5 What Can We Learn About Resilience from Large-Scale Longitudinal Studies?

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The Kauai Longitudinal Study Beginning in the prenatal period, the Kauai Longitudinal Study has monitored the impact of a variety of biological and psychosocial risk factors, stressful life events, and protective factors on the development of some 698 Asian, Caucasian, and Polynesian children, born in 1955, in the westernmost county of the United States. Some 30% of this cohort were exposed to four or more risk factors that included chronic poverty, perinatal complications, parental psychopathology, and family discord. Data on the children and their families were collected at birth, in the postpartum period, and at ages 1, 2, 10, 18, 32, and 40 years. The most comprehensive publication resulting from this study is the book *Journeys from Childhood to Midlife*: *Risk*, *Resilience, and Recovery* (Werner & Smith, 2001).

The Minnesota Parent–Child Project Begun in 1975, this project followed some 190 of 267 low-income women and their first-born children in Minneapolis from the last trimester of pregnancy to ages 7 and 10 days, 3, 6, 9, 12, 18, 24, 30, 42, and 48 months, and from grades 1, 2, 3, and 6 to age 25 years (Yates et al., 2003; Sroufe et al., 2005).

Project Competence Begun in 1977–1978, this study followed a normative school cohort of 205 third to sixth graders in the Minneapolis public schools (ages 8–12) after 7, 10, and 20 years, with high retention rates. Some 90% of the original cohort participated in the 20-year follow-up (Masten & Powell, 2003; Masten et al., 2004).

The Virginia Longitudinal Study of Divorce and Remarriage Begun in 1971, the initial sample consisted of 144 white middle-class families, half divorced, half nondivorced, with a target child of 4 years. Children and families were studied at 2 months and 1, 2, 6, 8, 11, and 20 years after divorce. Of the original 144 families, 122 are continuing to participate in this study. When the children were 10 years old, the sample was expanded to include 180 families. When the children were 15 years old, it was expanded to include 300 families, and when the young people were 24 years old, it was expanded to include 450 families (Hetherington, 1989).

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The Hetherington and Clingempeel Study of Divorce and Remarriage Begun in 1980, this study examined the adaptation in stepfamilies of adolescent children at 4, 17, and 26 months after their parents' remarriage. Participants in this study were 202 white middle-class families living in Philadelphia and its suburbs, with the non-divorced and stepfamilies studied at equal intervals (Hetherington & Kelley, 2002).

The Rochester Longitudinal Study Begun in 1970, this study included a core sample of 180 out of 337 women showing a history of mental illness (and a normal control group), whose children were studied at birth, at 4, 12, and 30 months, 4 years, and through grades 1–12 (Sameroff et al., 2003).

A Study of Child Rearing and Child Development in Normal Families and in Families with Affective Disorders Begun in 1980, this study enrolled 80 (Maryland) families in which parents had affective disorders, with 2 children each, i.e., a younger child in the age range from 15 to 36 months and an older child between the ages of 5 and 8 years, and 50 control families. There were three follow-ups at ages 42–63 months, 7–9 years, and 11–13 years (Radke-Yarrow & Brown, 1993).

Lehigh Longitudinal Study This study, which began in 1976, included 297 families (457 children and parents). Participants were recruited from child welfare abuse and protective service programs, with controls recruited from Head Start centers and childcare programs in Pennsylvania. The first set of data collection took place when the children were between 18 months and 6 years. The second wave of data collection followed 4 years later, and the third wave took place 10 years after that. Approximately 91% of the original participants were reassessed in the third wave (Sousa et al., 2011).

The Virginia Longitudinal Study of Child Maltreatment Between 1986 and 1989, this study focused on 107 maltreated children, identified from the statewide registry, and a normal control group of children attending public schools in Charlottesville. The children were assessed in grades 1–3, grades 4–5, and grades 6–7 (Bolger & Patterson, 2003).

The Notre Dame Adolescent Parenting Project (NDAPP) This focused on the fate of more than a 100 teenage mothers and their children—born in the late 1980s and early 1990s across the first 14 years of their lives. The goal of this study was to understand the mechanisms and pathways through which risk and protective factors influenced children's development at 6 months and 1, 3, 5, 8, 10, and 14 years of age (Borkowski et al., 2007).

The Chicago Longitudinal Study Begun in 1983, this is an ongoing longitudinal quasi-experimental cohort design, including 989 low-income children (93% African American), who entered the Child–Parent Center (CPC) programs in preschool, and 550 low-income children, who participated in an all-day kindergarten program (Reynolds, 2000). More than 75% of the original sample participated in the Age 35 survey (Ou et al., 2020).

Canadian Studies

National Longitudinal Study on Children (NLSC) Beginning in 1994, this study followed the development and well-being of children from across Canada's provinces and territories, from birth to early adulthood. A total of 22,831 children aged 0–11 years were included at baseline. Waves of data collection took place every 2 years, ending in 2008/2009.

The Quebec Longitudinal Study of Child Development (QLSCD) This is an ongoing longitudinal study of children born between October

1997 and July 1998 in Quebec, Canada. At baseline, 2120 participants were included in the study. Data were collected annually or every 2 years. When the children were 20 years old, 1245 remined in the study (Orri et al., 2021).

British Studies

The Early Prediction of Adolescent Depression (EPAD) Study This longitudinal study, also known as the Cardiff University Mood and Wellbeing Study, follows 337 families from across the UK with the aim to better understand the causes of youth mental health difficulties. Since 2017, three waves of assessment have been conducted and the results have shown that together, family, social, and child factors explain resilience within the high-risk sample.

The Millennium Cohort Study (MCS) This study followed 18,818 children born in England, Scotland, Wales, or Northern Ireland between 2000 and 2002. Data were collected when the participants were 9 months old and at ages 3, 5, 7, 11, 14, and 17 years. The next scheduled data collection will take place at age 22 (Joshi & Fitzsimons, 2016).

The Next Steps Study This study follows the lives of 15,770 people born in England in 1989–1990. Data were collected annually from 2004 to 2010. The next data collection took place in 2015–2016 when the cohort members were 25 years old, and another data collection is underway with participants aged 32 years.

The Medical Research Council (MRC) National Survey of Health and Development This study followed 5362 children, born in England, Scotland, or Wales in March 1946. Since the initial maternal survey, study members have been followed up 24 times. At the 24th follow-up, 2816 participants remained active in the study (Kuh et al., 2016).

The National Child Development Study (NCDS) This study followed some 16,994 persons, born in Great Britain between March 3 and 9, 1958, until adulthood. Data were collected on the physical, psychosocial, and educational development of the cohort at ages 7, 11, 16, 23, 33, 42, 44, 46, 50, and 55 years. In 2020 and 2021, participants were also asked to participate in three coronavirus-19 (COVID-19) surveys. The next data collection, Life in Your Early 60s Survey, is currently underway (Power & Elliott, 2006).

The British Cohort Study (BCS70) This study followed 14,229 children, born in the week between April 5 and 11, 1970, for over five decades. Follow-up data were collected when the cohort members were aged 5, 10, 16, 26, 30, 34, 38, 42, 46, and 51 years (Elliott & Shepherd, 2006).

The Avon Brothers and Sisters Study (ABSS) This is a longitudinal study of some 192 families, each with a child born between August 1991 and December 1992 and an older sibling over the age of 7 but below the age of 17 years. The aim of the research was to explore sibling relationships in different family types (two-parent families, single-parent families, and step-families) and the risk and protective factors that impact their development and adjustment (Gass et al., 2007).

New Zealand Studies

The Dunedin Multidisciplinary Health and Development Study This is a longitudinal investigation of a cohort of infants, born between April 1, 1972, and March 31, 1973, in Dunedin, New Zealand. The base sample contained 1037 children, followed up at ages 3, 5, 7, 9, 11, 13, 15, 18, 21, 26, 32, 38, and 45 years (Caspi et al., 2003). In the latest follow-up, at age 45 years, 94% of the living study members participated (Bourassa et al., 2021).

The Christchurch Health and Development Study Begun in mid-1977, this study consists of a birth cohort of 1265 children, born in the Christchurch urban region and followed at 4 months, 1 year, annually to age 16 years, and then at ages 18, 21, 25, 30, 35, and 40 years (Fergusson & Horwood, 2003).

Australian Studies

Childhood to Adolescence Transition Study (CATS) This study began in 2012 and follows more than 1200 children annually from grade three through adolescence. A total of 881 participants were assessed in 2019. During the school years, teachers and parents also completed the questionnaires. Parents have since been asked to complete some of the questionnaires (Mundy et al., 2013).

The Barwon Infant Study Beginning in 2010, this study recruited 1158 expectant mothers. Data collection took place within the first and second trimesters as well as the third trimester. At birth, 1074 infants were included in the study. Follow-up data collection took place at 4 weeks, at 3, 6, 9, 12, and 18 months, and at 2 and 4 years of age. At 4 years of age, 909 participants remained in the study. Data are currently being collected for participants ages 7–9 years (Vuillermin et al., 2015).

The Longitudinal Study of Australian Children This study began in 2003 with two cohorts—5000 children aged 0–1 years and 5000 children aged 4–5 years. This study includes children, their parents, carers, and teachers. Data collection took place every 2 years until 2019. Participation in 2009 included more than 3000 participants from each cohort. Since 2020, three surveys have been completed regarding COVID-19 (Wake et al., 2014).

The Mater-University of Queensland Study of Pregnancy (Brisbane) This is a prospective study of 8556 pregnant women that began in 1981. The mothers and their offspring were assessed between the third and fifth days postpartum and at 6 months, 5 years, 14 years, and 21 years. Between 2009 and 2012, the mothers were followed up. Between 2011 and 2014, the children were followed up. Between 2016 and 2018, the third generation was recruited to this study. In 2021, another phase of this study commenced with the second and third generations (Najman et al., 2005).

The Australian Temperament Project (ATP) This is a longitudinal study of the psychosocial development of a representative sample of 2443 children born in the Australian state of Victoria between September 1982 and January 1983. Since recruitment, 15 waves of data have been collected over 30 years including both parents and children. The ATP Generation 3 currently follows more than 1000 offspring from late gestation through to 6 years of age where 706 families participated in data collection (Edwards et al., 2013).

Scandinavian Studies

The Copenhagen High-Risk Study This study has traced 207 children of schizophrenic mothers and 104 matched controls from age 15 to ages 25 and 42 years. More than half had exhibited "no" psychopathology from mid-adolescence through mid-life (Parnas et al., 1993).

The Lundby Study This is a prospective longitudinal study of the mental health of some 2550 persons ages 0–92 years at baseline, including 590 children (mean age 8 years at baseline) living in southern Sweden. Three waves of follow-up took place (1957, 1972, and 1997). In 1957, 1013

people were added to the original cohort. Cederblad (1996) followed a subsample of 148 individuals who had been exposed to three or more psychiatric risk factors (such as parental mental illness, alcoholism, family discord, or abuse) in childhood. Three out of four were functioning well in midlife.

African Studies

The Longitudinal Study of War-Affected Youth (LSWAY) This is a 17-year prospective longitudinal study of the intergenerational impact of war on mental health and psychosocial well-being. Beginning in 2002, this study included children aged 10–17 years who participated in Sierra Leone's civil war as child soldiers as well as a random sample of similar aged youth (n = 395). In 2004 and 2008, caregivers were included in the study, and in 2016–2017, caregivers, intimate partners, and children were added. Although many participants show mental health problems with consequences to their families, family- and community-level risks and protective factors were identified (Betancourt et al., 2020).

German Studies

There are two longitudinal studies of risk and protective factors in Germany: Lösel and Bliesener (1990) have studied adolescents in residential institutions in Bielefeld; Laucht et al. (1999) have followed a birth cohort of 347 children in Mannheim from 3 months to 8 years. Reports on the findings of their studies are available in German in the book *Was Kinder Starkt* (*What Makes Children Strong?*) (Laucht et al., 1999).

Individual Attributes and Sources of Support Associated with Successful Coping Among High-Risk Children

Tables 5.1 and 5.2 summarize the individual attributes and sources of support in the family and community associated with successful coping among high-risk children, which have been replicated in a number of large-scale longitudinal studies in the United States and abroad. In most cases, the factors that contributed to resilience among those exposed to high levels of childhood adversity also benefited "low-risk" children, that is, they showed a main effect rather than an interaction effect in statistical analyses (Fergusson & Horwood, 2003).

Children who coped successfully with adversity tended to become less easily distressed than those who developed problems and had an active, sociable, "engaging" temperament that attracted adults and peers alike. They possessed good communication and problem-solving skills, including the ability to recruit substitute caregivers; they had a talent or special skill that was valued by their peers, and they had faith that their actions could make a positive difference in their lives.

They also drew on external resources in the family and community. Foremost were affectional ties that encouraged trust, autonomy, and initiative. Resilience levels were higher for children who have close relationships with their parents, friends they could trust and communicate with, and a sense of belonging within their school community. In formal support systems in the community also promote resilience by providing them with positive role models, such as teachers, mentors, and peer friends.

The frequency with which the same predictors of resilience emerge from diverse studies with different ethnic groups, in different geographic and sociopolitical contexts, conveys a powerful message of universality (Masten & Powell, 2003). That does not preclude the possibility that some protective factors are more age-, gender-, and context-specific than are others. For example, the Kauai Longitudinal Study found some variables that discriminated significantly between positive and negative developmental outcomes only when there was a series of stressful life events or when children were exposed to poverty. They did not discriminate between good and poor outcomes among middle-class children whose lives were relatively secure, stable, and stress-free (Werner & Smith, 1989).

Table 5.1 Individual attributes associated with successful coping in high-risk children—replicated in two or more large-scale longitudinal studies

Source notes	Characteristics of individual	Time period studied	Multiple (4+) risk factors	Childhood adversities			
				Poverty	Parental mental illness	Child abuse	Divorce
1	Low distress; low emotionality	Infancy–adulthood	+	+	+	+	+
2	Active; vigorous	Infancy–adulthood	+	+			
3	Sociable	Infancy–adulthood	+	+	+	+	
4	Affectionate "engaging" temperament	Infancy–childhood	+	+	+	+	+
5	Autonomy; social maturity	Early childhood	+	+			
6	Average to above-average intelligence (including reading skills)	Childhood–adulthood	+	+	+	+	+
7	High achievement motivation	Childhood–adulthood	+	+	+		
8	Special talents	Childhood–adolescence	+	+	+		
9	Positive self-concept	Childhood–adolescence	+	+	+		+
10	Internal locus of control	Childhood–adulthood	+	+	+	+	+
11	Impulse control	Childhood–adulthood	+	+	+		
12	Planning; foresight	Adolescence–adulthood	+	+			
13	Faith; a sense of coherence	Adolescence–adulthood	+	+	+		
14	Required helpfulness	Childhood–adulthood	+	+	+		

Source notes:

1. Farber and Egeland (1987), Fergusson and Horwood (2003), Werner and Smith (1992, 2001)
2. Farber and Egeland (1987), Werner and Smith (1992, 2001)
3. Farber and Egeland (1987), Lösel and Bliesener (1990), Werner and Smith (1992, 2001)
4. Farber and Egeland (1987), Hetherington (1989), Werner and Smith (1992, 2001)
5. Farber and Egeland (1987), Masten et al. (2004), Werner and Smith (1989, 1992, 2001)
6. Farber and Egeland (1987), Fergusson and Lynskey (1996), Hetherington and Elmore (2003), Lösel and Bliesener (1990), Masten and Powell (2003), Masten et al. (2004), Seifer et al. (1992), Werner and Smith (1992, 2001)
7. Fergusson and Horwood (2003), Lösel and Bliesener (1990), Masten and Powell (2003), Masten et al. (2004), Radke-Yarrow and Brown (1993), Schoon (2001), Werner and Smith (1992, 2001)
8. Anthony (1987), Werner and Smith (1992, 2001)
9. Cederblad (1996), Fergusson and Horwood (2003), Hetherington and Elmore (2003), Lösel and Bliesener (1990), Radke-Yarrow and Brown (1993), Werner and Smith (1992, 2001)
10. Bolger and Patterson (2003), Cederblad (1996), Hetherington and Elmore (2003), Masten and Powell (2003), Seifer et al. (1992), Werner and Smith (1992, 2001)
11. Fergusson and Lynsky (1996), Fergusson and Horwood (2003), Masten and Powell (2003), Werner and Smith (1992, 2001)
12. Masten et al. (2004), Rutter (2000), Werner and Smith (1992, 2001)
13. Cederblad (1996), Hansson et al. (2008), Hetherington and Kelley (2002), Howard et al. (2007), Rumbaut (2000), Suarez-Oroczo and Suarez-Oroczo (2001), Werner and Smith (1992, 2001)
14. Anthony (1987), Boyden (2009), Lösel and Bliesener (1990), Werner and Smith (2001)

Table 5.2 Resources in the family and community associated with successful coping in high-risk children—replicated in two or more large-scale longitudinal studies

Source notes	Resources	Time period studies	Multiple (4+) risk factors	Childhood adversities			
				Poverty	Parental mental illness	Child abuse	Divorce
1	Small family (<4 children)	Infancy	+	+			
2	Maternal competence	Infancy–adolescence	+	+	+	+	
3	Close bond with primary caregiver	Infancy–adolescence	+	+	+	+	
4	Supportive grandparents	Infancy–adolescence	+	+	+	+	+
5	Supportive siblings	Childhood–adolescence	+	+	+	+	+
6	Competent peer friends	Childhood–adolescence	+	+		+	+
7	Supportive teachers	Preschool–adulthood	+	+	+		+
8	Successful school experiences	Childhood–adulthood	+	+	+		+
9	Mentors (elders)	Childhood–adulthood	+	+			
10	Prosocial organizations: youth clubs, religious groups	Childhood–adulthood	+	+			

Sources:

1. Cederblad (1996), Werner and Smith (1992, 2001)
2. Egeland et al. (1993), Masten and Powell (2003), Seifer et al. (1992), Werner and Smith (1992, 2001)
3. Cederblad (1996), Fergusson and Horwood (2003), Losel and Bliesener (1990), Masten et al. (2004), Mednick et al. (1987), Rumbaut (2000), Seifer (2003), Werner and Smith (1992, 2001)
4. Farber and Egeland (1987), Herrenkohl et al. (1994), Hetherington (1989), Howard et al. (2007), Radke-Yarrow and Brown (1993), Werner and Smith (1992, 2001)
5. Gass et al. (2007), Hetherington (1989), Wallerstein and Blakeslee (1989), Werner and Smith (1992, 2001)
6. Bolger and Patterson (2003), Fergusson and Horwood (2003), Hetherington (1989), Losel and Bliesener (1990), Rumbaut (2000), Suarez-Oroczo and Suarez-Oroczo (2001), Wallerstein and Kelley (1980), Werner and Smith (1992, 2001)
7. Hetherington (1989), Losel and Bliesener (1990), Radke-Yarrow and Brown (1993), Reynolds and Ou (2003), Rumbaut (2000), Werner and Smith (1992, 2001)
8. Fergusson and Lynskey (1996), Masten et al. (2004), Schoon (2001, 2006), Wadsworth (1999), Werner and Smith (1992, 2001)
9. Howard et al. (2007), Yates et al. (2003), Werner and Smith (2001)
10. Howard et al. (2007), Masten and Powell (2003), McGee (2003), Rumbaut (2000), Suarez-Orozco and Suarez-Oroczo (2001), Werner and Smith (1989, 1992, 2001), Wyman (2003)

Protective factors include autonomy and self-help skills in early childhood for males and a positive self-concept in adolescence for females. Among protective factors in the caregiving environment for both boys and girls were a positive parent–child relationship observed during the second year of life and the number of sources of emotional support they could draw on in early and middle childhood. Furthermore, in the Rochester Child Resilience Project, Wyman (2003) reported context-specific effects of involvement in structured after-school activities among high-risk teens. Participation in prosocial group activities lowered the risk for delinquent behavior for children with many antisocial friends but not for those with few antisocial friends.

The Importance of Early Developmental Competence and Support

Previously, research on resilience had focused on middle childhood and adolescence, with a lesser focus on the early history of developmental competence. Both the Kauai Longitudinal Study and the Minnesota Parent–Child Project have shown that an early history of positive adaptation, engendered by consistent and supportive care, has a powerful and enduring influence on children's adaptation and that it increases the likelihood that they will utilize both formal and informal sources of support in their environment at later stages in the life cycle.

For example, Yates et al. (2003) found that children with early histories of secure attachment in infancy and generally supportive care in the first 2 years demonstrated a greater capacity to rebound from a period of poor adaptation when they entered elementary school compared to those with less-supportive histories. Likewise, children who exhibited positive transitions from maladaptation in middle childhood to competence in adolescence were able to draw on a positive foundation of early support and positive adaptation.

That the process of resilience is manifested at later stages in the developmental trajectory became apparent to us in our follow-up studies in early adulthood and midlife in Kauai (Werner & Smith, 1992, 2001). The majority of high-risk children who had become troubled teenagers (with delinquency records and mental health problems) recovered in the third and fourth decades of life and became responsible partners, parents, and citizens in their communities. Individuals who availed themselves to informal sources of support in the community, and whose lives subsequently took a positive turn, differed in significant ways from those who did not make use of such options. They had been exposed to more positive interactions with their primary caregivers in the first 2 years, that is, their early rearing conditions fostered a sense of trust.

The Shifting Balance Between Vulnerability and Resilience

Large-scale longitudinal studies that have followed boys and girls from birth to adulthood (whether children of poverty, divorce, or children coming from multi-risk families) have repeatedly found a shifting balance between stressful life events that heighten children's vulnerability and protective factors that enhance their resilience. The follow-up in adulthood in the Kauai Longitudinal Study, for example, found a few offspring of psychotic parents who had managed to cope successfully with a variety of stressful life events in childhood or adolescence but whose mental health began to deteriorate in the third decade of life (Werner & Smith, 1992).

Other high-risk children had grown into competent, confident, and caring adults but felt a persistent need to detach themselves from their parents and siblings whose domestic and emotional problems threatened to engulf them. This was especially true for the adult offspring of alcoholic parents, some of whom had been physically and emotionally abused when they were young. The balancing act between forming new attachments to loved ones of their choice and the loosening of old family ties that evoked painful memories exacted a toll on their adult lives. The price they paid varied from stress-related health problems to a certain aloofness in their interpersonal relationships.

On the positive side, the Kauai study demonstrated that the opening of opportunities at major life transitions (high school graduation, entry into the world of work, marriage) enabled the majority of the high-risk individuals who had a troubled adolescence to rebound in their 20s and 30s. Among the most potent second chances for such youth were adult education, voluntary military service, active participation in a church community, and a supportive friend or marital partner. Likewise, Project Competence identified a number of young people who did poorly in adolescence but turned their lives around in the transition to adulthood (Masten & Wright, 2009).

Protective Mechanisms: Interconnections Over Time

Just as risk factors tend to co-occur in a particular population (i.e., children of poverty) or within a particular developmental period (i.e., adolescence), protective factors are also likely to occur together to some degree (Gore & Eckenrode, 1994). The presence of a cluster of (interrelated) variables that buffer adversity at one point in time also makes it more likely that other protective mechanisms come into play at a later period of time.

There are only a few large-scale longitudinal studies that have demonstrated such interconnections over time. The highlights of the results of the latent variable path analyses that were applied to the data from the Kauai Longitudinal Study at six points in the life cycle illustrate the complexity of the phenomenon of resilience. They show how individual dispositions and outside sources of support and stress are linked together from infancy and early childhood to middle childhood and adolescence and how these variables, in turn, predict the quality of adaptation in young adulthood and midlife (Werner & Smith, 1992, 2001).

When the links between individual dispositions and outside resources were examined, men and women who had made a successful adaptation at midlife—despite serious childhood adversity—had relied on sources of support within the family and community that increased their competence and efficacy, decreased the number of stressful life events they subsequently encountered, and opened up new opportunities for them.

The protective processes that fostered resilience manifested themselves early in life. Across a span of several decades, maternal competence in infancy was positively related to their offspring's adaptation in adulthood (at 32 and 40 years). Girls whose mothers interacted in a consistently positive way with their infant daughters were more autonomous at age 2 and more competent at age 10. They also attracted more sources of emotional support in childhood and adolescence and encountered fewer stressful life events than did the daughters whose mothers were less competent caregivers. Males with more competent mothers were more successful at school at age 10, more resourceful and efficacious at age 18, and utilized more sources of emotional support in adulthood than did the sons of mothers who were less competent caregivers.

For both boys and girls, there was a positive association between autonomy at age 2 and scholastic competence at age 10. Boys who were more autonomous at age 2 encountered fewer stressful life events in the first decade of life and had fewer health problems in childhood and adolescence. Girls who were more autonomous as toddlers had fewer health problems in each decade of life and fewer coping problems by age 40.

For both boys and girls, there was a positive association between the number of sources of emotional support they were attracted to in childhood, their scholastic competence at age 10, and the quality of adaptation at age 40. Individuals who could count on more sources of emotional support in childhood reported fewer stressful life events at later stages of their lives than did those who had little emotional support.

For both sexes, scholastic competence at age 10 was positively linked to self-efficacy and the ability to make realistic plans at age 18. Males with higher scholastic competence at age 10 had fewer health problems in adolescence and higher activity scores in the Emotionality Activity Sociability (EAS) Temperament Survey at age 32. They also availed themselves of more sources of emotional support in adulthood. Females with higher scholastic competence at age 10 attracted more sources of emotional support in adolescence. For both boys and girls, the number of sources of emotional support they could rely on in adolescence was positively linked to their self-efficacy and ability to make realistic plans at age 18.

Men and women who were more resourceful and more realistic in their educational and vocational plans at age 18 received higher scores on the Scales of Psychological Well-Being at age 40. Their temperament was related to the quality of their adult adaptation as well. Men who scored higher on the activity scale of the EAS Temperament Survey at age 32 coped better at

age 40 than did males with lower activity scores. Women with higher distress scores at age 32 had more health problems and lower scores on the Scales of Psychological Well-Being at age 40.

Most of the variances in the quality of adaptation at age 40 were accounted for by earlier predictors of resilience (i.e., variables associated with successful coping at ages 2, 10, and 18 years). Most were attributed to four clusters of protective factors that had been independently assessed in the first decades of life: (1) maternal competence (a cluster of variables that included mother's age and education and the proportion of positive interactions with her child, observed independently at home at age 1 and during developmental examinations at age 2); (2) the number of sources of emotional support available to the child between ages 2 and 10 years (including members of the extended family); (3) scholastic competence at age 10 (a cluster of variables that included intelligence quotient (IQ) scores and scores on the Primary Mental Abilities (PMA) reasoning test and the Strategic Teaching and Evaluation of Progress (STEP) reading test); and (4) the health status of the child (between birth and 2 years for females; between birth and 10 years for males).

These findings point to the importance of the first decade of life in laying the foundations for later resilience—as has been also documented by Sroufe et al. in the Minnesota Parent–Child Project (Sroufe et al., 2005).

Gender Differences

All large-scale longitudinal studies of risk and resilience report gender differences that appear to vary with the stages of the life cycle and the demands made on each gender in the context of the prevailing sex role's expectations.

At each developmental period, beginning in the prenatal period and infancy, more males than females perished. In childhood and adolescence, more boys than girls developed serious learning and behavior problems and displayed more externalizing symptoms. In contrast, in late adolescence and young adulthood, more girls than boys were subject to internalizing symptoms, especially depression (Caspi et al., 2003; Fergusson & Horwood, 2003; Werner & Smith, 1989).

However, among the high-risk youth who had become "troubled teenagers," more women than men managed to make a successful transition into their 30s and 40s, at least in Kauai. Protective factors within the individual—an engaging temperament, scholastic competence, and self-efficacy—tended to make a greater contribution to the quality of adult adaptation for females than for males who successfully coped with adversities in their lives. In contrast, the sources of support available in the family and community tended to make a greater impact on the lives of the men who successfully overcame childhood adversities (Werner & Smith, 2001).

Biological Aspects of Resilience

Most of the longitudinal studies reviewed here were conducted by educators, psychologists, and sociologists, but there has been a growing interest in biological and genetic variables that may mitigate or modify the impact of stress and childhood adversities on the quality of adaptation at different stages of the life cycle (Curtis & Cicchetti, 2003).

Health

Surprisingly, the general health status of the individual tends to be overlooked in most studies concerned with resilience and vulnerability. Even in large-scale longitudinal studies, in which the original focus has been "health and development," the variables that are included in complex regression equations that look for "resiliency factors" tend to denote psychological or sociological constructs or are concerned with educational attainment rather than health (Fergusson & Horwood, 2003; Schoon, 2001).

Path analyses of the data of the Kauai Longitudinal Study suggest that it might be worthwhile to explore the effects of good health or debilitating illnesses or accidents on children's

ability to cope with stressful life events and adversity. In Kauai, at each stage of the life cycle—from early childhood to adulthood—individuals who encountered more stressful life events also encountered more health problems. Health problems in early childhood (a count of serious illnesses or accidents reported by parents between birth and age 2 years; the number of referrals to health-care providers, and the pediatrician's low rating of the toddler's physical status at age 2) were significantly correlated with coping problems in adulthood, both at 32 and age 40 (Werner & Smith, 1992, 2001).

On the positive side, perinatal health (i.e., the absence of pregnancy and birth complications) was a significant protective factor in the lives of adolescents who were the offspring of mothers who suffered from mental illness. These findings have been replicated in the Copenhagen High-Risk Study (Parnas et al., 1993) and in a study of 15-year-old children of depressed mothers who were participants in the Mater-University Study of Pregnancy and Outcomes in Brisbane, Australia (Brennen et al., 2002).

Biological Sensitivity to Context

An exciting new avenue of research has focused on the role of psychobiological factors as moderators of children's vulnerability to stress. The concepts of "biological sensitivity to context" and "differential susceptibility to environmental influences" have been advanced to explore the possibility that some children are more sensitive to the influence of context than are others, whether the context is adverse or beneficial (Belsky et al., 2007; Ellis et al., 2005).

Biological reactivity to naturally occurring stressors appears to be a robust, replicable phenomenon that involves a set of complex responses within the neural circuitry of the brain, and within peripheral neuroendocrine pathways regulating metabolic, immunological, and cardiovascular functions. Ellis et al. (2005) have demonstrated in several studies that a disproportionate number of preschool children in supportive home environments displayed a high autonomic reactivity. Conversely, a relatively high proportion of children in very stressful family environments, followed from infancy to age 7 years, showed evidence of heightened adrenocortical and sympathetic reactivity. In both studies, children from moderately stressful home environments displayed the lowest reactivity levels.

These finding suggest that relations between levels of childhood support/adversity and the magnitude of stress reactivity are curvilinear, an observation supported by Belsky et al. (2007) who speculate that the anxiety displayed by fearful children reflects a highly sensitive nervous system on which experience registers powerfully—one that makes them especially susceptible to both negative and positive rearing effects.

Research on differential susceptibility has only just begun. Studies that include twins and other siblings from the same family (such as the Swedish Twin Registry) may prove especially powerful as they could distinguish between genetically and environmentally induced variations in susceptibility (Hansson et al., 2008).

Gene–Environment Interactions

There is ample evidence of the important role that genetic factors play in the susceptibility of individuals to psychopathology, such as alcoholism, antisocial behaviors, and severe psychiatric illnesses (schizophrenia and bipolar disorder). Several studies, including the Copenhagen High-Risk Study (Parnas et al., 1993) and the Kauai Longitudinal Study, have reported findings that suggest that adverse environments, including serious pre- and perinatal stress, have the most negative impact on individuals who are genetically vulnerable, among them the offspring of alcoholic and schizophrenic mothers (Werner & Smith, 2001).

It stands to reason that gene–environment interactions also play a significant role in relation to the phenomenon of resilience. Evidence of gene–environment interactions in which an individual's response to environmental insults appears to be moderated by his or her genetic makeup has been reported by Caspi et al. (2002,

2003) from the 26-year follow-up of the Dunedin (New Zealand) Multi-Disciplinary Health and Development Study, in which 847 Caucasian cohort members participated.

Individuals with one or two copies of the short allele of the *5-HTTLPR* gene (a serotonin transporter) exhibited significantly more (self-reported) depressive symptoms in relation to four or more stressful life events between the ages of 21 and 26 than did individuals homozygous for the long allele. Of special interest was the finding that childhood maltreatment in the first decade of life predicted adult depression only among individuals carrying a short allele but not among individuals homozygous for the long allele (Caspi et al., 2003).

In another analysis of data from the Dunedin Study, Caspi et al. found that a functional polymorphism in the X-linked gene encoding the neurotransmitter-metabolizing enzyme monoamine oxidase A (MAOA) was found to moderate the effects of childhood maltreatment in males. Boys with a genotype conferring high levels of MAOA expression who had been maltreated in childhood were less likely to develop antisocial problems (conduct disorders between ages 10 and 18; convictions for violent crimes by age 26) than those with low levels of MAOA activity (Caspi et al., 2002). The authors wisely suggested that "until this study's findings are replicated, speculations about clinical implications are premature" (p. 853).

Kim-Cohen et al. (2006) were able to replicate the original finding by showing that the *MAOA* genotype moderated the development of psychopathology after exposure to physical abuse in a cohort of 975 7-year-old British boys. Their meta-analysis of the results of five independent investigations (from Great Britain, New Zealand, and the United States) demonstrated that across studies the association between childhood maltreatment and mental health problems was significantly stronger in the group of males with the genotype conferring low MAOA activity. These findings provide the strongest evidence to date, suggesting that the *MAOA* gene influences vulnerability to environmental stress and that this biological process can be initiated early in life. However, that evidence so far is based only on samples of Caucasian males.

Meta-analyses of studies of the interaction between the serotonin transporter gene (*5-HTTLPR*), stressful life events, and increased risk of major depression have yielded mostly negative results—though substantial resources have been devoted to replication efforts.

Risch et al. (2009) conducted a meta-analysis of 14 studies, using both published data and individual-level original data. Of a total of 14,250 participants, 1769 were classified as having depression. In the meta-analysis of published data, the number of stressful life events was significantly associated with depression. No association was found between the *5-HTTLPR* genotype and depression in any of the individual studies, and no interaction effect between genotype and stressful life events on depression was observed. This meta-analysis yielded no evidence that the serotonin transporter genotype alone or in interaction with stressful life events was associated with an elevated risk of depression in men alone, women alone, or in both sexes combined.

Munafo et al. (2009), at the University of Bristol, carried out an independent meta-analysis on 15 studies that focused on gene–environment interactions at the serotonin transporter locus and concluded that the main effects of the *5-HTTLPR* genotype and the interaction effect between *5-HTTLPR* and stressful life events at risk of depression are negligible. Only a minority of studies (Kaufman, 2008; Kendler et al., 2005) report a replication that is qualitatively comparable to that in the original report. In general, the positive results for the interactions between *5-HTTLPR* and stressful life events were compatible with chance findings.

Diversity of methods and approaches used to measure environmental risk may explain the inconsistencies in results across G x E studies. Health practitioners, educators, and behavioral scientists need to recognize the importance of the replication of findings from genetic analyses that seek to anchor in neurobiology individual differences in resilience (Reiss, 2010; Stein et al., 2009).

Findings from the Virginia Adult Twin Study of Psychiatric and Substance Use Disorders (VATSPSUD) found that both genetics and environmental influences contribute roughly equally to resilience in adulthood (Amstadter et al., 2014).

Personality

Findings from Project Competence found that showing higher childhood conscientiousness, agreeableness, and openness and lower neuroticism was associated with increased resilience during adulthood. Even when controlling for adversity throughout the lifespan, positive personality traits have been found to be predictive of positive outcomes in adulthood (Shiner & Masten, 2012).

Resilience in a Cross-Cultural Context

Research on resilience needs to acquire a cross-cultural perspective that focuses on children in the developing world who have been exposed to many biological and psychosocial risk factors that increase their vulnerability far beyond that of their peers born in more stable and affluent conditions.

Immigrant and refugee children are the fastest growing segment of the US child population. The Children of Immigrants Longitudinal Study (CILS) has examined the aspirations, educational performance, and psychological adaptation of more than 5000 teenage youths in 2 key areas of immigrant settlements in the United States: Southern California and South Florida (Rumbaut, 2000). The original survey (T1) conducted in spring 1992 interviewed 2420 students enrolled in the eighth and ninth grades in the San Diego Unified School District and 2842 students in public and private schools in the Miami area. Three years later, from 1995 to 1996, a second survey (T2) of the same youth was conducted, supplemented by interviews with their parents. The students from San Diego were mostly of Mexican and Southeast Asian origin, and the students from Florida came mostly from Latin America.

Regardless of their country of origin, immigrant children with higher school achievement, aspirations, and self-esteem relied on high levels of social support by their parents and the extended family and on competent peers from the same ethnic group. Among the protective factors that enhanced their psychological well-being were closeness with parents, religion, and social support from family, friends, and teachers.

A 5-year Longitudinal Immigrant Student Adaptation (LISA) Study, directed by Carola and Marcel Suarez-Oroczo (2001), reports similar findings. The LISA study followed some 400 immigrant children (ages 9–14) who came from 5 regions (China, Central America, the Dominican Republic, Haiti, and Mexico) to the Boston and San Francisco areas.

Qualitative interview data and quantitative survey data employed in the LISA study illustrated the importance of supportive friends, counselors, and members of the extended family in the social world of immigrant youth and the protective role of religion and church-based relationships in the lives of immigrant teenagers.

Young Lives is a longitudinal study of childhood poverty in four developing countries: Ethiopia, India (Andhra Pradesh), Peru, and Vietnam (Hardgrove et al., 2010). So far, data have been gathered on some 12,000 children and their families over a span of 15 years. The children are in two age groups: the older cohort was born in 1994–2010 and the younger in 2001–2002. Some of the overall trends across the three rounds of available survey data (2002, 2006, 2009) are as follows:

Maternal education is a significant correlate of an array of positive outcomes for poor children, especially their nutritional status. In turn, there is a strong relationship between nutrition and children's cognitive achievement and psychosocial well-being.

Intergenerational interdependency is crucial to children's well-being and resilience in poor families where children's efforts are combined with those of parents and elders to meet family needs. Norms concerning what constitutes a

"good child" tend to reinforce their work contributions.

Evidence on children's active contributions to the domestic economy suggests that it is not just essential to household maintenance in poor families but can also foster their sense of belonging and responsibility and ease their transition to adulthood (Boyden, 2009). We found the same to be true in our longitudinal study of multiracial families in Kauai (Werner & Smith, 2001).

Evaluation Studies of the Effectiveness of Programs Designed to Foster Resilience

Scarr (1992) points out that it is not easy to intervene deliberately in children's lives. We know how to rescue children from extremely bad circumstances and to return them to normal developmental pathways but only within the limits of their own heritable characteristics, such as intelligence, temperament (activity, excitability, sociability), and psychobiological reactivity (cardiac and immunological responses under stress). Since the 1980s, many "competence enhancement" and "strength" or "asset" building programs for high-risk children have been introduced in North America, most of which have focused on preschool and school-age children. So far, there have been very few evaluation programs that have examined their long-term effectiveness. Some of these programs are discussed in other chapters of this book.

A notable example is the Chicago Longitudinal Study, begun in 1983, an ongoing investigation of the effects of the CPC, the oldest extended childhood intervention program in the United States of America and the second oldest federally funded preschool program (after Head Start). The program stresses center-based language learning and parent participation and provides educational and family support services to disadvantaged children from preschool to the early elementary grades (3–9 years). The data available on more than a 1000 participants in the Chicago public schools cover nearly four decades of life.

Reynolds and Ou (2003) reported the results of several path analyses that modeled the effect of preschool participation (from years 3 to 5), cognitive skills (at age 5), parent involvement at school (in the years 8–12), quality of school (at ages 10–14), on school achievement and grade retention (at ages 14–15), and on the diminished likelihood of special education placement and dropping out of high school by age 20.

Effect sizes on measures of social competence averaged 0.70 standard deviations (SDs), modest but higher than those reported from several meta-analyses on the effectiveness of preventive mental health programs (average 0.34 SD) and of a wide range of psychological and behavioral treatments (0.47 SD). Children who attended programs in the poorest neighborhoods benefited the most from the CPC programs.

Because the pathways that lead to positive adaptation despite childhood adversities are influenced by context, it is not likely we will discover a "magic bullet," a model intervention program that will succeed every time with every youngster who grows up under adverse circumstances. Knowing this does not mean we should despair. However, it does mean, as Rutter (2002) admonishes us, that "caution should be taken in jumping too readily onto the bandwagon of whatever happens to be the prevailing enthusiasm of the moment" (p. 15).

Conclusions

Large-scale longitudinal studies, extending from childhood to adulthood, have documented the shifting balance between stressful life events and risk factors that increase children's vulnerability and internal dispositions and outside sources of support that enhance their resilience. This balance may change at different stages in life for each gender and is affected by the cultural context.

The frequency with which the same predictors of resilience emerge from longitudinal studies conducted with different ethnic groups and in different geographic settings is impressive. In most cases, the factors that mitigated the negative

effects of childhood adversity also benefited children who lived in stable and secure homes, but they appear to have particular importance when adversity levels are high.

Large-scale longitudinal studies have demonstrated that an early history of developmental competence, engendered by consistent and supportive care, is a powerful and enduring influence on children's adaptation at later stages of the life cycle and increases that likelihood that they will rebound from a "troubled" adolescence.

The pathways that lead to positive adaptation, despite childhood adversity, are complex, and there is great need to map the interconnections between individual dispositions and outside sources of support that increase competence and self-efficacy, decrease negative chain effects, and open up opportunities, whether in natural settings or in structured intervention programs.

Longitudinal research needs to focus more on the role of gene–environment interactions that moderate an individual's response to stressful life events. It also needs to acquire a cross-cultural perspective that focuses on children from the developing world. We need to know more about individual dispositions and sources of support in the family and community that enable these children to operate effectively in a variety of high-risk contexts.

References

Anthony, E. J. (1987). Children at high risk for psychosis growing up. In E. J. Anthony & B. J. Cohlcr (Eds.), *The invulnerable child* (pp. 147–184). Guilford. Google Scholar.

Amstadter, A. B., Myers, J. M., & Kendler, K. S. (2014). Psychiatric resilience: Longitudinal twin study. *The British Journal of Psychiatry, 205*(4), 275–280. https://doi.org/10.1192/bjp.bp.113.130906

Belsky, J., Bakermans-Kranenburg, M. J., & Van Ijzcndoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science, 16*, 300–304. CrossRefGoogle Scholar.

Bolger, K. E., & Patterson, C. (2003). Sequelae of child maltreatment: Vulnerability and resilience. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 156–181). Cambridge University Press. CrossRefGoogle Scholar.

Borkowski, J. G., Farris, J. R., Whitman, T. L., Carothers, S. S., Weed, K., & Keogh, D. A. (Eds.). (2007). *Risk and resilience: Adolescent mothers and their children grow up*. Lawrence Erlbaum. Google Scholar.

Bourassa, K. J., Rasmussen, L. J. H., Danese, A., Eugen-Olsen, J., Harrington, H., Houts, R., Poulton, R., Ramrakha, S., Sugden, K., Williams, B., Moffitt, T. E., & Caspi, A. (2021). Linking stressful life events and chronic inflammation using suPAR (soluble urokinase plasminogen activator receptor). *Brain, Behavior, and Immunity*. https://doi.org/10.1016/j.bbi.2021.06.018

Boyden, J. (2009). Risk and capability in the context of adversity: Children's contributions to household livelihoods in Ethiopia. *Children, Youth, and Environments, 19*, 2. Google Scholar.

Brennan, P., Le Broque, R., & Hammen, C. (2002, September). *Resilience in children of depressed mothers: A focus on psychological, behavioral and social outcomes at age 15 years*. Paper presented at the meeting of the Society for Life History Research in Psychopathology, New York. Google Scholar.

Betancourt, T. S., Keegan, K., Farrar, J., & Brennan, R. T. (2020). The intergenerational impact of war on mental health and psychosocial wellbeing: Lessons from the longitudinal study of war-affected youth in Sierra Leone. *Conflict and Health, 14*(1), 62. https://doi.org/10.1186/s13031-020-00308-7

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., et al. (2002). Role of genotype in the cycle of violence in maltreated children. *Science, 297*, 851–853. PubMedCrossRefGoogle Scholar.

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., et al. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science, 30*, 386–389. CrossRefGoogle Scholar.

Cederblad, M. (1996). The children of the Lundby study as adults: A salutogenic perspective. *European Child & Adolescent Psychiatry, 5*, 38–43. CrossRefGoogle Scholar.

Curtis, W. J., & Cicchetti, D. (2003). Moving research on resilience into the 21st century: Theoretical and methodological considerations in examining the biological contributors to resilience. *Development and Psychopathology, 15*, 773–810. PubMedCrossRefGoogle Scholar.

Edwards, B., Hawkins, M., Letcher, P., Little, K., Macdonald, J., Oberklaid, F., O'Connor, M., Olsson, C., Prior, M., Sanson, A., Smart, D., Toumbourou, J., & Vassallo, S. (2013). *The Australian temperament project: The first 30 years*. https://doi.org/10.1037/e567282013-001

Egeland, B., Carlson, L., & Sroufe, L. A. (1993). Resilience as process. *Development and Psychopathology, 5*, 517–528. CrossRefGoogle Scholar.

Ellis, B. J., Essex, M. J., & Boyce, W. T. (2005). Biological sensitivity to context II: Empirical explorations of an evolutionary-developmental theory. *Development and Psychopathology, 17*, 303–328. PubMedCrossRefGoogle Scholar.

Elliott, J., & Shepherd, P. (2006). Cohort profile: 1970 British birth cohort (BCS70). *International Journal of Epidemiology, 35*(4), 836–843. https://doi.org/10.1093/ije/dyl174

Farber, E. A., & Egeland, B. (1987). Invulnerability among abused and neglected children. In E. J. Anthony & B. J. Cohler (Eds.), *The invulnerable child* (pp. 253–288). Guilford. Google Scholar.

Fergusson, D. M., & Horwood, J. L. (2003). Resilience to childhood adversity: Results of a 21-year study. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 130–155). Cambridge University Press. CrossRefGoogle Scholar.

Fergusson, D. M., & Lynskey, M. T. (1996). Adolescent resiliency to family adversity. *Journal of Child Psychology and Psychiatry, 37*, 281–292. PubMedCrossRefGoogle Scholar.

Gass, K., Jenkins, J., & Dunn, J. (2007). Are sibling relationships protective? A longitudinal study. *Journal of Child Psychology and Psychiatry, 48*, 167–175. PubMedCrossRefGoogle Scholar.

Gore, S., & Eckenrode, J. (1994). Context and process in research on risk and resilience. In R. J. Haggerty, L. R. Sherrod, N. Garmezy, & M. Rutter (Eds.), *Stress, risk, and resilience in children and adolescents* (pp. 19–63). Cambridge University Press. Google Scholar.

Hansson, K., Cederblad, M., Lichtenstein, P., Reiss, D., Pedersen, N., Belderhiser, J., et al. (2008). Individual resiliency factors from a genetic perspective: Results from a twin study. *Family Process, 47*, 537–551. PubMedCrossRefGoogle Scholar.

Hardgrove, A., Boyden, J., & Dornan, P. (2010). *Summary of findings on children's experiences of poverty from young lives: A focus on risk, resilience, and protection* (Working paper). Google Scholar.

Herrenkohl, F. C., Herrenkohl, R. C., & Egolf, B. (1994). Resilient early school age children from maltreating homes: Outcomes in late adolescence. *The American Journal of Orthopsychiatry, 64*, 301–309. PubMedCrossRefGoogle Scholar.

Hetherington, E. M. (1989). Coping with family transitions: Winners, losers, and survivors. *Child Development, 60*, 1–14. PubMedCrossRefGoogle Scholar.

Hetherington, E. M., & Elmore, A. M. (2003). Risk and resilience in children coping with their parents' divorce and remarriage. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 182–212). Cambridge University Press. CrossRefGoogle Scholar.

Hetherington, E. M., & Kelley, J. (2002). *For better or for worse: Divorce reconsidered*. Norton. Google Scholar.

Howard, S. K., Carothers, S. S., Smith, L. E., & Akri, C. E. (2007). Overcoming the odds: Protective factors in the lives of children. In J. G. Borkowski, J. R. Farris, T. L. Whitman, S. S. Carothers, K. Weed, & D. A. Keogh (Eds.), *Risk and resilience: Adolescent mothers and their children grow up* (pp. 205–231). Lawrence Erlbaum. Google Scholar.

Joshi, H., & Fitzsimons, E. (2016). The millennium cohort study: The making of a multi-purpose resource for social science and policy. *Longitudinal and Life Course Studies, 7*(4), Article 4. https://doi.org/10.14301/llcs.v7i4.410

Kaufman, J. (2008). Genetic and environmental modifiers of risk and resiliency in maltreated children. In J. J. Hudziak (Ed.), *Developmental psychopathology and wellness: Genetic and environmental influences* (pp. 141–159). American Psychiatric Publishing. Google Scholar.

Kendler, K. S., Kuhn, J. W., Vittum, J., Prescott, C., & Riley, B. (2005). The interactions of stressful life events and serotonin transporter polymorphism in the prediction of episodes of major depression: A replication. *Archives of General Psychiatry, 62*, 529–535. PubMedCrossRefGoogle Scholar.

Kim-Cohen, J., Caspi, A., Taylor, A., Williams, B., Newcombe, R., Craig, I. W., et al. (2006). MAOA, maltreatment, and gene-environment interaction predicting children's mental health: New evidence and a meta-analysis. *Molecular Psychiatry, 11*, 903–913. PubMedCrossRefGoogle Scholar.

Kuh, D., Wong, A., Shah, I., Moore, A., Popham, M., Curran, P., Davis, D., Sharma, N., Richards, M., Stafford, M., Hardy, R., & Cooper, R. (2016). The MRC national survey of health and development reaches age 70: Maintaining participation at older ages in a birth cohort study. *European Journal of Epidemiology, 31*(11), 1135–1147. https://doi.org/10.1007/s10654-016-0217-8

Laucht, M., Esser, G., & Schmidt, M. H. (1999). Was wird aus Risikokindern? Ergebnisse der Mannheimer Längsschnittstudie im Überblick. In G. Opp, M. Fingerle, & A. Freytag (Eds.), *Was Kinder stärkt* [What makes children strong?] (pp. 71–93). Ernst Reinhardt. Google Scholar.

Lösel, F., & Bliesener, T. (1990). Resilience in adolescence: A study on the generalizability of protective factors. In K. Hürrelmann & F. Lösel (Eds.), *Health hazards in adolescence* (pp. 299–320). De Gruyter. Google Scholar.

Masten, A. S., & Powell, J. L. (2003). A resilience framework for research, policy, and practice. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 1–28). Cambridge University Press. CrossRefGoogle Scholar.

Masten, A. S., & Wright, M. O. (2009). Resilience over the lifespan: Developmental perspectives on resistance, recovery, and transformation. In J. W. Reich (Ed.), *Handbook of adult resilience* (pp. 213–237). Guilford. Google Scholar.

Masten, A. S., Burt, K. B., Roisman, G. I., Obradovic, J., Long, J. D., & Tellegen, A. (2004). Resources and resilience in the transition to adulthood: Continuity and change. *Development and Psychopathology, 16*, 1071–1094. PubMedCrossRefGoogle Scholar.

McGee, R. (2003, June). *Participation in clubs and groups from childhood to early adulthood: Effects on perceived competence and attachment*. Poster

session presented at the 11th scientific meeting of the International Society for Child and Adolescent Psychopathology, Sydney, Australia. Google Scholar.

Mednick, S. A., Parnas, J., & Schulsinger, F. (1987). The Copenhagen high risk project. *Schizophrenia Bulletin, 16*(3), 485–495. CrossRefGoogle Scholar.

Munafo, M. R., Durrant, C., Lewis, G., & Flint, J. (2009). Gene X environmental interactions at the serotonin transporter locus. *Biological Psychiatry, 65*, 211–219. PubMedCrossRefGoogle Scholar.

Mundy, L. K., Simmons, J. G., Allen, N. B., Viner, R. M., Bayer, J. K., Olds, T., Williams, J., Olsson, C., Romaniuk, H., Mensah, F., Sawyer, S. M., Degenhardt, L., Alati, R., Wake, M., Jacka, F., & Patton, G. C. (2013). Study protocol: The childhood to adolescence transition study (CATS). *BMC Pediatrics, 13*(1), 160. https://doi.org/10.1186/1471-2431-13-160

Najman, J., Bor, W., O'Callaghan, M., Williams, G., Aird, R., & Shuttlewood, G. (2005). Cohort profile: The Mater-University of Queensland Study of Pregnancy (MUSP). *International Journal of Epidemiology, 34*(5), 992–997. https://doi.org/10.1093/ije/dyi119

Orri, M., Boivin, M., Chen, C., Ahun, M. N., Geoffroy, M.-C., Ouellet-Morin, I., Tremblay, R. E., & Côté, S. M. (2021). Cohort profile: Quebec Longitudinal Study of Child Development (QLSCD). *Social Psychiatry and Psychiatric Epidemiology, 56*(5), 883–894. https://doi.org/10.1007/s00127-020-01972-z

Ou, S.-R., Mondi, C. F., Yoo, S., Park, K., Warren, B., & Reynolds, A. J. (2020). Thirty years later: Locating and interviewing participants of the Chicago longitudinal study. *Early Childhood Research Quarterly, 51*, 1–13. https://doi.org/10.1016/j.ecresq.2019.08.002

Parnas, J., Cannon, T. D., Jacobsen, B., Schulsinger, H., Schulsinger, F., & Mednick, S. A. (1993). Lifetime DSM-III-R diagnostic outcomes in the offspring of schizophrenic mothers: Results from the Copenhagen high risk study. *Archives of General Psychiatry, 56*, 707–714. CrossRefGoogle Scholar.

Power, C., & Elliott, J. (2006). Cohort profile: 1958 British birth cohort (National Child Development Study). *International Journal of Epidemiology, 35*(1), 34–41. https://doi.org/10.1093/ije/dyi183

Radke-Yarrow, M., & Brown, E. (1993). Resilience and vulnerability in children of multiple-risk families. *Development and Psychopathology, 5*, 581–592. CrossRefGoogle Scholar.

Reiss, D. (2010). Genetic thinking in the study of social relationships: Five points of entry. *Perspectives on Psychological Science, 5*, 502–515. CrossRefGoogle Scholar.

Reynolds, A. J., & Ou, S. R. (2003). Promoting resilience through early childhood intervention. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 436–462). Cambridge University Press. CrossRefGoogle Scholar.

Reynolds, A. J. (2000). *Success in early intervention: The Chicago child parent centers*. U of Nebraska Press.

Risch, N., Herrell, R., Lehner, T., Liang, K. Y., Eaves, L., Holt, J., et al. (2009). Interaction between the serotonin transporter gene (5-HTTLPR), stressful life events and risk of depression: A meta-analysis. *Journal of the American Medical Association, 301*, 2462–2471. PubMedCrossRefGoogle Scholar.

Rumbaut, R. G. (2000). Profiles in resilience: Educational achievement and ambition. In R. D. Taylor & M. C. Wong (Eds.), *Resilience across contexts: Family, work, culture and community* (pp. 257–293). Lawrence Erlbaum. Google Scholar.

Rutter, M. (2000). Resilience reconsidered: Conceptual considerations, empirical findings, and policy implications. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early intervention* (2nd ed., pp. 651–681). Cambridge University Press. CrossRefGoogle Scholar.

Rutter, M. (2002). Nature, nurture, and development: From evangelism through science toward policy and practice. *Child Development, 23*, 1–21. CrossRefGoogle Scholar.

Sameroff, A., Gutman, L. M., & Peck, S. C. (2003). Adaptation among youth facing multiple risks: Prospective research findings. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 364–391). Cambridge University Press. CrossRefGoogle Scholar.

Scarr, S. (1992). Developmental theories for the 1990's: Development and individual differences. *Child Development, 63*, 1–19. PubMedCrossRefGoogle Scholar.

Schoon, I. (2001). Risk and resources: A developmental-contextual approach to the study of adaptation in the face of adversity. In R. K. Silbereisen & M. Reitzle (Eds.), *Psychologie 2000*. Pabst Science Publishers. Google Scholar.

Schoon, I. (2006). *Risk and resilience: Adaptations in changing times*. Cambridge University Press. CrossRefGoogle Scholar.

Seifer, R. (2003). Young children with mentally ill parents: Resilient developmental systems. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 29–49). Cambridge University Press. CrossRefGoogle Scholar.

Seifer, R., Sameroff, A. J., Baldwin, C. P., & Baldwin, A. (1992). Child and family factors that ameliorate risk between 4 and 13 years of age. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 893–903. PubMedCrossRefGoogle Scholar.

Shiner, R. L., & Masten, A. S. (2012). Childhood personality as a harbinger of competence and resilience in adulthood. *Development and Psychopathology, 24*(2), 507–528. https://doi.org/10.1017/S0954579412000120

Sousa, C., Herrenkohl, T. I., Moylan, C. A., Tajima, E. A., Klika, J. B., Herrenkohl, R. C., & Russo, M. J. (2011). Longitudinal study on the effects of child abuse and children's exposure to domestic violence, parent-child attachments, and antisocial behavior in adolescence. *Journal of Interpersonal Violence, 26*(1), 111–136. https://doi.org/10.1177/0886260510362883

Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, B. E. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. Guilford. Google Scholar.

Stein, M. B., Campbell-Sills, L., & Gelenter, F. (2009). Genetic variation in 5-HTTLPR is associated with emotional resilience. *American Journal of Medical Genetics, 150B*, 900–906. PubMedCrossRefGoogle Scholar.

Suarez-Orozco, C., & Suarez-Orozco, M. (2001). *Children of immigrants*. Harvard University Press. Google Scholar.

Vuillermin, P., Saffery, R., Allen, K. J., Carlin, J. B., Tang, M. L., Ranganathan, S., Burgner, D., Dwyer, T., Collier, F., Jachno, K., Sly, P., Symeonides, C., McCloskey, K., Molloy, J., Forrester, M., & Ponsonby, A.-L. (2015). Cohort profile: The Barwon infant study. *International Journal of Epidemiology, 44*(4), 1148–1160. https://doi.org/10.1093/ije/dyv026

Wadsworth, M. (1999). Ergebnisse der Resilienzforschung in Grossbritannien. In G. Opp, M. Fingerle, & A. Freytag (Eds.), *Was Kinder starkt* [What makes children strong?] (pp. 59–70). Ernst Reinhardt. Google Scholar.

Wake, M., Clifford, S., York, E., Mensah, F., Gold, L. C., Burgner, D., & Davies, S. (2014). Introducing growing up in Australia's child health checkpoint: A physical and biomarkers module for the longitudinal study of Australian children. *Family Matters, 95*, 15–23.

Wallerstein, J. S., & Blakeslee, S. (1989). *Second chances: Men, women, and children a decade after divorce*. Ticknor and Fields. Google Scholar.

Wallerstein, J. S., & Kelley, J. B. (1980). *Surviving the break-up: How children and parents cope with divorce*. Basic Books. Google Scholar.

Werner, E. E., & Smith, R. S. (1989). *Vulnerable but invincible: A longitudinal study of resilient children and youth*. Adams, Bannister, Cox. (Original work published by McGraw Hill, 1982). Google Scholar.

Werner, E. E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Cornell University Press. Google Scholar.

Werner, E. E., & Smith, R. S. (2001). *Journeys from childhood to midlife: Risk, resilience, and recovery*. Cornell University Press. Google Scholar.

Wyman, P. A. (2003). Emerging perspectives on context specificity of children's adaptation and resilience: Evidence from a decade of research with urban children in adversity. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 293–317). Cambridge University Press. CrossRefGoogle Scholar.

Yates, T. M., Egeland, B., & Sroufe, L. A. (2003). Rethinking resilience: A developmental process perspective. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 243–266). Cambridge University Press. CrossRefGoogle Scholar.