeconomic status* at the time of the survey child's birth was assessed using the Elley-Irving (1976) scale of socioeconomic status for New Zealand. (b) *Parental education*: Both maternal and paternal education levels were assessed at the time of the survey child's birth using a three level classification system reflecting the highest level of educational attainment (no formal qualifications; high school qualifications; tertiary qualifications). (c) *Standard of living*: At each assessment from age 1 to age 12 years, interviewer ratings of the family's standard of living were obtained using a 5-point scale that ranged from 'obviously affluent' to 'obviously poor/very poor'. To provide a measure of exposure to consistently low living standards, these ratings were used to construct a count measure of the number of years in which the family was rated as having a below average standard of living.

Measures of parental change and conflict. Comprehensive data on family placement and changes of parents were collected at annual intervals from birth to age 16 years. This information was used to construct two measures of family stability over the period 0-16 years: (a) *Single parent family*: this measure was based on whether the child had ever spent time in a single parent family before age 16 either as a result of entering a single parent family at birth, or as a result of parental separation/divorce. (b) *Changes of parents*: an overall measure of family instability was constructed on the basis of a count of the number of changes of parents experienced by the child before age 16 years. Information on family instability was supplemented by a further measure of parental conflict. (c) *Interparental violence*: At age 18, sample members were questioned using items from

the Conflict Tactics Scale (Straus, 1979) to assess the extent to which they had witnessed incidents of physical violence or serious threats of physical violence between their parents during childhood.

Measures of child abuse exposure. At ages 18 and 21 years, sample members were questioned concerning their experience of child abuse prior to age 16 years. (a) *Parental use of physical punishment*: Young people were asked to describe their parents' use of physical punishment on a 5 point scale ranging from 'parent never used physical punishment' to 'parent treated me in a harsh and abusive way' (Fergusson & Lynskey, 1997). The questioning was conducted separately for the mother and the father. For the purposes of the present analysis the young person was defined as having been exposed to physical child abuse if s/he reported at either 18 or 21 years that either parent had used physical punishment too often or too severely or had treated the respondent in a harsh and abusive manner during childhood. (b) *Childhood sexual abuse*: Young people were also questioned at 18 and 21 concerning their experience of sexual abuse in childhood ranging in severity from episodes of non contact abuse to various forms of sexual penetration (Fergusson, Lynskey, & Horwood, 1996). For the purposes of the present analysis the young person was classified as having experienced sexual abuse if s/he reported at either 18 or 21 years any episode of sexual abuse involving physical contact with the perpetrator.

Measures of parental adjustment. (a) *Parental alcohol problems*: When sample members were aged 15 years, parents were questioned whether there was a history or alcohol problems for any parent; (b) *Parental criminality*: Also at age 15, information was obtained from parents on whether any parent had a history of criminal offending; (c) *Parental illicit drug use*: When sample members were aged 11, information was obtained from parents concerning their history of illicit drug use.

Measures of Resilience Factors (0-16 Years)

On the basis of the literature on resilient adolescents, a range of family, individual and related factors believed to be associated with resilience to adversity was included in the analyses. In all cases these measures were assessed at or before age 16 years.

Family factors. (a) *Parental attachment*: This was assessed at age 15 years using the parental attachment scale developed by Armsden and Greenberg (1987). The full scale score was used in the present analysis and this scale was found to be of good reliability ($\alpha = .87$). (b) *Parental bonding*: To measure the quality of parental bonding during childhood, the maternal and paternal care and protection scales of the Parental Bonding Instrument (PBI) (Parker, Tupling, & Brown, 1979) were administered to sample members at age 16 years. The reliabilities of these scales were good with coefficient α values ranging from .85 to .91.

Child factors. (a) *Gender*. (b) *Attentional problems (8 years)*: At age 8 years sample members were assessed on their tendencies to restless/inattentive/ hyperactive behaviors using a measure that combined items from the Rutter et al (1970) and Conners (1969; 1970) parent and teacher behavior rating scales. For the purposes of the present analysis, the parent and teacher reports were combined to provide an overall measure of childhood attentional problems. The resulting measure was of good reliability ($\alpha = .88$). (c) *Childhood conduct problems (8 years)*: The extent to which the child exhibited conduct disordered or oppositional behaviors at age 8 years was also assessed using items from the Rutter and Conners parent and teacher questionnaires. For the purposes of the present analysis, the parent and teacher reports were combined to produce an overall measure of the extent to which the child exhibited tendencies to conduct problems. This scale was of excellent reliability ($\alpha = .93$). (d) *Child neuroticism (14 years)*: A measure of the child's tendencies to neuroticism was obtained at age 14 years using a short form version of the Eysenck Personality Inventory Neuroticism Scale (Eysenck & Eysenck, 1964). The scale score was found to be of moderate reliability ($\alpha = .80$). (e) *Novelty seeking*: At age 16 years, sample members were administered the novelty seeking sub-scale of the Tridimensional Personality Questionnaire (TPQ) (Cloninger, 1987). The resulting scale score was of moderate reliability ($\alpha = .76$). (f) *Self esteem (15 years)*: This was assessed using the Coopersmith Self Esteem Inventory (Coopersmith, 1981). The full scale score was used in this analysis and found to have good reliability ($\alpha = .80$).

Peer factors. *Peer affiliations (16 years)*: At age 16 years sample members and their parents were questioned on a series of items concerning the extent to which the young person's friends used tobacco, alcohol or illicit drugs, truanted or offended against the law. These items were combined to produce separate self report and parental report scales of the extent to which the young person affiliated with substance using or delinquent peers. These scales were of moderate reliability ($\alpha = .74$ for self report and $\alpha = .79$ for parental report).

School factors. Two measures of schooling/academic attainment were used. (a) *School retention*: Sample members who left school at age 16 or earlier were classified as early school leavers. (b) *School Certificate passes*: School Certificate is a national series of examinations that is undertaken by the majority of students in their third year of high school. Students may sit examinations in any number of subjects (typically 4 or 5), and performance in each subject is graded from A to E, with a grade of C or better implying a 'pass' in that subject. An overall measure of academic attainment for each young person was obtained by summing the number of pass grades achieved in all School Certificate examinations.

Sample Size and Sample Bias

The analyses reported here are based on a sample of 991 sample members for whom data on risk exposure to age 16 years and psychosocial outcomes from 16-21 years were available. This sample represents 78.3% of the original cohort. To examine the effects of sample losses on the representativeness of the sample, the 991 subjects included in the analysis were compared with the remaining 274 subjects on a series of measures of socio-demographic characteristics assessed at the point of birth. These comparisons suggested that there were slight tendencies for the obtained sample to under-represent children from socially disadvantaged families characterised by low parental education, low socioeconomic status or single parenthood.

To address this issue, all analyses were repeated using the data weighting method described by Carlin et al (1999) to adjust for possible selection effects resulting from the pattern of sample attrition. These analyses produced essentially identical conclusions to those based on the

unweighted data. Since the two sets of results were consistent, in the interests of simplicity, the results reported here are based on the unweighted sample.

FINDINGS

The Prevalence of Childhood Adversity

Table 1 shows the percentages of the cohort who were exposed to various forms of childhood and family adversity during the period from 0-16 years. Measures of adversity are classified into four groups of related measures: i) measures of socio-economic adversity; ii) measures of parental change and conflict; iii) measures of child abuse; and iv) measures of parental adjustment problems. The Table shows:

a) Socioeconomic Adversity: In the region of one child in four came from a family characterised by low socio-economic status, and in one third of families both parents lacked formal educational qualifications. Just over 10% of the cohort were rated repeatedly as having below average living standards.

b) Parental Change and Conflict: There was a relatively high rate of family instability in the cohort with over one third of cohort members having experienced the separation of their parents before the age of 16 or having entered a single parent family at birth. One in five cohort members had experienced three or more changes of home circumstances by the age of 16 and over 20% of the cohort reported acts of physical violence or threats of physical violence between their parents.

c) Child Abuse: Just over 6% of the cohort described their parents' use of physical punishment as either harsh or overly severe and 12% of the cohort reported experiencing contact sexual abuse by the age of 16.

d) Parental Adjustment: In approximately one in eight families, there was a reported history of parental alcohol problems or criminality. In 25% of families there was a reported history of parental illicit drug use.

INSERT TABLE 1

The variables described in Table 1 tended to be positively correlated, reflecting the tendency for childhood and family adversities to co-occur. To describe the overall exposure of the cohort to childhood adversity a simple unweighted score was constructed by counting for each child the number of adverse circumstances he/she encountered during childhood. Over half of the cohort had experienced either 0 or 1 childhood adversity whereas at the other extreme, just over 9% of the cohort had experienced 6 or more adversities.

Table 2 shows the relationship between the childhood adversity score and rates of externalizing behaviors (Table 2a) and internalizing behaviors (Table 2b). In this table, the association between childhood adversities and each outcome is tested for statistical significance using the Mantel Haenszel chi square test of linearity.

Table 2a shows that with increases in childhood adversity, there were corresponding and significant increases in rates of: conduct/antisocial personality disorder; violent crime; property crime; alcohol and illicit drug dependence. Overall, those exposed to six or more adversities during childhood had risks of externalizing problems that were 2.4 times higher than those with low exposure (50.0% vs 20.5%). Similarly, the rate of externalizing problems was 3.1 times higher amongst those exposed to high adversity when compared with those exposed to low adversity (1.13 vs .37).

There are similar, but perhaps less marked relationships, between exposure to childhood adversity and measures of internalizing behaviors (Table 2b). Those exposed to six or more childhood adversities had risks of internalizing disorders that were 1.8 times higher than those not exposed to adversity (68.5% vs 38.8%) and overall rates of internalizing problems that were 2.3 times higher (1.50 vs .64).

INSERT TABLE 2

Modelling Resilience Processes

Since not all of those exposed to high levels of childhood adversity developed externalizing or internalizing problems, the results in Table 2 suggest the presence of non observed resilience processes that act to mitigate the effects of high exposure to childhood adversity. To examine this issue, an exploration was undertaken of the relationships between: a) exposure to childhood adversity; b) the family, individual, peer and school resilience factors described in Methods; and c) risks of externalizing and internalizing responses. This analysis involved two stages.

1. Examination of bivariate associations: In the first stage of the analysis, the relationships between each of the resilience factors and risks of externalizing and internalizing were examined. This analysis showed that:

i) Risks of externalizing responses were related to: parental attachment ($p < .0001$); parental bonding ($p < .001$); gender ($p < .001$); attention deficit symptoms 8 years ($p < .001$); conduct problems 8 years ($p < .001$); self esteem 15 years ($p < .001$); novelty seeking 16 years ($p < .001$); deviant peer affiliations 16 years ($p < .001$); early school leaving ($p < .001$); success in School Certificate Examinations ($p < .001$).

ii) Risk of internalising responses were related to: parental attachment ($p < .001$); parental bonding ($p < .001$); gender ($p < .001$); neuroticism at 14 years ($p < .001$); self esteem at age 15 ($p < .001$); novelty seeking at 16 ($p < .005$); deviant peer affiliations ($p < .001$); early school leaving ($p < .05$).

2. Fitting Logistic Models: Following the exploration of bivariate associations logistic regression models were fitted to risks of: i) externalizing responses; and ii) internalizing responses. The model fitted was:

$$\text{Logit } Y_i = B_0 + B_1 X_1 + \sum B_j Z_j + \sum B_{1j} (X_1 \times Z_j)$$

where logit Y_i was the log odds of the i th outcome (externalizing; internalizing), X_1 was the measure of exposure to childhood adversity shown in Table 2, Z_j were the resilience factors and $(X_1 \times Z_j)$ were a set of multiplicative interaction terms.

For both analyses (externalizing; internalizing) all resilience factors and interaction terms were entered into an initial model and this model was then refined successively to identify significant factors.

The fitted model for externalizing identified 5 factors that made contributions to risks of externalizing. These factors were: exposure to childhood adversity ($p < .0001$); gender ($p < .001$); deviant peer affiliations ($p < .001$); novelty seeking ($p < .001$) and self esteem ($p < .005$). These results showed that, independently of childhood adversity, females, those with low novelty seeking, those without delinquent peer affiliations and those with high self esteem, were less likely to display externalizing responses in adolescence and young adulthood.

The fitted model for internalizing also identified five significant factors. These factors were: exposure to childhood adversity ($p < .0001$); gender ($p < .001$); neuroticism ($p < .001$); novelty seeking ($p < .001$) and parental attachment ($p < .001$). These results suggested that males, those with low levels of neuroticism and novelty seeking and those with high levels of parental attachment, were less likely to develop internalizing responses in adolescence and young adulthood.

The results for both externalizing and internalizing fitted a main effects model and there was no evidence of significant interactions between exposure to childhood adversity and the resilience factors described above. Further model checking including cross tabulation and plotting of results failed to produce evidence of interactive associations between childhood adversity and the resilience factors.

To explore the implication of the results of the logistic regression a little further, these results were used to create vulnerability/resilience scores for externalizing and internalizing responses. These scores were created by weighting the resilience factors in each regression by their regression coefficients to obtain scores representing the extent to which:

a) Individuals were exposed to the factors that may mitigate (female gender; low novelty seeking; avoidance of delinquent peer affiliations; high self esteem) or exacerbate (male gender;

high novelty seeking; affiliations with delinquent peers; low self esteem) risks of subsequent externalizing.

b) Individuals were exposed to the factors that may mitigate (male gender; low novelty seeking; low neuroticism; high parental attachment) or exacerbate (female gender; high novelty seeking; high neuroticism; low parental attachment) risks of subsequent internalizing responses.

The associations between the vulnerability/resilience scores described above, exposure to childhood adversity and rates of externalizing and internalizing responses are shown in Table 3. This Table shows the vulnerability/resilience scores divided into quartiles that range from those with high resilience to those with low resilience and cross tabulated with the childhood adversity scores. The cells of the tables show the percentages of the group who developed subsequent externalizing responses (Table 3a) and internalizing responses (Table 3b).

The Table shows that risks of subsequent externalizing or internalizing responses were modified substantially by the resilience scores. This may be seen by examining the ways in which variations in the resilience scores modify risks of externalizing and internalizing responses amongst those exposed to high levels of family adversity (6+). The Table shows that:

1. Amongst those with high resilience to externalizing who were exposed to high family adversity, only 18% developed subsequent externalizing responses. In contrast, amongst those with low resilience to externalizing who were exposed to high childhood adversity, 70% developed subsequent externalizing.

2. Amongst those with high resilience to internalizing who were exposed to high family adversity 44% developed subsequent internalizing responses. In contrast, amongst those with low resilience to internalizing who were exposed to high childhood adversity, 76% developed subsequent internalizing responses.

DISCUSSION

In this chapter, data from a 21 year longitudinal study has been used to examine the relationships between childhood adversity and subsequent externalizing and internalizing responses. This study had a number of features that made it highly suitable for examining the factors that may contribute to resilience in the face of childhood adversity. These features included:

- a) Use of a representative population study with high rates of sample retention.
- b) Longitudinal study of the cohort from birth to young adulthood.
- c) Assessment of a wide range of childhood or family adversities.
- d) Assessment of both externalizing and internalizing responses using standardized and validated questionnaires.
- e) Assessment of a wide range of factors that may influence resilience or vulnerability to adversity.

The key issues and themes to emerge from this analysis are summarised below:

Resilience and the Accumulative Effects of Childhood Family Adversity

A composite measure of exposure to childhood adversity was constructed by summing items from a number of domains of family functioning including: socio-economic advantage/disadvantage; family change and conflict; exposure to child abuse and parental adjustment. In agreement with previous findings from this study and in agreement with other research provided previously, there was evidence that with increasing exposure to childhood adversity there were corresponding increases in rates of both externalizing and internalizing disorders. Those exposed to 6 or more adverse factors during childhood had rates of externalizing disorders that were 2.5 times higher than those with low exposure to adversity and rates of internalizing disorders that were 1.8 times higher. However, it was also clear that even at high levels of exposure to adversity, not all those exposed develop problems. These findings are suggestive of the presence of resilience processes that mitigated the effects of exposure to adversity.

Modelling Resilience

Statistical modelling of resilience factors, led to two sets of conclusions about the factors and processes that may contribute to resilience to childhood adversity. First, in all cases the data fitted a main effects model and there was no evidence of interactive relationships in which the relationships between the risk factors and outcomes were modified by the resilience factors. These results suggested that the resilience factors had their effects by compensating for childhood adversity, rather than acting in a protective role.

Second, the models for externalizing and internalizing identified a similar set of resilience factors. These factors included:

a) Gender: The models for externalizing and internalizing showed that gender had quite opposite effects in compensating for the effects of childhood adversity. Being female reduced risks of developing externalizing, whereas being male reduced risks of developing internalizing responses. These results suggest the presence of gender specific strengths and vulnerabilities that may act to mitigate or exacerbate the effects of family adversity on risks of problems in adolescence. The finding that gender plays a role in resilience is consistent with previous literature on this topic (Emery & O'Leary, 1982; Hetherington, 1989; Porter & O'Leary, 1980; Rutter, 1990; Wallerstein & Kelly, 1980). However, this previous literature has tended to emphasize the role of female gender as a protective or compensatory factor and has paid less attention to male gender as a source of resilience. When externalizing and internalizing in adolescence are considered, it is apparent that each sex has what appear to be gender specific strengths and vulnerabilities with femaleness providing resilience to externalizing but vulnerability to internalizing, whilst maleness provides vulnerability to externalizing but resilience to internalizing. These findings also illustrate the important point that in the analysis of resilience it is important to distinguish between resilience to externalizing responses and resilience to internalizing responses. The results show that what may confer resilience to one outcome may increase vulnerability for another.

b) Personality and Related Factors: The analyses of both externalizing and internalizing responses suggest that personality factors may exacerbate or mitigate the effects of exposure to childhood adversity. For externalizing responses, both novelty seeking and self esteem were resilience factors with low novelty seeking and high self esteem mitigating the effects of exposure to childhood adversity. In the case of internalizing responses, novelty seeking and neuroticism were resilience factors with low novelty seeking and low neuroticism mitigating the effects of exposure to childhood adversity. These findings are generally consistent with a literature that has suggested that personality or temperamental factors may play an important role in determining resilience in the face of adversity (Luthar, 1991; Werner & Smith, 1992; Wyman et al., 1991).

A clear limitation of the present study is that it provides no insight into the processes by which personality factors contribute to vulnerability or resilience. However, it seems likely that there are two general routes by which personality factors may act to increase vulnerability or resilience. First, these factors may influence the threshold at which the individual reacts to environmental adversity. For example, in the case of neuroticism it is likely that those with low neuroticism are less likely to react to environmental adversity by developing internalizing responses. Second, these factors may influence individual behavior and choices that may act to increase or decrease rates of problem outcomes. For example, low novelty seeking may inhibit individuals from the high risk taking behaviors that are a characteristic prelude to externalizing problems.

c) Affiliations and Attachments: The final measures that played a role in influencing resilience to adversity related to the nature of attachment and affiliation relationships. For externalizing, the avoidance of affiliations with delinquent peers proved to mitigate the effects of exposure to family adversity, whereas in the case of internalizing, the formation of strong parental attachment proved to mitigate the effects of exposure to family adversity. These findings are generally consistent with the view that the nature of parent/child attachment and peer relationships

may play a role in determining vulnerability or resilience in the face of adversity (Benard, 1990; Benard, 1992; Davis et al., 2000; Fonagy, Steele, Steele, Higgitt, & Target, 1994).

Again the study does not make clear the processes by which parental attachment influenced subsequent internalizing or peer affiliations influenced subsequent externalizing. However, the findings on parental attachment are consistent with evidence and theorising that secure attachment lays the foundations for resilience to adversity (Fonagy et al., 1994). The present results suggest that this may apply to internalizing but not externalizing, again highlighting the fact that the factors that confer resilience to externalizing may differ from the factors that confer resilience to internalizing.

The findings on the role of delinquent peer affiliations are clearly consistent with a large literature that has linked these affiliations to increases in externalizing behaviors in adolescence (Farrington et al., 1990; Fergusson & Horwood, 1996; Fergusson, Horwood, & Lynskey, 1995; Hawkins et al., 1992; Quinton, Pickles, Maughan, & Rutter, 1993).

d) Accumulative Effects of Resilience Factors: Since the data fitted main effects models, the resilience factors outlined above combined additively to mitigate or exacerbate the effects of child/family adversity on risks of externalizing and internalizing. These accumulative effects were illustrated by examining the relationships between family adversity and risks of externalizing or internalizing for quartiles of the accumulative resilience scores. This analysis showed that differences in the resilience factors had quite dramatic effects on rates of problems amongst children exposed to high family adversity. For externalizing, of those in the top quartile of resilience (ie females, low novelty seeking, high self esteem, low affiliation with delinquent peers) only 18% of those exposed to high childhood or family adversity exhibited later externalizing. In contrast of those in the lowest quartile of resilience (male, high novelty seeking, low self esteem, high affiliations with delinquent peers) over 70% of those exposed to high childhood of family adversity exhibited later externalizing. For internalizing, variations in resilience scores were associated with similar but less marked trends for rates of internalizing to vary depending on levels

of resilience. Both sets of results illustrate the ways in which accumulations of resilience factors may act to mitigate the effects of accumulations of childhood adversities on risk of later internalizing or externalizing.

e) Omitted Factors: It is clearly possible to suggest a number of factors that were omitted from the analysis but if included may have explained further resilience. The most important of these factors are likely to be non observed genetic factors that may shape the individual's predispositions to respond to environmental adversity. The possible role of such genetic factors is clearly suggested by the fact that important resilience factors identified in the analysis included personality factors such as neuroticism and novelty seeking, both of which have relatively high heritability (Heath, Cloninger, & Martin, 1994). These considerations highlight the need for future research into resilience to employ genetically informative research designs that have the capacity to separate the roles of nature and nurture in response to environmental adversity.

Risk and Resilience

In recent years there has been a growing interest in the issue of resilience. This interest appears to derive from the view that, while studies of risk factors emphasise negative features, the study of resilience emphasizes positive features. For this reason, it has often been suggested that resilience research differs fundamentally from risk research because of the focus of resilience research on positive aspects of human development (Davis, 1999; Werner & Smith, 1992). This emphasis has also been incorporated into models of program development through the so called "strengths" perspective that emphasizes the need for programs to build on individual, family or community strengths rather than focussing on individual, family community deficits or risk factors (Werner & Smith, 1992).

Although there have been attempts to draw sharp distinctions between "risk factor" and "resilience" research, the extent to which these distinctions can be justified will depend critically on the type of statistical model that describes linkages between risk factors, resilience factors and outcome measures. If these variables are linked by an additive main effects model then risk and

resilience prove to be different sides of the same coin. Thus (under a main effects model) if low self esteem is a factor that contributes to increased risk (vulnerability) then high self esteem can be said to contribute to reduced risk (resilience). Under the main effects model, any risk factor can be represented as a resilience factor and any resilience factor is a risk factor simply by reversing the interpretation of the factor.

As Rutter (1985) has pointed out in his now classic essay on protective factors, to distinguish between risk and protective factors it is necessary for protective factors to be something more than the opposites of risk factors. From this position, Rutter developed the view that protective factors were defined by an interactive process in which exposure to the protective factor modified the effects of the risk factor on the outcome.

In this study, we have used longitudinal data gathered on a birth cohort studied into young adulthood to examine the ways in which a large number of individual, family, peer and school factors may act to mitigate the effects of exposure to childhood adversity. Despite extensive analysis we have been unable to uncover the type of interactive processes that meet Rutter's definition of protective factors. The results of our statistical analyses suggest a main effects model in which factors such as gender, personality, attachment and peer relationships act additively in ways that may mitigate or exacerbate the effects of exposure to childhood adversity. There are two important implications of the main effects model identified in this research.

First, a sharp distinction between risk and resilience research was not possible using the data gathered in the CHDS. For these data, risk and resilience proved to be different sides of the same coin and whether results are described in terms of risk or resilience depends on the perspective applied to a main effects model.

Second, the main effects model did provide a means of (at least partially) explaining why not all children exposed to high adversity went on to develop problems in adolescence. The main effects model identified the presence of a series of personal, family and peer factors that could either exacerbate risks of later problems or mitigate these risks.

In summary, the results of this study suggest three general conclusions about the relationship between childhood adversity, adolescent outcomes and resilience factors.

First, there was clear evidence to suggest that with increasing exposure to childhood adversities there were marked increases in rates of both internalizing and externalizing problems in adolescence and young adulthood. However, not all of those exposed to high levels of adversity developed later externalizing or internalizing, suggesting the presence of resilience processes.

Second, the effects of exposure to childhood adversity on later outcomes were modified by a series of factors that acted to mitigate or exacerbate these risks.

Third, in all cases the data fitted main effects models, suggesting that the factors that contributed to resilience amongst those exposed to high levels of childhood adversity were equally beneficial for those not exposed to these adversities.

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Table 1. Rates (%) of childhood and family adversity (0-16 years).

Measure	% of Sample
<u>Socioeconomic Adversity</u>	
Family of semi-skilled/unskilled socioeconomic status	25.0
Both parents lacked formal educational qualifications	33.5
Family rated as having below average living standards on >3 occasions	10.3
<u>Parental Change and Conflict</u>	
Experienced parental separation or entered single parent family at birth	34.2
Experienced 3 or more changes of parents	19.7
Physical violence or threats of physical violence between parents	22.0
<u>Child Abuse</u>	
Experienced harsh or severe physical punishment	6.4
Experienced contact sexual abuse	11.6
<u>Parental Adjustment</u>	
Parental history of problems with alcohol	12.1
Parental history of criminal offending	13.3
Parental history of illicit drug use	24.8

Table 2. Rates (%) of: a) externalizing behaviors (16-21 years) by childhood adversity score (0-16 years); b) internalizing behaviors (16-21 years) by childhood adversity score (0-16 years).

a) Externalizing responses

Measure	Adversity Score				p
	0, 1 (N = 503)	2,3 (N = 260)	4, 5 (N = 136)	6+ (N = 92)	
Alcohol dependence	5.8	12.3	15.4	14.1	<.0001
Illicit drug dependence	6.4	10.4	11.8	23.9	<.0001
Conduct/antisocial personality disorder	3.8	8.1	8.1	15.2	<.0001
Repeated (2+) violence offenses	9.2	16.2	16.9	30.4	<.0001
Repeated (2+) property offenses	12.1	20.4	17.7	29.4	<.0001
At least one of the above	20.5	31.9	36.0	50.0	<.0001
Mean number (rate) of externalizing behavior problems	0.37	0.67	0.70	1.13	<.0001

b) Internalizing responses

Measure	Adversity Score				p
	0, 1 (N = 503)	2,3 (N = 260)	4, 5 (N = 136)	6+ (N = 92)	
Major depression	25.5	35.4	50.0	48.9	<.0001
Anxiety disorder	17.9	23.5	30.9	43.5	<.0001
Suicidal ideation	17.1	24.6	28.7	38.0	<.0001
Suicide attempt	3.2	5.8	8.8	19.6	<.0001
Any of the above	38.8	50.8	61.8	68.5	<.0001
Mean number (rate) of internalizing problems	0.64	0.89	1.18	1.50	<.0001

Table 3. Rates (%) of later adjustment problems by childhood adversity and resilience score.

a) Externalizing Problems

Resilience Score (Quartile)	Childhood Adversity Score				Total
	0, 1	2, 3	4, 5	6+	
Q1 (high)	6.0 (9/149)	7.6 (4/53)	5.3 (1/19)	18.2 (2/11)	6.9 (16/232)
Q2	13.6 (17/125)	13.8 (8/58)	21.9 (7/32)	16.7 (3/18)	15.0 (35/233)
Q3	21.2 (25/118)	30.0 (18/60)	31.4 (11/35)	61.1 (11/18)	28.1 (65/231)
Q4 (low)	51.1 (45/88)	63.9 (46/72)	66.7 (24/36)	70.3 (26/37)	60.5 (141/233)
Total	20.0 (96/480)	31.3 (76/243)	35.2 (43/122)	50.0 (42/84)	27.7 (257/929)

b) Internalizing Problems

Resilience Score (Quartile)	Childhood Adversity Score				Total
	0, 1	2, 3	4, 5	6+	
Q1 (high)	26.7 (39/146)	25.0 (14/56)	31.8 (7/22)	44.4 (4/9)	27.5 (64/233)
Q2	35.7 (45/126)	35.0 (21/60)	54.2 (13/24)	64.7 (11/17)	39.7 (90/227)
Q3	39.8 (47/118)	53.6 (30/56)	61.8 (21/34)	63.2 (12/19)	48.5 (110/227)
Q4 (low)	58.6 (51/87)	81.2 (56/69)	82.9 (34/41)	75.7 (28/37)	72.2 (169/234)
Total	38.2 (182/477)	50.2 (121/241)	62.0 (75/121)	67.1 (55/82)	47.0 (433/921)