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Edited by Lea Pulkkinen, Jaakko Kaprio and Richard J. Rose

Excerpt

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## Introduction

Richard J. Rose

### TWO COMPLEMENTARY FINNISH RESEARCH STUDIES

This book celebrates two sets of ongoing longitudinal research studies conducted in Finland. In the 16 chapters that follow, the principal investigators of the Finnish longitudinal studies introduce their research designs, and 25 of their collaborators selectively review recent research results from these studies. Reports from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), now in its 38th year and with accumulated observations on its participants from mid-childhood to mid-adulthood, make up much of the book. The JYLS reports are presented in the context of emerging theory and prospective data relating childhood assessments of socioemotional behavior to educational, occupational, and social success, and to physical and psychological health at later follow-up. The rich multi-occasion, multilevel longitudinal data of the JYLS are related to social, educational, and occupational outcomes, and to self-esteem, health, and well-being. Research publications from the Jyväskylä Longitudinal Study have importantly contributed to our conceptual understanding of the role of emotional and behavioral regulation and self-control in life-span development, and the reports contained in this volume update empirical results from the study and extend its conceptual contributions.

Reports from two longitudinal studies of families of young Finnish twins, now in their 15th year of data collection, make up the balance of

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this volume. Each of the two *FinnTwin* studies sequentially enrolled twins over 60-month periods of baseline data collection to achieve age-matching across five consecutive twin birth cohorts; each was designed to address environmental as well as genetic influences on children's development. The younger *FinnTwin* study yoked classmate controls to selected twin pairs to distinguish school and neighborhood effects from those arising within families, and that study directly adapted school-based assessments first used in the JYLS for application to families of twin children. Accordingly, reports from the *FinnTwin* studies complement JYLS findings with genetically informed analyses of individual, familial, and extra-familial predictors of developmental outcomes from early adolescence into early adulthood. Applications of the *FinnTwin* studies to substance use, pubertal development, eating disorders, and gender differences in socioemotional behavior are reviewed in chapters that follow.

The JYLS and the *FinnTwin* studies illustrate the central features of a true longitudinal research design. Baseline assessments were completed on selected samples of children when all children in each studied sample were of the same age; the same subjects were then repeatedly assessed again and again across developmental periods from childhood onward. In their research design, both the JYLS and *FinnTwin* research share features of many similar studies completed, or ongoing, throughout the world. But JYLS and *FinnTwin* are uniquely conducted in Finland, each having selected its research subjects from members of Finnish families residing in that small country. So it is appropriate that this introduction offer a capsule portrait of Finland as a research setting for the kinds of longitudinal research here described. And it is appropriate, as well, to consider the unique strengths and challenges of longitudinal research designs, of twin study comparisons, and of longitudinal research that samples families of twins, in efforts to understand the causes and developmental consequences of individual differences in children's patterns of socioemotional behavior.

Accordingly, this introductory chapter addresses three sets of questions: *Why longitudinal research? Why twin-family research? Why Finland?*

Traditional research in developmental and health psychology relied on a cross-sectional research design, selecting a single subject

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from each of a sample of unrelated families and making observations on each subject on a single occasion. In typical cross-sectional research, the studied sample of subjects varied in age, family history and family circumstance, and many other unmeasured (and perhaps unknown) between-family differences. For decades, such cross-sectional research designs and the correlational analysis of their data formed the evidential basis of developmental, personality, and health psychology. The designs featured in this volume – longitudinal study of the same individuals across decades of their lives, and the ambitious complication introduced by sampling twins rather than singleton subjects for longitudinal study – place many more demands on researchers' time and resources. Are they worth it? In what unique ways does longitudinal research address questions of socioemotional development and health? How does sampling twins and their families enrich that understanding? And what advantages does the country of Finland offer to those who pursue longitudinal and twin-family research?

## WHY LONGITUDINAL RESEARCH?

**Information Unique to Longitudinal Study**

What unique information does a longitudinal study design add to traditional cross-sectional research? Two answers are immediate and instructive: Longitudinal study of a representative group of persons uniquely provides information on consistency and change in their social behavior, on the stability of their behavioral individuality across time and circumstance. It is the only research design that can inform us as to whether individual differences in children's social behavior – readily evident to the children's parents, teachers, and classmate peers – remain consistent across the children's life spans. How much of the individuality that we observe in children's early lives is preserved into their adolescence and adulthood? It is the stability of individual differences from age to age, the preservation of rank-ordered differences in salient dimensions of socioemotional behavior, that longitudinal research uniquely addresses.

In seeking to map the consistency of individual behavior patterns across time, longitudinal research parallels the psychology of

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everyday life, the psychology each of us engages in as we monitor the behavior of our friends and neighbors, pleased when we anticipate their actions (“I knew you were going to say that!”) and surprised when their behavior upsets our anticipations (“What’s gotten into you today?”). For such reasons, tracking the trajectories of individual lives through longitudinal study has been called “the backbone for behavioral study” (Cairns & Cairns, 1994). And we learn something more, something crucial for prevention and intervention: Longitudinal study of behavioral differences observed in early childhood uniquely tests the predictive value of those behavioral differences for developmental outcomes in adolescence and adulthood – outcomes as diverse as education and employment, marriage and parenting, health habits and disease outcomes.

Are there important developmental consequences for children who exhibit frequent “explosive” behaviors during childhood? Do the frequent and intense temper tantrums of a child navigating his “terrible two’s” predict social consequences significantly different from those of nonirritable age-mates when the two sets of children are compared decades later in life? In the question plainly asked by one longitudinal research team (Caspi, Elder, & Bem, 1987): “Do ill-tempered boys become ill-tempered men?” Nothing short of longitudinal research, conducted across many years, can address such questions, documenting whether profiles of childhood behaviors predict social outcomes decades later in the developmental unfolding of individual lives.

Longitudinal research assesses persons as well as discrete behaviors across situations and over time. In an important sense, every longitudinal study is a set of separate individual studies, the set of unfolding life stories of every individual participant under study. Longitudinal study of individual lives has confirmed the everyday observation that some persons are more stable over time and situation than are others; some children and adults are quite consistently predictable from their personality dispositions, but others less so. Some children are resilient to highly stressful environmental circumstance; others are highly vulnerable to it. And within each of us, some behavioral domains are more pliable and sensitive to environmental modification than others. Some behaviors exhibit greater age-to-age stability at certain developmental stages of life than at others, and greater

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consistency and more pronounced preservation of ordered individual differences may be found for certain behaviors in one sex than the other at a given developmental stage.

In this brief introduction, we consider only the more general question: Does behavioral observation of children identify robust early precursors of adult outcomes? Do early personality dispositions significantly affect trajectories of the adult life course? Results from a number of celebrated longitudinal research studies that have spanned the lives of their research participants address such questions. To illustrate, and to create a context for exploring mechanisms for age-to-age continuity of behavior, a summary of just one set of analyses of one childhood behavior pattern in longitudinal data from one study will suffice.

### **An Illustration: The Berkeley Growth Study**

The Berkeley Study began in 1928–29, when, for an 18-month period, every third newborn in the city of Berkeley, California, was enrolled in an observational study. The sample included 214 children, mostly from White, Protestant, native-born, middle-class families, and about 90% of these boys and girls were followed up into mid-adulthood. Results allow us to relate individual behavioral differences in childhood, revealed in structured assessments based on interviews with the children's mothers, with adult outcomes, assessed from two sets of interviews with the subjects themselves at ages 30 and 40.

As all parents of more than one child know, a salient dimension of behavioral variation in childhood is the frequency and intensity of temper tantrums. At annual intervals when the Berkeley study participants were ages 8, 9, and 10, their mothers were interviewed, and from the interviews a simple 5-point scaling was made of the severity of temper tantrums and their frequency (which across the studied children, ranged from one a month to several per day). From that scaling, 38% of all boys in the sample were classified as having had a history of childhood temper tantrums.

How did they turn out as adults? The question goes beyond asking whether ill-tempered boys grow up to become ill-tempered men; it is a question of whether and how they differ in transitioning into adult roles, in the education levels they achieved, in the employment

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positions they held, in their patterns of job security and social stability, and in their histories of marriage and parenthood. Analyses of the Berkeley data (Caspi et al., 1987) confirm the significant association of an ill-tempered childhood with adult outcomes. Two decades later, ill-tempered boys were judged (from their interviews) to be more irritable and less controlled than their even-tempered peers in the sample. Their life histories revealed a progressive deterioration of their socioeconomic status, and their childhood tantrums were as predictive of their adult occupational status as was their fathers' social class. The downward drift in social status of men with a childhood history of tantrums was dramatic: More than half experienced downward mobility, nearly twice the proportion found among their even-tempered middle-class peers. Their job histories were erratic, and the association of childhood tantrums with job status remained significant after adjustment for the men's class origin, education, and adolescent IQ. Finally, more than half of these men had experienced divorce, twice the rate of their even-tempered peers.

And what of ill-tempered girls? From their childhood data, 29% of the girls in the Berkeley sample were identified with a history of childhood tantrums. And, as for men, that childhood history was associated with socially important adult outcomes. Traced through the occupational status of their husbands, a significant effect of childhood tantrums on the women's status was evident: "they fared less well than their even-tempered peers in the marriage market" (Caspi et al., 1987), and that association remained significant after controlling for their class origin, education, and adolescent IQ. And again like ill-tempered men, these women were more than twice as likely to have experienced divorce by mid-life. Perhaps most significantly, given role expectations for this cohort born in the 1920s, ill-tempered women became ill-tempered mothers. Both their husbands and their children perceived their parenting to be less adequate, less controlled, less even-tempered.

### **Mechanisms of Continuity**

The evidence is that men and women with a history of temper tantrums in late childhood show significant continuities in their

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explosive behavior patterns. Compared to their even-tempered peers, they experience significant problems in their adult life roles. But *why* should this be so? How can we understand continuity across time and situation in the expression of what is, quite clearly, maladaptive behavior? If behavior is maintained by its social consequences, as psychologists have long thought true, how explain the continued expression of ill-tempered action patterns across the life span? The question has prompted (if not required) developmental scientists to adopt a perspective of people as active agents who select their own environments, matching their dispositional behaviors to social situations that will foster their expression.

The metaphor that development is a passive process, a mechanical mirroring of one's experience, is rejected, replaced by the concept of a continuous, lifelong process of person-environment interaction. People select environments that offer opportunities for expression of their behavioral dispositions; the selected environments then reinforce, sustain, and enhance those initial dispositions. Over time, an ancient proverb is realized: "As a man grows older, he becomes more like himself." Early personality dispositions, evident in the temperamental dimensions of childhood behavior, get strengthened across development, because each of us selects experiences that provide opportunity for our dispositions to find expression and, in the environments we so select, behaviors we express receive reinforcement. This idea, with nuances in details of its description, emerged during the 1980s from different investigators.

Longitudinal researchers (Caspi, Elder, & Bem, 1987, 1988) suggested the idea of *cumulative continuity* to describe the process in which behaviors "channel" selection of environments in which those behaviors can be "sustained" by the "progressive accumulation of their own consequences." Among personality/social psychologists, research on the construct of *self-monitoring* (Snyder, 1983) led to a focus on "the influence of individuals on situations" and the processes by which "individuals plan and enact their behavioral choices in social contexts." And at the same time, behavior geneticists had distinguished different types of gene-environment interactions and correlations, suggesting that "genes direct the course of human experience," and advancing arguments that most behavioral differences between people arise from "genetically determined differences in

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the experiences to which they are attracted” and from the different experiences their genetic differences “evoke from their environments” (Scarr & McCartney, 1983).

However described, this notion that our genetic differences shape differences in our experience is important to this Introduction because it ties the longitudinal research data of the JYLS, which abundantly document continuities of behavior from childhood to mid-adulthood, with analyses from the *FinnTwin* studies that document gene by environment interactions and correlations. In Chapter 2, we will revisit this notion that people create the environments in which they live their lives.

### Externalizing Childhood Behavior and Its Consequences

Childhood temper tantrums are one aspect of aggression, a core feature of a pattern now conceptualized as externalizing behavior (Chapters 1 and 8). Age-to-age continuity of externalizing behavior has been demonstrated in many longitudinal studies in many different cultures, satisfying the acid test for longitudinal analyses. And that test is met, as well, in the predictive association between externalizing behavior patterns in early childhood and earlier onset of alcohol use in adolescence and its more rapid acceleration to alcohol abuse by early adulthood. Robust cross-cultural confirmations (in Sweden, Canada, New Zealand, Denmark, and the United States) document that a childhood history of externalizing behavior, identified in ratings by classroom teachers and classmate peers, distinguish those more likely to abuse alcohol by late adolescence; these longitudinal findings are fundamental evidence for a developmental genetic perspective of alcohol abuse (Rose, 1998). And that association was confirmed in Finnish culture, as well, in the longitudinal data from the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) (Pulkkinen & Pitkänen, 1994).

### A Long-Term Longitudinal Study of Development, the JYLS

Those who have engaged themselves in longitudinal research have noted that, by its very nature, it leads to an inextricable overlapping of



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the lives of the researchers with those of their subjects. Longitudinal research creates the powerful paradox in which the project investigators and their participants “travel together through space and time,” a long-term endeavor that “demands as large a slice of the lives of the investigators as of the participants” (Cairns & Cairns, 1994). And so it is with Lea Pulkkinen and the JYLS study, jointly tracking the development of those first studied when they were 8-year-old students in a dozen second-grade classes in Central Finland. Of this remarkable study, I recently noted:

It’s quite a story. A behavioral scientist in a small, somewhat isolated nation completes a dissertation for her doctorate in psychology, obtaining behavioral ratings from teachers and peers on a cohort of 8-year-old school children in classrooms in and around the university town in which she trained. The life development of the participant subjects in the dissertation consumes her professional life, and, working mostly alone and with limited research support, she regularly restudies them as they, and she with them, move through life. (Rose, 2004)

The JYLS, like many other longitudinal studies, began as a cross-sectional investigation, planned as no more than a dissertation project, a one-time study. Only after initial baseline assessments were completed were plans made for a follow-up. And one follow-up led to another. Results of those follow-up assessments, from age 8 into mid-adulthood, are reported in chapters to follow in Parts III and IV. A key feature of the JYLS, underlying its importance today, was the inclusion of multi-informant measures, including those of classmate peers, at the age 8 baseline and again at first follow-up at age 14. These rich childhood assessments led to the conceptual theory that the JYLS data fostered, or perhaps, required (Chapter 1); now, nearly four decades later, the peer assessment instrument derived from the JYLS offers evidence that assessments by classmates carry information that is more predictive of some later outcomes than are the assessments from either children’s teachers or their parents (Pagan et al., 2005). From its beginning, the JYLS has focused on the role of emotion regulation in behavior development, and that focus has ensured the relevance of the study’s conceptual framework across nearly four decades of change in the zeitgeist of developmental psychology.

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## WHY TWIN RESEARCH?

**The Rationale for Twin Studies**

Consider now the second question posed for this essay: What unique information do samples of families of twins add to samples of singletons from unrelated families? Simply stated: *Why twin studies?* The central rationale for conducting research with samples of twins is to identify the genetic and environmental sources of interindividual differences in behavior, to estimate their magnitudes, and to assess correlations and interactions of genetic and environmental influences on behavioral variation. Twin studies thus address fundamental questions of developmental psychology: How and why do people differ in developmental outcomes? Why do children growing up together in the same household show both similarities and differences in their behavior development and adult outcome? How much do children resemble their parents? And why do children differ from the parents who raised them?

To address these kinds of questions, we must sample families rather than individuals, and, depending on the question of interest, we may study data from several different informative comparisons. We can compare persons who differ in their genetic relatedness but who grow up together sharing their experiences into late adolescence – for example, comparing pairs of identical twins who share all their genes identical-by-descent with fraternal twin pairs (and perhaps non-twin siblings) who share, on average, one-half of the segregating genes transmitted by their parents. Or we might focus on the effects of neighborhood and school experience in creating similarities among children, matching pairs of unrelated classmates to pairs of identical and fraternal twins in their classes to create double dyads in which the different dyads share none, half, or all their genes; some dyads, but not others, also share a family household; and each member of every double dyad has grown up in the same neighborhood, attends the same school, and studies in the same classroom. Or we might identify sets of married identical twins to assess the similarities of each to their spouse, and that of each twin to the spouse of the other twin, asking whether (and to what magnitude for which behaviors) genetic factors influence spouse selection. Or we might study