

# Pathways from Childhood to Adult Life\*

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*Abstract*—Principles and concepts of development are reviewed in relation to life-span issues noting the need to consider: development in its social context; timing of experiences; intrinsic and experiential factors; continuities and discontinuities; parallels and differences between normal and abnormal development; heterotypic and homotypic continuities; key life transitions; risk and protective factors; indirect chain affects; mediating mechanisms; age as an index of maturational and experiential factors. Developmental findings from childhood to adult longitudinal studies are reviewed for possible mediating factors. These include: genetic mechanisms; the (non-genetic) biological substrate; shaping of the environment; cognitive and social skills; self-esteem and self-efficacy; habits, cognitive sets and coping styles; links between experiences.

*Keywords:* Life-span development, developmental continuities/discontinuities, turning points in development, personality development

## Introduction

Throughout his highly productive life, Jack Tizard was strongly committed to the application of research methods in psychology to issues of relevance for social policy and practice (see Clarke & Tizard, 1983). However, he was equally committed to the need for basic research that is focused on the elucidation of the processes and mechanisms underlying normal and abnormal development. In his letter to the Chief Scientist outlining the philosophy of the Thomas Coram Research Unit, he was forthright in arguing that it was essential to combine both approaches. Research must bring forth new ideas and fresh knowledge so that patterns of practice may be improved in the future; it is not enough simply to assess the best of what is being done today.

My own debt to Jack is enormous; not only in gaining an appreciation of how research and policy interact but, more particularly, in learning how epidemiological and longitudinal research methods may be used in this connection. Our collaboration in the Isle of Wight studies (Rutter, Tizard & Whitmore, 1970; Rutter, Tizard, Yule, Graham & Whitmore, 1976) was an exciting learning experience for me. Jack was an extremely generous as well as immensely stimulating teacher, whose combination of unwavering methodological rigour and intellectual openness provided a model that

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*Accepted manuscript received 12 August 1988*

\*Jack Tizard Memorial Lecture. Delivered on 1 July 1988 at the Association for Child Psychology and Psychiatry Annual Conference, London.

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all of us who worked with him strove to follow. The longitudinal element in the Isle of Wight studies, four years, was relatively short, but it served to alert me to the importance of understanding how developmental processes served to bring about both stability and change. This elucidation of the mechanisms underlying continuities and discontinuities of development over the life-span is crucial if we are to devise improved means of intervening to bring about long term gains for children suffering intrinsic or extrinsic hazards during their growing years.

It has to be said that Jack was always sceptical of claims that short term experiences could have long term effects and that permanent change should be the goal of treatment. In his presidential address to the British Psychological Society (Tizard, 1976), he argued for the importance of the immediate environment as the main influence on a person's behaviour, and he urged that we should abandon notions about the long term value of preventive interventions such as Headstart, and that instead we should examine the characteristics of the environment that contribute to immediate happiness and well being. Those cautions remain apposite today, and both of the first two Jack Tizard lectures—by Alan Clarke (Clarke & Clarke, 1984) and by Ron Clarke (1985)—developed these themes well and showed their importance.

On the other hand, Jack was well aware that, in some circumstances, adverse experiences could have long term sequelae, as he demonstrated in his own collaborative research on the development of children who suffered the combination of malnutrition and psychosocial privation (Hertzog, Birch, Richardson & Tizard, 1972; see also Tizard, 1975). His point was *not* that continuities did not occur, but rather that simplistic concepts of immutable effects needed to be put aside and replaced by more dynamic notions of the continuing interplay over time between intrinsic and extrinsic influences on individual development. This is the theme that I seek to explore in this paper.

Over the last three decades there have been major changes in the ways in which the developmental process has been conceptualized. During the 1950s beliefs in the consistency of personality and in the lack of major changes after the first few years of life held sway (see Kelly, 1955). Longitudinal studies sought to chart this early stabilization of personality (see Moss & Susman, 1980), and it was urged that maternal deprivation in infancy led to permanent, irreversible damage (Bowlby, 1951). However, longitudinal studies failed to show high temporal stability and the claims on maternal deprivation were subjected to severe academic criticism (e.g. O'Connor, 1956; Orlansky, 1949; Yarrow, 1961). It became clear that people changed a good deal over the course of development and that the outcome following early adversities was quite diverse, with long-term effects heavily dependent on the nature of subsequent life experiences (Clarke & Clarke, 1976). Even markedly adverse experiences in infancy carry few risks for later development if the subsequent rearing environment is a good one (Rutter, 1981).

The pendulum swung and it came to be argued that there was little continuity in psychological development, such continuity as there was being dependent on people's interpretation of their experiences (Kagan, 1984). Mischel (1968, 1969) challenged the very notion of personality traits and argued that much behaviour was highly situation-specific. These claims gave rise to equally vigorous dispute on both the concepts and the empirical findings (Block, 1979; Epstein, 1979; Epstein & O'Brien,

1985; Hinde, 1987; Hinde & Bateson, 1984; McCall 1977; Magnusson, 1988; Nesselroade, 1988; Olweus, 1979).

In recent years there has been a limited swinging back of the pendulum, as investigators have been faced with evidence demonstrating a rather complex mix of both continuities and discontinuities (Rutter, 1987a). That mix applies to all phases in the developmental process, but my focus today is on the longer time span of connections between childhood and adult life.

### Principles and concepts of development

Before proceeding to consider some of the key findings from several major longitudinal studies, it may be useful first to outline some of the principles and concepts of development that derive from research findings both on normal development (Rutter, 1987a) and on psychopathology (Rutter, 1984a,b; Rutter, 1988).

The first point is that a life-span perspective is necessary (Rutter, 1984b). That is because *Homo sapiens* is a social animal and because social development occurs in relation to a person's interactions and transactions with his or her social environment (Erikson, 1963; Bronfenbrenner, 1979; Hinde, 1987; Hinde & Stevenson-Hinde, 1988). Because key social experiences such as marriage or childbearing tend not to occur during the childhood years, social development needs to be extended into adult life. A related point is that development includes the *content* of emotions and social relationships as well as *capacities* in these areas of functioning. Maccoby (1984) made the point that, although there are important universals in development, social development follows more than one pathway and has more than one endpoint—hence the plural of pathways in the title of this paper.

A related issue is that the *timing*, as well as the nature, of experiences is likely to influence their impact. The importance of timing arises for several different reasons. First, the effects on neural structure and functioning will be affected by what is happening at the time in neural development. This is illustrated by the effects of prenatal androgens on both brain organization and sexually dimorphic behaviours in later life (Mayer-Bahlburg, Ehrhardt & Feldman, 1986), by the varying effects of brain damage at different ages (Goodman, 1987; Rutter, 1982) and by the effects on binocular vision of uncorrected strabismus in infancy. Secondly, the effects will also be influenced by sensitivities and vulnerabilities deriving from the psychological processes that are emerging at the time. Thus, very young infants are protected from separation experiences because they have yet to develop strong attachments; older children are protected because they have learned to maintain relationships over time and space; but toddlers are most at risk because attachments are first becoming established at that age and because they lack the cognitive skills required to maintain relationships during an absence (Rutter, 1981, 1987a). Thirdly, timing may be important because experiences may be felt differently, or give rise to different societal responses, if they arise at non-normative times. For example, this may apply to the links between teenage pregnancy and difficulties in parenting (Hayes, 1987), to those between early marriage and an increased risk of divorce (Otto, 1979), to the differences in effects between redundancy in middle life and retirement in old age (Warr, 1987)

and to the psychological consequences of unusually early puberty (Graham & Rutter, 1985).

A biological perspective, of course, requires an emphasis on both intrinsic and experiential influences on development. Genetic factors will play a part in shaping not only individual differences in psychological characteristics but also their developmental course (Plomin, 1986; Plomin & Thompson, 1988). In addition, it is likely that physiological transitions such as puberty, which involve major changes in hormonal output and in bodily configuration, will have a psychosocial impact (Petersen, 1988; Rutter, in press a). However, development is also affected by environmental factors that are not accompanied by somatic alteration. Experiences within and outside the home have been shown to make an impact on intellectual (Rutter, 1985a) and behavioural development (Rutter, 1985b).

A fourth consideration, also stemming from a biological perspective, is that both continuities and discontinuities are to be expected (Hinde, 1988; Hinde & Bateson, 1984; Rutter, 1987a). The process of development is concerned with change and it is not reasonable to suppose that the pattern will be set in early life. Physiological alterations, as at puberty, and new experiences will both serve to shape psychological functioning. However, continuities will occur because children carry with them the results of earlier learning and of earlier structural and functional change. This does not necessarily mean that a person's characteristics at one age will predict the degree or type of *change* over a later time period, but it does mean that it is likely to predict later *levels* of functioning, because they will incorporate earlier levels. The importance of this distinction is well shown in the excellent recent study of primary school effectiveness undertaken by Mortimore, Sammons, Stoll, Lewis and Etab (1988). Final attainment level was strongly correlated with family background and with the child's level of skills at school entry, but *progress* between 7 and 11 yrs was most strongly associated with school characteristics. The importance of differentiating between progress and final attainment level is also shown in Tizard, Blatchford, Burk, Farquahar and Plewis' (1988) important longitudinal study of children attending inner city infant schools.

The next issue is that there can be no presupposition that normal and abnormal development do, or do not, involve the same mechanisms or do, or do not, share the same qualities; rather there must be a concern empirically to test for similarities and dissimilarities (Rutter & Sandberg, 1985; Rutter, 1988). It is clear that both occur. Thus, it may well be that the features associated with the development of a pattern of heavy drinking in the general population parallel those that play a role in the emergence of alcoholism; by contrast it is possible that the pathways leading to schizophrenia or bipolar affective disorder include elements that do not constitute any part of normal development.

A sixth consideration is that there must be a search for heterotypic as well as homotypic continuities. In other words, we must recognize that behaviours may change in *form* whilst still reflecting the same basic *process*. There are, however, methodological hazards that must be avoided in any consideration of heterotypic continuity. The mere finding that behaviour *X* at one age is correlated with behaviour *Y* at a later age provides no basis for assuming continuity. In any complex statistical analysis, many such correlations are bound to arise by chance. To infer continuity it is important

either to show that both behaviours, although different in form, function similarly in their association with risk factors and/or consequences, or to replicate the longitudinal correlation in another sample (or preferably both). Nevertheless, it is clear that there are heterotypic continuities that have withstood these tests. For example, there is continuity between social isolation, peer rejection, odd unpredictable behaviour and attention deficits in childhood and schizophrenic psychosis in adult life (Nuechterlein, 1986; Rutter, 1984a). It has also been found that conduct disorder in childhood leads not only to antisocial personality disorders in adult life, but also to a broader range of social malfunctions associated with an increased risk of depressive disorder—the former pathway being more common in males and the latter in females (Robins, 1986; Quinton, Rutter & Gulliver, in press; Zeitlin, 1986).

A life-span perspective requires attention to the variety of transitions that occur during the course of development, such as leaving the parental home, starting work, getting married and becoming a parent. However, it also brings a further consideration—the need to focus on the process of *negotiation* of life transitions, and not just their occurrence or the behavioural outcome that follows. Thus, the fact of getting married at a particular age is one thing, but it is equally important to consider why and how the decision was taken when it was, as well as the social context of the decision and the characteristics of the spouse.

An eighth consideration is the need to take into account individual differences in the meaning of, and response to, such transitions. Thus, parenthood that arises unwanted at the age of 15 yrs will not be the same as a wanted child being born to a young adult in the context of a happy marriage, and both will differ from the experience of having a first child after a decade's unsuccessful attempts to conceive associated with multiple treatments for infertility. All three will differ yet again from parenthood as a result of artificial insemination by donor or adoption or fostering.

A ninth issue is that an emphasis is needed on both risk *and* protective factors, together with interactions between them (Rutter, 1983; in press a). Both good and bad experiences influence development. However, it is also crucial that some experiences that seem negative at the time may nevertheless be protective. Just as a resistance to infection stems from "successful" encounters with the infective agent in a modified or attenuated form (the basis of immunization), perhaps too resistance to psychosocial adversity is fostered by successful coping with earlier stressful experiences. Elder's (1974, 1979) example of the strengthening effect of older children having to take on family responsibilities during the great economic depression is a case in point.

A related issue is the need to recognize the importance of indirect chain and strand effects in the developmental process (Brown, 1988), as well as direct influences. In other words, the impact of some factor in childhood may lie less in the immediate behavioural change it brings about than in the fact that it sets in motion a chain reaction in which one "bad" thing leads to another or, conversely, that a good experience makes it more likely that another one will be encountered. For example, academic success at school is likely to increase the chance of a well-paid job in adult life and better living conditions—not because passing exams alters personality but simply because academic credentials open the doors to career advancement which in turn is associated with a range of social advantages in adult life.

The penultimate principle is that there must be a concern to elucidate the processes and mechanisms involved in such indirect and direct effects. It is, of course, important to determine the various factors associated with an adaptive psychosocial outcome. Thus, it has been useful that research has shown that these are more likely if the child has positive characteristics such as high self-esteem and a positive social orientation; if the family shows warmth, harmony and cohesion; and if adequate social supports are available (Masten & Garmezy, 1985). However, if we are to use this information to develop effective means of fostering normal development and of preventing mental disorder, we must go on to ask *how* self-esteem develops, which experiences or biological qualities are likely to foster it, and by which mechanisms does it operate.

Finally, in studying these processes and mechanisms, it is necessary to appreciate that age is an ambiguous variable; the finding that some psychological function increases as children grow older does not, in itself, provide an answer as to why or how this happens (Rutter, in press b). It may occur as a result of physiological maturation (but, if so, there is the further question of which aspect of maturity is crucial; thus, cognitive and endocrinological maturity do not necessarily proceed hand in hand). Equally, however, the psychological advance may derive from the cumulative effect of certain sorts of experiences or from the occurrence of particular types of experiences that usually arise only later in childhood or adolescence.

In short, the investigation of pathways from childhood to adult life requires an analysis of a quite complicated set of linkages over time. It is not simply a matter of determining the level of correlation for particular behaviours from one age to some later age.

### Some childhood to adult life longitudinal studies

With these considerations as a background, let me turn to the empirical evidence on pathways from childhood to adult life. I will not dwell on the findings on correlations over time for particular psychological characteristics, as these have been extensively reviewed previously (see e.g. Moss & Sussman, 1980; Rutter, 1987a). Suffice it to say that the correlations between early or middle childhood and adult life for most psychological features are general positive, but quite low. There is some tendency for children's behaviour to predict adult behaviour, but the correlations are too weak for much useful prediction at the individual level.

#### *Psychopathological continuities*

That conclusion, however, applies to normally distributed characteristics as assessed in the general population. The situation with respect to psychopathological features is somewhat different in that some types of disorder, especially conduct disturbances, do exhibit substantial continuity between childhood and adult life. Robins (1978) showed that antisocial personality disorder in adulthood was almost always preceded by conduct disturbance in childhood, so that continuity looking backwards is very strong indeed. However, because conduct disturbance in the childhood years is very common, and because only about a third persist into adulthood, continuity looking

forwards is less impressive. This finding raises several important issues. First, there is the question of whether the apparent reduction in conduct problems is real or whether, rather, the form of disturbance has changed but the disorder nevertheless continues—the issue of heterotypic continuity. As already noted, conduct problems do indeed lead on to a broader range of adult disorders. Using the ECA retrospective data, Robins (1986) reported that when women had had three or more conduct problems in childhood, 85% had some form of psychiatric disorder in adult life compared with 41% of the remainder. The relative risk (a four-fold increase) was greatest for drugs, alcohol and antisocial problems, but there was also a two-fold increase for emotional disorders.

The second issue is what features differentiate the individuals who are most likely to show persistence of disorder into adult life. The Stockholm longitudinal study (Magnusson, 1988) showed that the risk was particularly great for boys who exhibited the combination of aggression, hyperactivity and poor peer relationships. Compared with well-adjusted boys, the risk of having adult criminality *and* alcohol abuse *and* psychiatric disorder was 20 times higher and, compared with the total population rate, it was still more than seven times higher! The children with multiproblem patterns were few in number but they accounted for much of the persistence.

The findings from the Cambridge longitudinal study of working class London boys confirm the markedly increased risk for persistent adult criminality associated with both hyperactivity and conduct disturbance in childhood. In that longitudinal study of 411 boys, only 24 had as many as six convictions by their 26th birthday. Twenty of these 24 men had shown hyperactivity and/or conduct disturbance at 8–10 yrs; a ten-fold increase in risk that accounted for 83% of chronic adult offenders (Farrington, Loeber & Van Kammen, in press).

Parker and Asher's (1987) excellent recent review of the association between poor peer relationships in childhood and adult disorder emphasizes the importance of both low peer acceptance and aggressiveness as predictors of school dropout, adult criminality and probably also other types of adult problems. Shyness/withdrawal does not seem to carry the same risks. As Parker and Asher point out, many issues remain to be resolved. Thus, it is not clear whether the risk stems from lack of social skills, lack of social ties or negative socially disapproved behaviour. Moreover, it remains uncertain whether low peer acceptance is merely an incidental correlate of persisting psychopathological disturbance or whether it plays a causal role in continuities over time because it predisposes to deviant socialization experiences and opportunities. Nevertheless, the evidence from longitudinal studies that have examined hyperactivity, conduct disturbance and poor peer relationships is that when present in marked pervasive form they carry a markedly increased risk for adult disorder of one kind or another.

This does not necessarily mean that the continuities stem from intrinsic psychological processes. It could be that the persistence of disorder simply reflects the continuation of the psychosocial risk factors that gave rise to the children's problems in the first place. This is a very real possibility because conduct disorders are particularly associated with types of family discord and disorganization and of parental deviance that tend to be very persistent (Rutter, 1985b). We need to focus on circumstances where children's environments have changed markedly for the better in order to see if this

is accompanied by parallel improvements in the children's conduct disturbance. Richman, Stevenson and Graham (1982), in their longitudinal study from age 3-8 yrs, found that a reduction in marital disharmony made no difference to the likelihood that children's problems would remit; however, improved parent-child relationships (as reflected in increased parental warmth and reduced criticisms) were associated with benefits for the children. It seems that the specifics of children's interpersonal interactions may be more important in continuity than the overall family circumstances.

A more dramatic change in children's circumstances was investigated by Hodges and Tizard (1989 a,b) in their follow-up to age 16 yrs of children reared in residential nurseries until at least age 2 yrs and then adopted or restored to their biological parents at some time between 2 and 7 yrs (Tizard & Hodges, 1978). The restored group, whose families tended to be disturbed and disadvantaged, showed a high rate of antisocial behaviour, with almost all having had contact with the police and/or psychiatric services. The adoptees, most of whom were in stable harmonious homes, were much less likely to show this pattern, but tended to be more worried, unhappy and fearful than the comparison group children. These differences would seem to reflect their current circumstances more than their early institutional experiences. However, both the adoptees and restored children were very similar to each other, and different from controls, in being more oriented towards adult attention and in having more difficulties with peers and fewer close peer relationships. As the experiences of the adoptees and of the restored children were so different over the decade preceding the 16 yr follow-up, it must be inferred that the institutional upbringing for the first few years of life had left some social sequelae that were somewhat resistant to later influences, at least up to the age of 16 yrs. Nevertheless, it is notable that this persistence in terms of subtle qualities of peer relationships stands out as different from the pattern exhibited by other behaviours.

A further possibility that has to be considered is that the children's behaviour, as a result of its impact on other people, makes later stressful environments more likely. It is clear that both conduct disturbance and poor peer relationships, the two types of psychopathology most likely to persist, carry that potential. Thus, Robins (1986) reported that the ECA data showed that women aged 30-49 yrs who showed three or more conduct problems in childhood had a two-fold increased risk of job loss during the 6 mths before interview, a two-fold increased risk of break-up with a spouse or lover and a four-fold increased risk of break-up with a best friend during the same time period. These retrospective data require confirmation from longitudinal studies, but the strong implication is that behavioural disturbance predisposes to an increased likelihood of adverse psychosocial experiences or life events in adult life. Kandel and Davies (1986), using longitudinal questionnaire data, similarly showed that adolescent depression was associated with an increased risk of certain kinds of social stress situations in early adult life.

### *Psychosocial pathways*

With that possibility in mind, let me turn to a few of the long term longitudinal studies that have attempted to chart the various steps that might be involved in



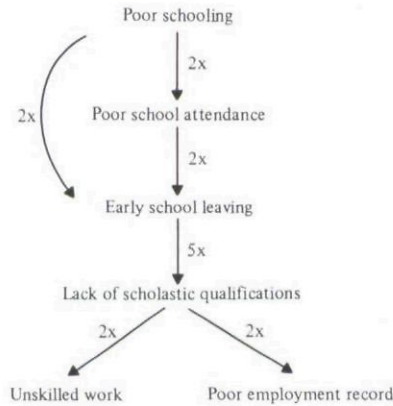


Fig. 1. Simplified pathway from poor schooling to poor job success (Gray *et al.*, 1980).

pathways from childhood to adult life. The first investigation to mention is our follow-up of inner London children from age 10 yrs to one year after leaving school (Gray, Smith & Rutter, 1980). Figure 1 summarizes the pathways leading from poor schooling to poor job success. We found no effect of schooling that was independent of later circumstances, but the indirect continuities were quite strong. The children who went to less effective schools were twice as likely as other children to show poor school attendance; poor attenders were twice as likely to leave school early without sitting national examinations—necessarily this meant that all left without scholastic qualifications, compared with only a fifth of other pupils; those without qualifications were in turn twice as likely to go into unskilled work and were twice as likely to have a poor employment record as shown by their getting dismissed from jobs. These continuities were still evident after controlling for other variables such as the individual's measured intelligence and social circumstances.

Of course, the chain of adversity was far from inevitable, in that each link was open to other influences that could break (or strengthen) the chain. For example, black girls were particularly likely to have a good attendance record and to stay on at school beyond the period of compulsory education (Maughan, Dunn & Rutter, 1985a; Maughan & Rutter, 1986). As a result of their unusual educational persistence they left school with exam qualifications that were substantially better than might have been expected on the basis of their reading skills on entering secondary school or the quality of the schools they attended. Conversely, boys with poor reading skills tended to leave school without exam qualifications, not so much because their academic limitations meant that they failed exams, but rather because their conduct problems tended to be associated with leaving school early without sitting any exams (Maughan, Gray & Rutter, 1985b).

The second study to mention is the follow-up of institution-reared children undertaken by David Quinton and myself, together with colleagues (Quinton & Rutter, 1988). The young people were interviewed in depth in their mid 20s and comparable data were obtained for a general population sample, reared at home by their biological parents, and followed up over a comparable time period. The findings showed a chain by which parenting breakdown in one generation *sometimes* led to parenting breakdown

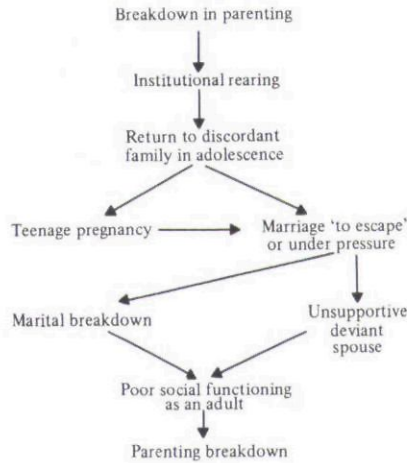


Fig. 2. Simplified model of intergenerational transmission of parenting breakdown (Quinton & Rutter, 1988).

in the next. Not surprisingly, perhaps, the adult outcome of the institution-reared girls was significantly worse than that of the comparison group, and overt parenting breakdown was found only in the institutional sample, occurring in a third of cases. Numerous statistical analyses were undertaken to determine the possible mechanisms underlying the heterogeneity in outcome.

Figure 2 presents a selection of the findings in terms of the intervening steps leading to eventual parenting breakdown. The story begins with a variety of psychosocial problems in the girls' parents; these problems were associated with parenting difficulties and with lack of social support, which in turn led to the girls' admission to residential nurseries or Group Homes where they remained off and on, or continuously, until adolescence. On leaving the institutions, many of the girls either had no family to which to go or they returned to the same discordant families from which they had been 'rescued' when young. Faced with these stressful circumstances, many married hastily to 'escape' or under pressure as a result of a teenage pregnancy. An institutional upbringing led many of the girls to feel that they could not control their lives and they tended not to plan ahead with either work or marriage. As one might have expected, these impulsive marriages undertaken for negative reasons were often to deviant men from similarly disadvantaged backgrounds and many of the marriages broke down. Alternatively, the women were left unsupported in a conflictful, unrewarding marital relationship. These adult circumstances were then associated with a markedly increased risk of poor social functioning in adult life which, in turn, was accompanied by an increased risk of parenting breakdown.

It will be appreciated that this chain of adversities is made up of a series of contingencies which, if not met, are likely to result in different consequences. Figure 3 provides one example of how a more adaptive chain of circumstances could arise. The girls who were admitted to the institution after the age of 2 yrs, not having experienced early disruptions of parenting, were much more likely to return to a harmonious family on leaving the Children's Home in adolescence. The presence

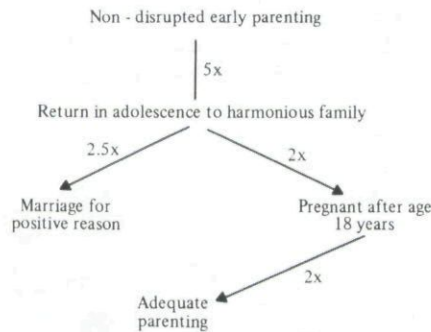


Fig. 3. Simplified adaptive chain of circumstances in institution-reared women (1) (Quinton & Rutter, 1988).

of such a harmonious home at that time made it more than twice as likely that the girls would marry for positive reasons (i.e. not under pressure or to escape) and that they would not become pregnant until age 19 or later. Both these circumstances increased the likelihood of adequate or good parenting.

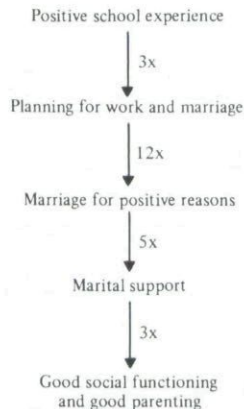


Fig. 4. Simplified adaptive chain of circumstances in institution-reared women (2) (Quinton & Rutter, 1988).

In a sense, that chain involved a series of partially interconnected social circumstances. However, some risk pathways were turned into more adaptive routes as a result of adventitious happenings. Thus, for example, it was a policy of the Children's Homes to distribute the children among many different schools in order to avoid an undue weighting of institutional children in any one school, which could lead to adverse labelling. As a consequence, some children had much more positive school experiences than others. Those who had good experiences were three times as likely to show planning in their choice of careers and of marriage partner. This meant that they were much more likely to marry for positive reasons which, in turn, much increased the likelihood that they would marry a non-deviant man with whom they developed a warm confiding relationship. The presence of such marital support

greatly increased the likelihood that they would show good social functioning and good parenting as a young adult. This chain of connections remained after controlling for other variables, such as the girls' non-deviant behaviour in childhood and adolescence.

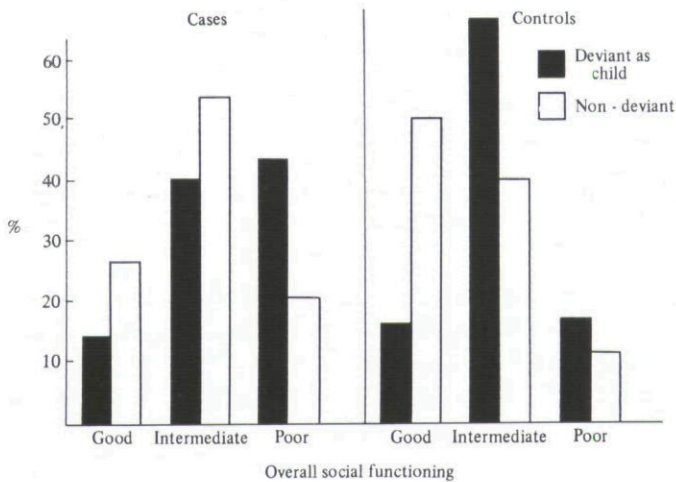


Fig. 5. Childhood deviance and adult outcome (males) (based on Rutter, Quinton & Hill, in press).

Nevertheless, deviant behaviour was itself associated with outcome, and this statistical relationship was substantially stronger in males than in females (Rutter, Quinton & Hill, in press). The findings for males showed that childhood deviance was significantly associated with poor overall social functioning in adult life, there being a two-fold increase in risk. However, among those showing childhood deviance, an institutional rearing was still associated with a two-fold increase in poor social functioning. In other words, there was a pathway involving childhood deviance, but also one or more that involved other features.

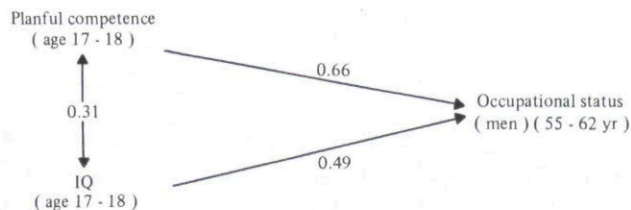


Fig. 6. Berkeley longitudinal studies: the role of planful competence (Clausen, 1986).

Our data suggested the important role of planning as a factor associated with good adult outcomes. However, we had to measure planning retrospectively, with all the uncertainties that retrospective measurement involves. The Berkeley longitudinal

studies (Clausen, 1986) provided the opportunity to assess the same effect prospectively. What was termed 'planful competence' was measured at age 17-18 yrs, when there was also an assessment of IQ. The two measures intercorrelated only modestly at the 0.31 level. Strikingly, planful competence correlated 0.66 with occupational status in late middle life, at age 55-62 yrs, a stronger correlation than that found with IQ.

Table 1. Number of marriages according to Senior High School level of planful competence (percentage distribution) (men)

	Planful competence		
	High	Inter.	Low
Total	100	100	100
None	—	5	—
One	82	75	55
Two	18	15	32
Three or more	—	5	14
Number of subjects	28	20	22

(Data from Clausen, 1986)

As in our institution-reared sample, a lack of planful competence was also associated with an increased risk of marital breakdown. Nearly half (46%) of those who lacked such planning had two or more marriages, compared with 18% of those with high planning. The comparable figures for females (based on a slightly different measure) were 46% versus 6%. It is evident that characteristics shown in adolescence were quite strongly predictive of marital and occupational circumstances in middle life, some 40 yrs later. Note, however, that what is evident is *not* unchanging behaviour over time, but rather a style of dealing with life circumstances that increased the chances of things turning out less well.

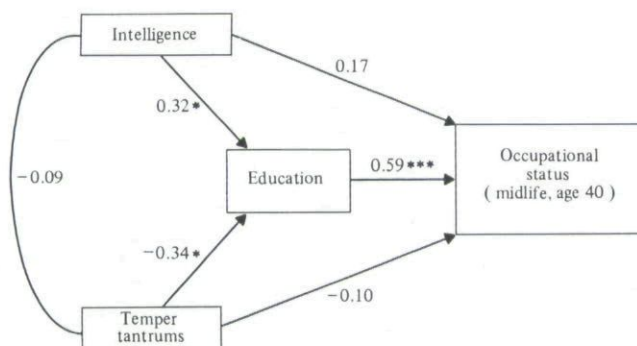


Fig. 7. Temper tantrums in childhood and occupational status in adult life (based on Caspi, Elder & Herbener, in press).

The Berkeley and Oakland studies were also used as a data-base by Caspi, Elder and Herbener (in press). Once again, a variety of chain reactions are to be seen. Figure 7 summarizes the consequences of a pattern of frequent temper tantrums in childhood. This type of 'explosive' behaviour made it significantly more likely that there would be an early exit from school and hence less likely that the person would

end up with good educational attainments in early adult life. Poor attainments were, in turn, associated with lower occupational status in mid life. The childhood behaviour had no direct effect on occupational level, but it had an important indirect effect via its impact on scholastic attainment.

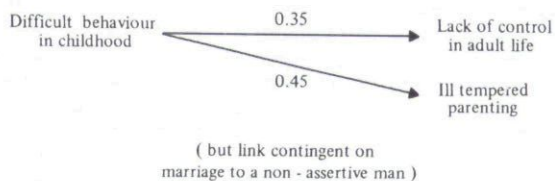


Fig. 8. Longitudinal study of Berkeley women: adult sequelae of difficult behaviour in childhood (Caspi & Elder, 1988).

Difficult behaviour in childhood was also associated with an increased risk of ill-tempered parenting and of poor social control in adult life in women (Caspi & Elder, 1988). Interestingly, however, this outcome was contingent on marriage to a non-assertive man. Difficult behaviour made it significantly more likely that the women *would* marry men with these characteristics and, if they did, they were more likely to show poor social control in mid life. If they did not, however, there was *no* such tendency.

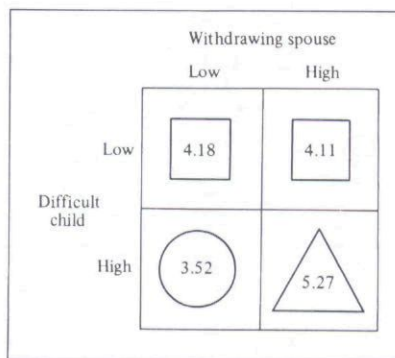


Fig. 9. The behavioural consequences of difficult girls' mate-selection patterns. Dependent variable: women's undercontrolled behaviour at midlife (1 = low, 9 = high) (Caspi & Elder, 1988).

The findings are summarized in Fig. 9. The score in the triangle in the bottom right hand corner shows the lack of adult control score when there was the combination of difficult childhood behaviour in the women and unassertive withdrawal in the spouse. The rate of poor control is significantly higher than that in all other cells. Caspi and Elder (1988) concluded that the continuities reside in interactional styles that operate in two ways: firstly, through selection of environments and relationships (as shown by the effect on choice of spouse); secondly, through elicitation of interactions that bring out maladaptive behaviours (the interactive effect shown in Fig. 9).

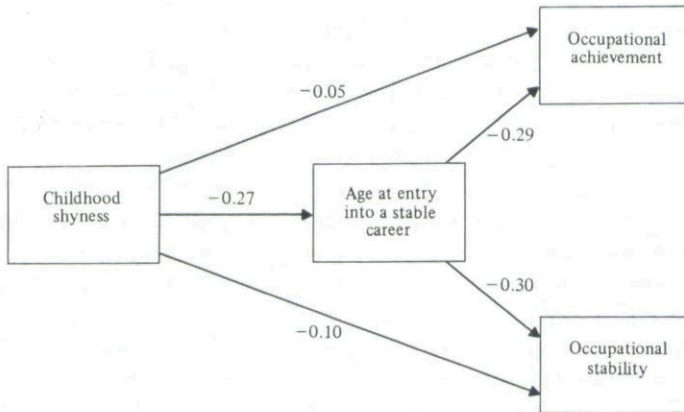


Fig. 10. Adult sequelae of childhood shyness (based on Caspi, Edler & Herbener, in press).

Childhood shyness, another early manifest characteristic, showed a rather different causal chain. It was accompanied by an increased likelihood of late entry into a stable occupational career; late entry was then associated with a lower level of occupational achievement and greater occupational instability. It seemed as if career entry at an atypically late point meant a lesser investment in career skills and benefits and hence an increased career vulnerability.

However, it should not be assumed that people who undergo key life transitions unusually late are always thereby disadvantaged. Elder (1986) showed that, in some circumstances, it could be protective if the late transitions opened up new opportunities. In the Berkeley Guidance Study, low achieving youths from a deprived background who, in adolescence, scored low on measures of social competence tended to join the Armed Forces unusually early, often dropping out from high school to do so (this was in the late 1940s during a period of conscription). Military service was associated with a prolongation of education (the great majority took up schooling again in the Army) and with a delay in both marriage and the starting of careers. For these deprived youths, military service proved to be an important turning point that enabled them to acquire scholastic and occupational skills that they would not have had otherwise; also their later marriage meant that they were marrying at a time when they were more self-sufficient and part of a better functioning social group. Follow-up into middle life showed that this was accompanied by a beneficial change in life trajectory; their outcome was significantly better than expected on the basis of their background and their functioning in adolescence. Of course, in the population as a whole, military service was not likely to have this beneficial effect and it is not argued that it should be recommended as a solution to deprivation. Rather, the point is that even experiences with many negative aspects can be helpful if they serve to provide adaptive opportunities that would not otherwise have been available.

The importance of timing is evident in another longitudinal project, the Stockholm study reported by Magnusson (1988). Unusually early puberty in girls, a menarché under the age of 11 yrs, was associated with a marked increase in drunkenness and in other forms of norm-breaking in mid adolescence. It was found that this increase was a function of a greater tendency to be part of an older peer group. The early

maturing girls who did not mix with older teenagers did not exhibit any increase in norm-breaking. It seemed that the stimulus was physiological but the mechanism was psychosocial (Magnusson, Stattin & Allen, 1986). However, later follow-up in the mid 20s showed that early maturity was no longer associated with an increase in norm-breaking. It was inferred that the early maturing girls had adopted an older adolescent style of behaviour that was evanescent, because as peer groups changed so the influences on behaviour altered; hence there was no long term persistence.

The early maturing girls were also more likely to drop out of school, again following the pattern of older girls. However, unlike the school leaving of older girls who had completed their education, the premature drop-out of the early maturers meant that they left with lower educational attainments. This outcome was persistent; probably because to reverse it would have required a return to education at a later age. Although this was possible, it required a major step that few took. The continuity stemmed from a closing down of opportunities rather than from any intrinsic personality change as such. Similarly, leaving school meant that many turned to marriage and home making. As a consequence, the early maturers had significantly more children at age 26 yrs than the remainder of the sample. Again, this was a continuity that lay in the consequences of early behaviour rather than in internal change in the women themselves.

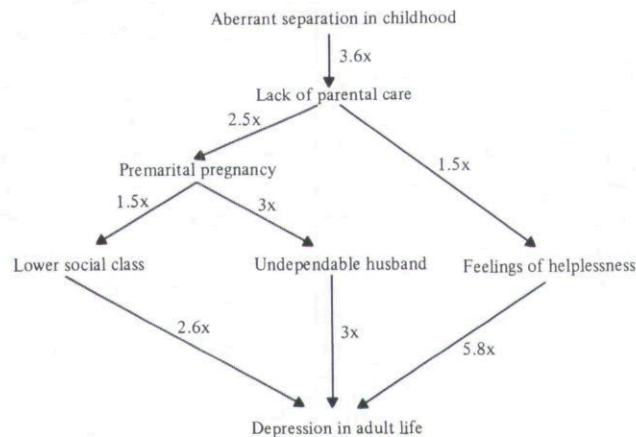


Fig. 11. Simplified model of the links between aberrant separation in childhood and depression in adult life (based on data from Brown *et al.*, 1986).

Several of the studies that have been discussed have drawn attention to pregnancy, marriage and choice of occupation as important turning points in people's lives. The importance of these life transitions is shown again in the study of adult women by Brown and his colleagues (Brown, Harris & Bifulco, 1986; Harris, Brown & Bifulco, 1986, 1987). Figure 11 summarizes some of the main findings. The pathway starts with aberrant separations from parents in childhood (sometimes leading to institutional admission). This was associated with an increased risk (3.6 ×) that parental care would be poor. Poor parental care was then associated with a 2.5 times increase in the likelihood of a premarital pregnancy. Such a pregnancy increased the risk that the girl would land up with an undependable husband and also it made it more likely



that the girl would not rise in social class. Lack of parental care separately increased the probability of the woman showing feelings of helplessness. Each of these three strands (i.e. to a lower social class, to a poor marriage and to feelings of helplessness) was associated with an increased vulnerability to depression in adult life. It was notable, as in the other studies, that each link in the chain was contingent on how the life transitions were negotiated. Thus, parental separation carried no risk if it did not lead to poor parental care. Similarly, if the premarital pregnancy was coped with well it did not have the ill-effects noted in Fig. 11.

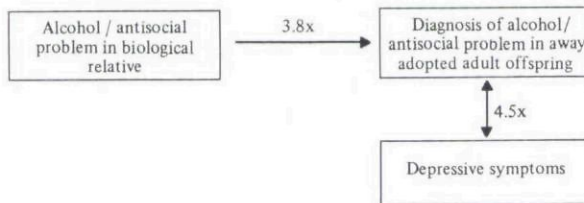


Fig. 12. Simplified model of links between genetic risk factor for alcohol/antisocial problems and occurrence of depression (Cadoret *et al.*, in press).

Another pathway that requires mention is that through genetic influences. In their investigation of children who were adopted in early life and therefore not reared by their biological parents, Cadoret, Troughton, Morens and Whitters (in press) found both direct and indirect genetic effects. They found that alcohol or antisocial problems in biological relatives were associated with a 3.8 times risk of similar problems in the away-adopted adult offspring—a direct genetic effect. These problems in the biological family were not associated with any direct effect on depression in the offspring. On the other hand, individuals with alcohol or antisocial problems were over four times as likely to show depressive symptoms—a substantial indirect genetic effect. It remains uncertain just why antisocial disorder is associated with an increased risk of depression, but many studies have shown that it is. One explanation is probably that the deviant behaviour leads to both stressful interpersonal interactions and social disadvantage (cf. Robins, 1986), both of which in turn predispose to depression.

My account of long-term longitudinal studies has been deliberately incomplete. The pattern of findings in the studies cited is more complex than I have been able to indicate and, of course, there are many other studies that could have been considered. Nevertheless, the overall patterns that I have presented are, I think, reasonably representative of those reported in the literature and, as I have shown, many of the key patterns have been replicated across studies. These patterns fall far short of anything approaching a complete explanation of developmental connections. Nevertheless, they do point to some of the ways in which chain effects may arise. It remains to bring the findings together in a consideration of the various processes and mechanisms that might underlie these continuities (and discontinuities) between childhood and adult life (see Maughan & Champion, in press; Rutter, 1984c).

## Possible mediating factors for continuities and discontinuities

### *Genetic mechanisms*

The first possibility is that both continuities and change may be mediated genetically. This may occur in several different ways. Thus, the persistence of a disorder from childhood to adult life may be a function of the intrinsic qualities of a genetically determined condition; this may apply to autism where there seems to be a strong genetic component (Folstein & Rutter, 1987; Smalley, Asarnow & Spence, 1988). Less obviously, however, genetic factors need to be considered in relation to the continuity between conduct disorder in childhood and personality disorder in adult life. Although the broad run of conduct problems and of delinquent behaviour in childhood seems to have only a weak genetic component, the evidence suggests that genetic factors may well be more important in the subgroup that persist into adult life (Rutter, MacDonald, Le Couteur, Harrington, Bolton & Bailey, submitted). Equally, however, genetic mechanisms may play a part in the continuities between two different forms of behaviour. Thus, this may apply to the connections between social oddities and attentional deficits in childhood and schizophrenic psychoses in adult life (Nuechterlein, 1986; Gottesman & Shields, 1976) and to depression in early adult life as a precursor of Huntington's disease in middle age (Folstein, Franz, Jensen, Chase & Folstein, 1983).

In addition, however, genetic factors may also operate indirectly in leading to types of psychopathology that then are associated with an increased vulnerability to other forms of psychiatric disorder. Thus, the study of Cadoret *et al.* (in press) showed that this probably occurred with genetic mechanisms in relation to antisocial disorders which were, in turn, associated with an increased risk of depressive symptomatology.

### *Biological substrate*

Secondly, mediation may lie in aspects of the biological substrate that are not genetically determined. For example, several investigations have shown statistical associations between pregnancy and birth complications and schizophrenia in adult life (Lewis & Murray, 1987; Murray *et al.*, in press; Parnas, Schulsinger, Teasdale, Schulsinger, Feldman & Mednick, 1982). The mechanisms involved in this association remain uncertain but it may be that the later maturation of brain systems linked with schizophrenia, possibly dopaminergic neural systems, activates the mental disorder because the relevant brain structures were damaged at birth (Weinberger, 1987). The brain pathology as such is not progressive, but the effects are not manifest until much later because the brain systems associated with schizophrenia have yet to develop. The suggestion remains speculative so far as schizophrenia is concerned but there are well-established medical examples of similar late effects or of changing manifestations with age. Thus, there is the link between encephalitis lethargica (or brain damage from boxing) in early adult life and the later development of Parkinsonism. Similarly, there are the well established associations between viral infections and the development of various forms of cancer some decades later. The association between high alcohol exposure *in utero* and attentional deficits in childhood provides an example of a prenatal effect (Porter, O'Conner & Whelan, 1984); the adult sequelae are as yet unknown.

However, the mediation does not necessarily have to involve organic brain damage. For example, the animal experiments of Levine and others (Hennessy & Levine, 1979; Hunt, 1979) showed that physical stress in infancy led to both enlarged adrenal glands and increased resistance to later stressors. Also, the administration of prenatal adrenogens is associated with an increased tendency for females to show tomboyish behaviour (Mayer-Bahlberg *et al.*, 1986). Adequate sensory experiences are necessary for the development of the related neural systems. This has been well demonstrated for vision, but the sensory deprivation of non-visual stimuli has also been shown to have effects on brain structure and function (Greenough, Black & Wallace, 1987; Rosenzweig & Bennett, 1977).

### *Shaping of environment*

A third mediating mechanism is to be found in the ways in which a person's behaviour or experiences in childhood serve to shape the environment experienced in adult life. This is seen most obviously in the connections between educational achievement and later occupational status, as shown in several of the longitudinal studies discussed. It is important to emphasize that the link is *not* just a secondary consequence of individual qualities such as IQ. The Stockholm Study (Magnusson, 1988; Magnusson *et al.*, 1986) showed how early puberty in girls could lead to drop-out from education; our own longitudinal studies (Maughan *et al.*, 1985b) showed a similar effect from conduct disturbances, as did the Berkeley studies (Caspi *et al.*, in press); the latter also showed how joining the Armed Forces could lead to a prolongation of education (Elder, 1986); and our studies of black school children showed how their greater persistence in education had benefits in the form of higher scholastic achievement (Maughan & Rutter, 1986). In these instances, drop-out from, or persistence in, education closed down or opened up career opportunities that were likely to affect social circumstances in adult life. It is important to appreciate that people's living conditions are in part a consequence of steps that they themselves have taken, steps that serve to shape their later experiences (cf. Scarr & McCartney, 1983).

An equally important factor in shaping the adult environment is the choice of marriage partner. Our study of institution-reared girls (Quinton & Rutter, 1988) showed the strong tendency for them to marry in haste at an early age to escape from what they felt to be an intolerable family situation—a tendency that much increased the likelihood that they would land up with an unsatisfactory marriage that would break down. The same investigation, and the Berkeley study (Clausen, 1986), demonstrated the protective effect of planning, an effect that was associated with a significant increase in marital stability. The studies of Brown *et al.* (1986) have also shown the key role of a premarital pregnancy, and numerous investigations have indicated the greater likelihood of divorce for teenage marriages.

A more continuing shaping of environments stems from the effects of people's behaviour on other people's responses to them. There is much evidence to show that this occurs. For example, experimental investigations have shown how oppositional children elicit different types of adult behaviour than do passive compliant children (Brunk & Henggeler, 1984). Observational studies, too, have demonstrated that aggressive boys tend to elicit negative behaviour from their peers (Dodge, 1980). I

mentioned earlier the ECA finding that conduct disturbance in childhood was associated with an increased risk of social rebuffs and job loss in adult life (Robins, 1986).

It should be added that antisocial behaviour also will influence later environments through the societal responses that it induces—such as custodial or correctional actions that may serve both to 'label' and to strengthen antisocial peer group influences, as well as potentially to create more adaptive environments.

On the beneficial side, the available evidence suggests that, insofar as the gains associated with good early educational experiences persist, they do so because they make it more likely that the children will develop a positive approach to schooling that makes them rewarding to teach and *not* because there is a lasting effect on cognitive capacity (Pedersen, Faucher & Eaton, 1978; Berreuta-Clement, Schweinart, Barnett, Epstein & Weikart, 1984).

Of course, too, the fact that a person has children means that they will be exposed to the influence of those children on themselves as adults. The stresses and rewards of parenthood derive from their own behaviour in becoming parents. The circumstances in which they do so (e.g. as a single teenager or a happily married adult) and the number and timing of children are likely to help determine whether the effects are mainly positive or negative.

### Cognitive and social skills

The enhancement or reduction of cognitive and/or social skills constitutes a fourth possible mediating mechanism. A variety of studies of children reared in high risk environments have shown that those of higher IQ or better scholastic attainments are less likely to develop later psychiatric disorders (Cohler, 1987; Garmezy, 1983; Rutter, 1979). The reasons why greater cognitive skills are protective remain obscure. Doubtless part of the explanation is that such skills bring their own rewards in terms of enhanced self-esteem and are associated with environmental advantages. But perhaps, too, the skills are protective because they mean that the individuals have a greater repertoire of adaptive strategies to deal with later life challenges and hazards.

However, it is likely that social skills are as important as those in the strictly cognitive domain. Thus, Dodge's work (Dodge, 1983; Dodge, Pettit, McClaskey & Brown, 1986) has shown that aggressive boys lack interpersonal skills and deal ineptly with social interactions. This lack of social skills is likely to play a role in the further perpetuation of their conduct problems. As already noted, social incompetence and poor peer relationships are predictive of later psychopathology (Parker & Asher, 1987).

A major tenet of attachment theory is that early parent-child relationships constitute the basis for all later relationships and that a failure to develop secure attachments in the first few years leads to a relatively lasting impairment in the ability to form close confiding relationships as an adult (Bowlby, 1969, 1988; Bretherton & Waters, 1985; Waters, Hay & Richters, 1986). Early writings, heavily influenced by psychoanalysis, postulated a rather fixed effect on personality organization (Bowlby, 1951). Influences from ethology led to suggestions that parent-child attachment was equivalent to imprinting of the following response seen in certain species of birds (Bowlby, 1969). However, Bowlby's (1988) current views hypothesize a much more

fluid process involving developmental pathways that remain open to change throughout life. What remains distinctive, nevertheless, is the notion that the key thread underlying continuities derives from the effect of early relationships as shaping influences on later ones. There is a lack of good data on the extent to which such an association does in fact exist and, insofar as it does, on the mechanisms involved. Nevertheless, the data from Hodges and Tizard's (1989 a,b) follow-up of children who spent their first few years in a residential nursery suggests that there may be something in the proposition. The effects are not as extreme as once suggested but, nevertheless, an early institutional rearing was associated with less intense and less selective relationships in adolescence. It remains to be seen whether this feature will persist into adult life.

Our own follow-up of institution-reared girls also showed that, compared with girls reared in ordinary families, they were more likely to develop disorder when faced with social adversity in adult life (Quinton & Rutter, 1988). Given good social circumstances, their outcome was fairly comparable with controls but they were more likely to succumb when faced with social difficulties. Whether or not this was because they lacked coping skills is not known, but that may have been part of the explanation. Similarly, in the Kauai longitudinal study (Werner & Smith, 1982; Werner, 1985) it was noted that resilience was associated with superior problem-solving skills.

It is often argued that vulnerability of this kind is a consequence of not 'working through', or otherwise coming to terms with, earlier stressful experiences. For example, this is particularly emphasized in relation to grief following bereavement, where it is suggested that there is an increased risk of later psychiatric disorder when grief has not been manifest at the time. It is certainly possible that the ways in which the grieving processes are dealt with psychologically at the time are associated with increased or decreased vulnerabilities to later disorder. However, such evidence as there is shows that an absence of depression following bereavement is not a risk factor; rather the reverse (Wortman & Silver, in press). Similarly, Vaillant's follow-up of the Glueck's inner city sample of deprived children showed that good functioning in adult life tended to have been preceded by the same in childhood—an absence of disturbance is *not* a risk factor (Felsman & Vaillant, 1987). Nevertheless, it could still be the case that the way someone conceptualizes earlier adverse experiences is important in determining later sequelae (Main, Kaplan & Cassidy, 1985; Bowlby, 1988).

#### *Self-esteem and self-efficacy*

A related notion is that childhood adversities may create a vulnerability to later psychiatric disorder because they lead to a diminished self-esteem and sense of self-efficacy. For example, this has been postulated as one of the mechanisms mediating the link between lack of affectionate care in childhood and a vulnerability to depression in adult life (Brown *et al.*, 1986). There are findings that are consistent with the hypothesis, but direct longitudinal evidence is so far lacking. However, there is evidence that successful coping and/or positive experiences tend to be protective, and it is plausible that the protection lies in the enhanced self-confidence that derives from the experiences (Rutter, 1987a, in press a). Thus, in the follow-up of institution-reared girls, it was found that positive school experiences were associated with an

increased tendency to exert 'planning' in relation to both marriage and careers (Quinton & Rutter, 1988; Rutter *et al.*, in press). It was suggested that this was because the successful coping in one situation—school—increased the likelihood that the girls would feel in control of other aspects of their lives and able to do something about their situation. Similarly, Elder (1974, 1979) found that older children who took on family responsibilities successfully in the Great Depression tended to have better outcomes.

#### *Habits, cognitive sets and coping styles*

A sixth mediating mechanism concerns established habits, cognitive sets and coping styles. In a sense, this is the main way that continuities have been conceptualized in the past. The general notion is that through repetition we develop habitual ways of behaving that become both self-reinforcing and reinforced by others. Moreover, these traits become internally organized through the development of cognitive sets about ourselves, our relationships and our environment (Rutter, 1987a, b, c). The notion that this is one way by which personality functions develop and become stabilized is plausible, but we lack knowledge on the processes involved. Research that focused on the associations between cognitions and manifest behaviour, and on the circumstances in which each altered in relation to circumstances, would be helpful. Examples of personality functions conceptualized in this way are provided by 'working models of relationships' (Bretherton & Waters, 1985), styles of coping with stress situations (Moos, 1986; Snyder & Ford, 1987) and the variety of routines and patterns that most people develop in organizing their lives. It is relevant to note that these habits, cognitive sets and coping styles may be important not just—perhaps not even mainly—in the perpetuation of the same behaviours, but also through their effects in leading to other consequences. For example, the use of drugs (such as nicotine, alcohol, opioids or tranquillizers) as a way of dealing with either stress or boredom is likely to predispose to problems from the drugs themselves if their usage increases when stressors increase in later life. Involvement in a satisfying job may be protective in many circumstances but increase vulnerability if the job is lost through redundancy. As with the other mechanisms, it is necessary to consider the ways in which their operation may lead to changes in, as well as stabilization of, behaviour, as both occur.

#### *Links between experiences*

The last possible mediating mechanism to mention is the link between experiences. There are many examples of circumstances in which there is a major change of environment, yet nevertheless one bad environment tends to make it likely that another different bad environment will be experienced or, conversely, that one set of advantages predisposes to other advantages. That was evident in our follow-up of institution-reared children (Quinton & Rutter, 1988), as I have indicated. There was a chain of events by which parental mental disorder led to family discord, which was associated with parenting breakdown, which led to institutional admission. On discharge from the institution in adolescence, early parenting breakdown often meant that there was no family home to which the young people could go so that they were largely left to their own resources at a time of vulnerability. In comparable fashion, marital discord

may lead to divorce which, in turn, may be followed by disputes over custody and access and then by the additional change brought about by the entry of a step-parent into the family (Hetherington, 1988; Hetherington, Cox & Cox, 1982, 1985). All of this entails several changes of environment, but there is an essential continuity of potentially stressful circumstances. Advantages frequently involve similar mutually reinforcing chains. Children from privileged homes are more likely to go to better quality schools, the experience of good education will make it more likely that the person will go on to higher education, which in turn may open the way to social advantages as well as career success.

### Conclusions

In conclusion, it is evident that the limited empirical evidence available on the connections between childhood and adult life emphasizes the need to account for both continuities and discontinuities, and to recognize the multiplicity of pathways across the life-span and the diversity of end points. Life-span transitions have a crucial role in the processes involved, both in strengthening emerging patterns of behaviour and in providing a means by which life trajectories may change direction. Traditionally, such transitions have been thought of in terms of a ladder-like progression through predictable stages, each of which has its own set of tasks—as evident in both Erikson's (1963) and Levinson's (1976) concepts. However, that seems a rather misleadingly rigid way of viewing transitions. Most transitions are not universals—not everyone has a career, not everyone marries, not everyone has children, not everyone outlives their parents and so experiences parental death, some people never retire from work. Moreover, there are hugely important transitions that may be purely individual—as brought about, for example, by migration or by late adoption or by leaving an institutional environment. Transitions need to be considered in personal terms.

Also, however, there is immense individual variability in the number, type and timing of transitions, as is obvious when considering people's experiences of marriage or divorce, retirement, bereavement and physical illness. Equally, there is marked individual variability in the meaning of transitions. There is a world of difference between a much-wanted retirement from a stressful job and involuntary retirement from a rewarding one.

The point that comes over most strongly from longitudinal studies, however, is that the outcome of transitions, and the ways in which they are dealt with, is partially determined by people's past behaviour and experiences. People act in ways that serve to shape their experiences, and there are equally important links between different types of environment. Of course, too, the transitions will be influenced by societal factors. Career progression will be affected by job opportunities; the experience of marriage and childrearing by housing conditions; the choice of jobs and housing by racial or other forms of discrimination. Finally, the negotiation of transitions will similarly be influenced by the past and by societal factors.

The implication, I suggest, is that just as we have learned not to polarize nature and nurture as if they were mutually exclusive alternative explanations, so also we need to get away from the unduly simplified question of whether a person's behaviour

is the result of past or present experiences. Not only will behaviour be shaped by the biological substrate, genetically and non-genetically determined, as well as by psychosocial influences, but equally both the past and present are likely to have effects. Most crucially, however, they are not independent of one another. To an important extent the past helps to determine the present environment through a variety of different mechanisms. Chain effects are common and, if we are to understand the developmental process, we need to analyse each of the links in the chain, to determine how the links interconnect and to study how changes in life trajectory come about. In this way, life transitions have to be considered both as end products of past processes and as instigators of future ones—in data analysis terms as both independent and dependent variables. It is important to search for unifying principles in the mechanisms underlying the diversity of pathways from childhood to adult life, but in so doing we must consider the pathways in personal terms and in the context of possible person–environment interactions. The elucidation of the processes giving rise to these varied pathways should provide useful leads for both prevention and treatment through improved knowledge on how changes take place, for that is what development is all about.

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