



Kristin S. Mathiesen
Ann V. Sanson
Evalill B. Karevold
(Editors)

Tracking Opportunities and Problems From Infancy to Adulthood

20 Years With the TOPP Study

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About the Editors

Kristin S. Mathiesen, PhD, who is now retired, initiated the TOPP study in 1993. She was Principal Investigator until 2007, when she took the position as Director of the Department of Child and Adolescents in the Division of Mental Health at the Norwegian Institute of Public Health in Oslo. Dr. Mathiesen is particularly concerned with how to effectively use results from epidemiological studies focusing on children's mental health to inform preventive work and early interventions. Her work has focused on psychosocial problems in families with children at the municipal level in health centres and school services, at the county level in county health offices, at the state level in the Ministry of Social Affairs, and in research institutes.

Ann V. Sanson, PhD, is Honorary Professorial Fellow at the University of Melbourne, Australia, and has had a close collaborative relationship with the TOPP study since the 1990s. Her research expertise is in longitudinal research, focusing on the social and emotional development of children, adolescents, and young adults. She is Principal Investigator on the 34-year *Australian Temperament Project (ATP)*, which has followed a large community sample from infancy through adulthood and is now following the third generation. She is the Principal Scientific Advisor for the national Longitudinal Study of Australian Children (*Growing Up in Australia*), and also advises the Australian Longitudinal Study of Indigenous Children (*Footprints in Time*) as well as national child longitudinal studies in Ireland and New Zealand. She has over 200 publications and is a fellow of the Australian Psychological Society and the International Society for the Study of Behavioural Development.

Evalill Bølstad Karevold, PhD, is currently Associate Professor at the University of Oslo, Norway, where she researches and teaches developmental psychology. Her main field of research is temperament and emotional development in children and adolescents, and how the family and social context influence such development. She has extensive experience in longitudinal research, including as Principal Investigator of the TOPP Study for several years. Karevold is currently conducting several studies focusing on the effect of the parenting program *Tuning in to Kids* to enhance child emotional competence. In addition to having worked for 10 years within research and prevention of mental health problems in children and youths at the Norwegian Institute of Public Health, she has also worked as a clinical psychologist with toddlers and children. She is currently a member of the Board of the Department of Psychology, University of Oslo, and the Board of the Regional Centre for Child and Adolescent Mental Health in Oslo.

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Preface

The Tracking Opportunities and Problems study (TOPP; Norwegian title: “Trivsel og OPPvekst i barn- og ungdomstid”) started in 1993. Many scientific papers have emerged over the years drawing on data from the study. However, these are not easily accessible to all readers and do not provide an overall picture of the knowledge gained. This book aims to provide insights on many questions around child and adolescent development and family life in a more digestible format and with a minimum of technical language.

Some chapters address issues such as anxiety, depression, externalising behaviour problems, eating problems, and alcohol use. Others focus on social skills, resilience, parental mental health, sick-leave, and parent couple relationships. Many chapters identify risk and protective factors associated with their particular focal issues and discuss effective preventive approaches. In addition to summarising TOPP findings, we review existing knowledge in these areas and provide extensive reference lists for those who want to dig deeper.

We hope the book will be useful as teaching and resource material for researchers and professionals working on child and adolescent mental health, as well as for parents and others with concern for child development and well-being.

Many people have contributed to the success of the TOPP study over the years. First and foremost, we want to thank all the families in the Norwegian sample, who have trusted us and shared their experiences and thoughts by completing comprehensive questionnaires in eight waves over 17 years. These data are, of course, the greatest resource in the study and we are deeply grateful for the loyalty and dedication of the adolescents and their parents.

The TOPP databank is located at the Norwegian Institute of Public Health (NIPH). NIPH has embedded this study into its rich research environment. The Norwegian Research Council and the Norwegian Extra Foundation for Health and Rehabilitation have given considerable financial support to the study, which is greatly appreciated.

A number of collaborating researchers from Oslo in Norway, Melbourne in Australia, Seattle in the US, Ottawa in Canada, and Ghent in Belgium have provided extensive opportunities for members in the TOPP group to learn, share knowledge, and engage in collaborative research. A special thank you goes to the researchers working on the Australian Temperament Project, who have acted as mentors for many years, and to several Australian institutions that have generously hosted many of the researchers from the TOPP study for extended periods. More details on this collaboration and support are given in Chapter 20.

Finally and specifically, we want to thank Professors Rob Coplan (Department of Psychology, Carleton University, Ottawa, Canada), Margot Prior (Department of Psychology, University of Melbourne, Australia), Ian Colman (Department of Epidemiology and Community Medicine, University of Ottawa, Canada) and Filip De Fruyt (Department of Developmental, Personal, and Social Psychology, Ghent University, Belgium) for their thorough and thoughtful reviews of drafts of this book. Last but not least, the publication of this book would not have been possible without funding from the Department of Psychology at the University of Oslo and from the Norwegian Research Council. We are most grateful for their contributions. This book project received financial support from the Research Council of Norway (project number 268410/F10).

Kristin S. Mathiesen, Ann V. Sanson, and Evalill Bølstad Karevold

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Chapter 1

Introduction to the Book

Kristin S. Mathiesen, Ann V. Sanson, and Evalill Bølstad Karevold

The Purpose of the Book

Understanding why some children develop into happy, healthy and competent adults while others struggle with emotional and behavioural problems at various periods of their lives has been an ongoing quest for centuries. Theoretical explanations have ranged from those emphasising nurture or the environment (“it’s all because of their upbringing”) to those focusing on nature or biology (“it’s all a matter of genes” or “they were born that way”). We now know that arguments about nature *versus* nurture are too simplistic and that our task is to understand how intrinsic and extrinsic factors work together and *interact* to shape the developmental paths of individual children. Nevertheless, many questions remain about exactly what factors impact on what aspects of development, at what ages, and how they operate over time.

Some of our questions are about how early temperament characteristics may affect the child’s way of interacting with the world and act as inherited building blocks for later personality. Others have to do with the impact of a child’s exposure to risk factors, within their families or broader environments and at different stages in their lives. Importantly, we need to understand why some children can be exposed to a number of risk factors but show resilience and develop well, while others appear to be more vulnerable. For instance, do children need particularly sensitive and responsive parenting in order to overcome obstacles related to their own handicaps or illnesses, or to exposure to repeated stressful life events? Besides the roles of parents and the family, what influence do peers and school environments have in shaping children’s development? More broadly, what can we do to protect our children and adolescents, and help them to develop into well-functioning adults?

Longitudinal studies, in which the same children are followed throughout their lives, are one of the best methods for gaining knowledge about all such questions. This book summarises 17 years of research on the Tracking Opportunities and Problems study (henceforth the TOPP study), which has followed a community-based sample of almost 1000 Norwegian children and their families from when the children were 18 months old in 1993 until they turned 18.5 years of age in 2011. Information from questionnaires in eight waves of data collection has created a large databank on these children and families.

The TOPP study has provided new knowledge about precursors, developmental paths and predictors of both good adaptation and mental health problems. The main goal has been to extend our understanding of:

- why some *children* from early childhood and through adolescence develop symptoms of emotional distress and norm-breaking behaviour, while others develop good mental health and good social skills;
- why some *mothers* develop symptoms of mental distress, burnout and illness, while others exhibit good coping styles and wellbeing; and
- why some *parents* experience relationship breakdowns, while others develop strong partnerships.

The data from the TOPP study have formed the basis for 17 large and some smaller research projects, including 11 PhD projects and 6 postdoctoral projects; of these, 13 were hosted by the Norwegian Institute of Public Health and 4 by the University of Oslo. These projects have examined a wide range of topics, and have made substantial theoretical and empirical contributions that have been published in international journals specific to their topic areas. Given this diversity, it can be challenging to understand the overall contributions of the TOPP study over time.

The purpose of this book is to integrate the main research findings from all these projects, organised by theme and framed in the light of current knowledge in the various research fields. Our goal is to make the findings more accessible to professionals who work with children and youth, as well as to researchers, teachers and parents. A brief overview of design and results is given in a recent publication from researchers in the study (Nielsen et al., 2017).

Population-Based and Longitudinal Studies

The TOPP study is the first Norwegian longitudinal and community-based family study of problem behaviours and social skills with information gathered from early in life. At the start of the study, it was well known that many Norwegian children and adolescents had mental health problems despite good public health care and far-reaching social security systems. Given the existing evidence on the prevalence, stability and consequences of problem behaviours in childhood, prevention and early intervention are clearly preferable to attempts at treatment once problems have arisen. However, although preventive efforts were on political agendas in Western countries in the early 1990s, knowledge about the identification and persistence of problems among children from 1–2 years of age was limited. This constrained our ability to identify which of the problem behaviours that were present already in infancy would remain problematic later in childhood and to identify factors associated with stability and with change from this early age onwards.

A further limitation of international research at this time was that only a few studies had focused simultaneously on the positive and negative influences on development, including both intrinsic and environmental factors in the child's life. Before this, the focus of research tended to be either on the physical and social environment ("nurture") or on the individual's own characteristics ("nature"), but there was emerging acceptance of an ecological and interactive model of development in which "nature" and "nurture" are seen to mutually influence each other and together influence the developing individual (Bronfenbrenner & Morris, 2006). The TOPP study adopted a broad focus from the first wave of data collection, including questions pertaining to: 1) both negative and positive aspects of children's behaviour (e.g., problem behaviours as well as social competence); 2) factors that increase the probability that problem behaviours will develop (risk factors) and those that promote good adaptation (protective and supportive factors); and 3) both internal (i.e., within the child) and external (i.e., within the environment) factors. This broad focus allowed us to explore the plasticity of human development, as well as the importance of relationships between individuals and their real-world ecological settings (O'Connor et al., 2015).

Longitudinal studies are one of the strongest types of research for obtaining high-quality evidence about the determinants of development across the lifespan, as well as casting light on developmental processes in general (Rutter, 1994; Sanson & Smart, 2011). Their advantages include their ability to track continuities and discontinuities in development, identify critical transition points, test models of causal relationships between early events or characteristics and later outcomes, identify developmental pathways and, importantly, to tease out the relative and interacting contributions of diverse factors that impact on development. Through these strengths, longitudinal studies are able to provide evidence on optimal times and foci for interventions to interrupt maladaptive pathways and promote positive development.

Overview of the TOPP Study

The Sample

In order to shed light on the development of Norwegian children in general, it was important that the TOPP study recruited a sample that was typical of the overall population in Norway at that time. In Norway, health care centres are ideal sites for recruiting child participants in research programs aimed at preventing child mental health problems. Routinely, more than 95 % of all families with children attend local health care centres eight to twelve times during the first four years of the child's life. We therefore asked the area-based health administration in 6 municipalities in the eastern part of Norway for permission to distribute and collect questionnaires through the 19 centres in these areas. This allowed us to recruit a large enough sample to address our questions of interest. The areas covered in these municipalities differed considerably, including larger and smaller towns and rural, coastal and inland areas. These municipalities were also all located reasonably close to Oslo.

Participants in the TOPP study were recruited throughout 1993 when families attended child health care centres for their child's 18-month vaccination. Altogether, there were 1081 18-month-old children in the 19 areas who were eligible to attend a health care centre for their vaccination during 1993. In the first wave of the study (t1), families with 939 children participated (i.e., 87 % of eligible children), with the children's primary caregivers (mainly mothers) completing our questionnaires. In the early 1990s, more than 95 % of the Norwegian population was born in Norway and only parents who were able to read the questions and reply in Norwegian were included in the sample.

Comparisons between participants and non-participants at t1 showed no significant differences between characteristics of the families in our sample and those of the families that did not participate (Mathiesen & Tambs, 1999). A comparison of characteristics between the families in our sample and another sample of 1000 families using child health clinics all over Norway suggests that our sample was also reasonably representative of families with preschool children from other parts of Norway (Sætre, Mathiesen, & Nærde, 1996). This implies that findings from the first year of the study most likely apply to the whole population of 1–2-year-olds in Norway at that time.

Data Collection

The information was provided through eight waves of questionnaires completed when the children were aged: 1.5 years (t1), 2.5 years (t2), 4.5 years (t3), 8.5 years (t4), 12.5 years (t5), 14.5 years (t6), 16.5 years (t7) and 18.5 years (t8). In the three first waves, the questionnaires were handed out by nurses at the health care centres and returned to the centres in sealed envelopes. The remaining five surveys were conducted by mail. In the last two waves the respondents could also choose an Internet version of the questionnaire, and in the last wave a telephone interview was also offered. At the time of writing, we are planning a new wave of data collection that will follow the participants into adulthood.

Mothers completed questionnaires in all waves. From t5 to t8, children were sent their own age-appropriate questionnaires together with separate sealable envelopes. Although limited resources precluded the collection of information specifically from fathers in the first five waves of the study, they were sent questionnaires and return envelopes in the last three waves, from t6 to t8.

Attrition

Longitudinal studies always experience some drop in response rates in each wave of data collection. The trend is usually for well-functioning families to become overrepresented, partly because it is harder for those with more difficulties to find the time or motivation to complete long questionnaires (de

Graaf, Bijl, Smit, Ravelli, & Vollebergh, 2000; Thygesen, Johansen, Keiding, Giovannucci, & Gronbaek, 2008). As shown in Table 1-1, this has also been the case for the TOPP study.

Table 1-1. Sample sizes, age of child at each wave, and year of data collection (1993–2011)

Data waves	t1	t2	t3	t4	t5	t6	t7	t8
Child age (in years)	1.5	2.5	4.5	8.5	12.5	14.5	16.5	19
Year	1993	1994	1996	2000	2004	2006	2008	2011
<i>N</i> mothers (no twins) ¹	913	777	727	506	587	474	421	524
% mothers ²	84	85	80	55	64	52	46	57
<i>N</i> children (twins included) ³	939	804	760	535	611	481	425	524
% children	87	86	81	57	65	51	45	57
<i>N</i> fathers (no twins) ⁴	–	–	–	–	–	367	310	370
% fathers						40	34	41
<i>N</i> adolescents (twins included) ⁵	–	–	–	–	566	458	375	441
% adolescents					60	49	40	47

Notes. ¹Only mothers without twins are included in this table. At t1, there were 13 mothers with twins. ²t1 response rate is based on children invited at t1 (1081 children). All the following response rates for mothers and fathers (t2–t8) are calculated on the basis of mothers without twins participating at t1 (913 mothers). ³Mothers gave information about their children in all waves. At t1, the number of children (twins included) was 939. ⁴Fathers received separate questionnaires from t6. Only fathers without twins are included in this table. ⁵The children/adolescents (twins included) received separate questionnaires from t5 onwards.

Over time, the only factor that was significantly different between mothers who stayed with the study and those who dropped out was their education – low maternal educational levels predicted dropout from t1 to t5 (Karevold, Røysamb, Ystrøm, & Mathiesen, 2009) and from t1 to t7 (Gustavson, von Soest, Karevold, & Røysamb, 2012). Attrition among mothers was not affected by mother’s age, family structure, family’s financial situation, working status, temperament, partner relationship quality, social support, chronic stressors, symptoms of anxiety and depression, or child temperament. For adolescents who did and did not drop out, attrition from t5 to t7 and t8 was only predicted by low maternal education level and male gender (Nilsen, Karevold, Røysamb, & Mathiesen, 2013; Kjeldsen, Janson, Stoolmiller, & Mathiesen, 2014) (more details of attrition are given in Part 3, Chapter 18.3).

There were similar correlations between the 15 baseline variables (at t1) in the TOPP sample between those who stayed until t7 and those who dropped out (Gustavson et al., 2012). This indicates that the TOPP data are well suited to studying the relationships between explanatory variables and outcomes that have relatively high prevalence rates. From a public health perspective, these are the conditions that carry the highest burden of disease. While studies of high-risk samples have a very important role, it is also crucial to understand developmental processes in generally low-risk community samples. At the time that the TOPP study was initiated, there were few studies of this sort.

The principal strength of longitudinal studies is that they measure development from one time point to another among the same individuals. It is therefore possible to identify developmental paths and to relate them to possible causal factors. The value of the TOPP data has therefore increased with each new wave of questionnaires. Among its strengths are:

- the study is based on an ecological and interactive model of development
- the data collected include questions on a wide range of issues, capturing both numerous individual and contextual factors
- the data assessments started when the children were 1.5 years of age and have continued over the first 18 years of their lives (to date)
- multi-informant data were collected from three family members from waves t5 onwards.

More details on the sample and its representativeness, attrition, analytical approaches and methodological considerations are given in Part 3 of this book. Part 3 also provides an outline of central scales and questions used in the TOPP studies, and lists the 17 major projects using the TOPP data, the researchers who have been working on them over the years and the overall findings from each chapter.

Mental Disorders and Mental Health Problems

An important distinction in the fields of mental health and developmental psychopathology is between mental health *disorders* and mental health *problems or symptoms*. Although closely related, it is important to bear in mind the distinction between these two sorts of outcomes when comparing results across studies.

The major focus of the TOPP study has been on mental health problems. Most mental health problems or symptoms have a continuous distribution in the population (from low to high) and are measured on continuous scales. High levels and/or high numbers of problems can impair functioning and can hence be regarded as signs of psychopathology and pose risks for later development. “Mental health problems,” “psychological distress,” and “behaviour problems” are therefore the main terms we use in this book when referring to symptoms that significantly compromise a person’s wellbeing and their ability to master daily routines, without necessarily satisfying the criteria for a formal diagnosis.

Diagnoses of mental *illnesses* or *disorders*, in contrast, are much less common and are made after clinical assessment by qualified mental health professionals on the basis of diagnostic systems requiring a specified number, severity and duration of symptoms, such as the ICD-10 (International Statistical Classification of Diseases and Related Health Problems; World Health Organization, 1993) and DSM-5 (Diagnostic and Statistical Manual of Mental Disorders; American Psychiatric Association, 2013).

The Structure of the Book

The book is divided into three parts. Part 1 includes an overview of mental health problems among children and adolescents (Chapter 2) and eleven chapters addressing main findings from the TOPP study pertaining to different aspects of children’s health and development. The five chapters in Part 2 cover research addressing parental mental health, sick leave and the inter-parent relationship, including paths to relationship dissolution. The three chapters in Part 3 are designed particularly for researchers and give more details on the TOPP study overall, focusing specifically on measures, methodological issues and approaches to analysis. The book ends with a more comprehensive list of the TOPP findings presented in the chapters. Below is a brief overview of the main focus of the individual chapters.

- *Part 1: Children and adolescents – health and development*
 - *Chapter 2. Mental health problems among children and adolescents.* Here we present the main concepts used in the book, the wide range of problems and disorders that have been investigated and their predictors, based on a developmental perspective.
 - *Chapter 3. Problem behaviours in the early preschool years and their predictors.* This chapter addresses the identification and persistence of behaviour problems among children from 1–2 years of age, their classification into subgroups, and common and specific effects of risk factors for symptom development through the early preschool years (1–4 years).
 - *Chapter 4. Temperament and personality development in children and adolescents.* This chapter addresses the differentiation of temperament dimensions, development, stability and change in these dimensions and in temperament profiles, throughout childhood and adolescence, and their associations with developmental outcomes.

- *Chapter 5. Symptoms of anxiety and depression in adolescence.* This chapter addresses similarities and differences in reported symptoms of anxiety and depression across informants, as well as stability and change in symptoms throughout adolescence.
- *Chapter 6. Predictors of internalising behaviour problems in adolescents.* After presenting theoretical frameworks for explaining the development of internalising problems, this chapter draws together findings from TOPP studies on how individual factors, interpersonal factors and familial factors affect the development of internalising problems.
- *Chapter 7. Externalising behaviour problems in childhood and adolescence.* Definitional issues, constructs and gender differences related to externalising behaviour problems are discussed before the chapter gives an overview of TOPP findings on stability and change in externalising behaviour across time and the long-term developmental outcomes of externalising problems in childhood.
- *Chapter 8. Predictors of externalising behaviour problems in childhood and adolescence.* After presenting empirical literature on central risk and protective factors for externalising behaviour problems, as well as theoretical models that bind these factors together, this chapter describes findings from the TOPP study with a specific focus on early individual and family risk factors for long-term externalising development.
- *Chapter 9. Eating problems from childhood to young adulthood.* This chapter provides information on: 1) longitudinal developmental paths of eating problems from early childhood through adolescence to adulthood; and 2) risk factors for eating problems, using data from the TOPP study as well as the Young in Norway (YiN) study.
- *Chapter 10. Alcohol use in adolescence.* This chapter addresses how adolescent drinking behaviours develop and change over time, and the consequences of early drinking behaviours in early adulthood.
- *Chapter 11. Social resources across development – social competence and social support.* This chapter looks at the development of social skills among 14-year-olds and provides information on the level of social skills among Norwegian adolescents. It also discusses how social networks and social support are related to positive and negative health outcomes.
- *Chapter 12. Resilient pathways in childhood.* This chapter first addresses the interplay between social skills and behaviour problems, and the extent to which each of these can be taken as an indicator of resilience in children from stressed families. We then consider the role of social support and temperament factors in predicting resilient and vulnerable outcomes respectively, comparing the development of children growing up in families with, and without, substantial stressors.
- Part 2: Parents – mental health and partnerships
 - *Chapter 13. Anxiety and depression among mothers.* This chapter tracks stability and change in mental distress among mothers across the whole childrearing period until their children reached late adolescence.
 - *Chapter 14. Predictors of symptoms of anxiety and depression among mothers.* This addresses the relationships between symptoms of anxiety and depression among mothers and the factors that predict these throughout the period of childrearing, specifically addressing effects of socio-demographic factors, social support, stressors and temperament factors.
 - *Chapter 15. Associations between paternal and adolescent depressive symptoms.* This chapter addresses the neglected issue of the role of fathers' mental health for their adolescent children's symptomatology by examining the association between paternal and adolescent depressive symptoms.
 - *Chapter 16. Family-related stressors and sick leave in mothers and fathers.* This chapter uses perceptions from both children and their parents on family-related stressors and parents' sick leave to predict the amount of long sick leave taken by mothers and fathers over the eight waves of data collection.

- *Chapter 17. Parental couple relationships: pathways, predictors and associations with parental mental health.* This chapter addresses how parental couple relationships changed over the child-rearing years. Specific foci are the predictors of relationship dissolution, and pathways and predictors of parental conflicts.
- Part 3: TOPP study – tracking opportunities and problems from infancy to adulthood
 - *Chapter 18. Sample, response rate, and attrition.* This chapter addresses the recruitment of the families, characteristics of the sample and response rates. Attrition and generalisability are specifically discussed.
 - *Chapter 19. Methodology: measures and analytical approaches.* Here the theoretical model guiding instrument selection is presented, together with the main measures used in TOPP. This chapter also addresses construct validity and reliability, major methodological limitations and considerations, and the strengths of the study overall.
 - *Chapter 20. The TOPP researchers, projects, and overall findings.* After having presented the TOPP researchers, their projects and colleagues who have made substantial contributions to the results presented in this book, we end by presenting a summary of the overall findings from each chapter.

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Contributors

Dawit Shawel Abebe

dawit.s.abebe@nova.hioa.no

NOVA
Oslo
Norway

Oslo and Akershus University College of
Applied Sciences
Oslo
Norway

Silje Bårdstu

silje.bardstu@psykologi.uio.no

Department of Psychology
University of Oslo
Oslo
Norway

Frøydis Enstad

froydis.enstad@fhi.no

Division of Mental and Physical Health
Department of Child Development
Norwegian Institute of Public Health
Oslo
Norway

Kristin Gustavson

kristin.gustavson@fhi.no

Department of Mental Disorders
Norwegian Institute of Public Health
Oslo
Norway

Gertrud Sofie Hafstad

g.s.hafstad@nkvtts.no

Norwegian Centre for Violence and
Traumatic Stress Studies
Oslo
Norway

Maren Sand Helland

maren.helland@fhi.no

Department of Child Development
Norwegian Institute of Public Health
Oslo
Norway

Evalill Bølstad Karevold

e.b.karevold@psykologi.uio.no

Department of Psychology
University of Oslo
Oslo
Norway

Anne Kjeldsen

anne.kjeldsen@fhi.no

Division of Mental and Physical Health
Department of Child Development
Norwegian Institute of Public Health
Oslo
Norway

Kristin Garaas Løchen

kristin.g.lochen@gmail.com

Department of Psychology
University of Oslo
Oslo
Norway

Kristin S. Mathiesen

krsma@online.no

Department of Child Development
Norwegian Institute of Public Health
Oslo
Norway

Arnstein Mykletun

arnstein.mykletun@fhi.no

Department of Mental Health and Suicide
Norwegian Institute of Public Health
Oslo
Norway

Department of Community Medicine
University of Tromsø
Tromsø
Norway

Center for Work and Mental Health
Nordland Hospital Trust
Bodø
Norway

Ane Nærde

ane.narde@nubu.no

The Norwegian Center for Child Behavioral
Development (NUBU)
University of Oslo
Oslo
Norway

Wendy Nilsen

wendy.nilsen@afi.hioa.no

Work Research Institute
Oslo and Akershus University College of
Applied Sciences
Oslo
Norway

Division of Mental and Physical Health
Department of Mental Disorders
Norwegian Institute of Public Health
Oslo
Norway

Margot Prior

priorm@unimelb.edu.au

Psychological Sciences
University of Melbourne
Australia

Espen Røysamb

espen.roysamb@psykologi.uio.no

Department of Psychology
University of Oslo
Oslo
Norway

Norwegian Institute of Public Health
Oslo
Norway

Ann V. Sanson

annvs@unimelb.edu.au

Department of Paediatrics
University of Melbourne
Parkville, VIC
Australia

Anni Skipstein

annis@ostfoldfk.no

Norwegian Institute of Public Health
Oslo
Norway

Østfold County Council, Norway

Tilmann von Soest

t.v.soest@psykologi.uio.no

Department of Psychology
University of Oslo
Oslo
Norway

NOVA
Oslo
Norway

Oslo and Akershus University College of
Applied Sciences
Oslo
Norway

The definitive work on the best ways to support the healthy development of children and adolescents and their families, based on 20 years of the groundbreaking TOPP Study

The unique longitudinal study “Tracking Opportunities and Problems (TOPP)” began following nearly 1,000 children and their families in Norway in 1993. Few studies have ever accumulated such extensive information from such a large number of families. Eight waves of data on many aspects of child and family life have been collected from children aged 18 months to 18 years. The TOPP Study has provided new knowledge about and insight into the precursors, developmental paths and predictors of both good adaptation and mental health problems of children, as well as into parenting and family relationships.

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Kristin S. Mathiesen



Ann V. Sanson



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