Pathways from infancy to adolescence

Margot Prior,
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AUSTRALIAN TEMPERAMENT PROJECT 1983–2000

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Foreword

The ways in which children develop from helpless infancy to fully fledged and well-functioning members of society will always be a matter of fascination. Understanding the processes of this development is crucial to our ability to foster each child's optimal development and this, in turn, is fundamental to the wellbeing of our communities and to society. The Australian Temperament Project, which is described in this book, makes a substantial contribution to understanding the developmental paths of Australian children, and points to ways in which children and families can best be supported. The current federal government has shown its interest and commitment to these issues through its Stronger Families and Communities Strategy.

The book provides an intriguing account of the journey through life of a large cohort (that is, the entire sample group) of Australian youngsters and their families, as studied through the first 18 years of the Australian Temperament Project. It investigates patterns and pathways to positive and problematic adjustment, and the contribution of child, family and environmental factors to successful functioning. Beginning in infancy and continuing through to late adolescence, the project covers a wide range of topics. These include, on the problematic side, child and adolescent behaviour problems, learning difficulties and substance use; and, on the positive side, supportive peer relationships, social competence and social responsibility. A strong focus throughout is the contribution of the individual's temperament to these aspects of development. It is an impressive research endeavour of national and international stature and will provide an invaluable resource for parents as well as for researchers and professionals interested in human behaviour and development.

The book has been written by the principal researchers on the study since its inception in 1983: Margot Prior, Ann Sanson, Diana Smart and Frank Oberklaid. Margot Prior and Frank Oberklaid are Professors of Psychology and Paediatrics respectively at the Royal Children's Hospital and University of Melbourne. Ann Sanson is now the Principal Research Fellow in charge of the Parenting and Children Program at the Australian Institute of Family Studies (and currently the Acting Research Manager at the Institute), and Diana Smart is a Research Officer in that program.

Thus the Australian Institute of Family Studies has become a collaborative partner in the study. We look forward with great enthusiasm to being involved in this ground-breaking research as it follows the progress of these young Australians into their adult years.

David I. Stanton
Director
Australian Institute of Family Studies

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About the project

This publication tells the story of the Australian Temperament Project. It provides a concise digest of the many studies within the project, which is designed for readers wishing to access an overview of our research from infancy to adolescence. At the end of each section we indicate (by number) the published papers from the project which report more detail on each topic. References for these papers are listed at the end of the book.

The Australian Temperament Project is a longitudinal study of the psycho-social development of a large and representative sample of Australian children born in Victoria between September 1982 and January, 1983. (By 'longitudinal', we mean a study of a particular sample group of people over a long period of time.) Our team of researchers, specialising in psychology and paediatrics, from the Royal Children's Hospital, LaTrobe University, and University of Melbourne, has followed the growth of these children, so far up to the age of 17–18 years. Our aim has been to trace the pathways to psycho-social adjustment and maladjustment across their lifespan.

Putting the story together in this form was motivated by our feeling that the families whose loyalty has made this research possible deserved an account of the insights gained from their regular contributions. In addition, we needed an overview of the research for the many researchers and colleagues who ask about the project, and request information about our measures and methods.

The story begins with an explanation of temperament, why it is important and how it is measured. We document the early stages of recruiting the sample of children and their families participating in the research. The following sections summarise the findings from the many studies which examine the relationships between temperament and a variety of developmental outcomes.

A major theme throughout has been the influence of child temperament on emotional and behavioural adjustment; investigating questions such as 'how well does temperament in infancy predict adaptation at pre-school age', for example. We have also examined differences in significant domains of development between boys and girls. A further long-term interest of this research has been learning progress at school, and how this affects, and is affected by psycho-social adjustment. Problems which have developed in a small proportion of the children, such as having a chronic illness, aggressive behaviours, attention deficits and hyperactivity, anxiety, depression, and problematic substance use, have been measured over time. This has allowed us to track the pathways in their development from the early years through to adolescence, and to identify some of the short and longer-term influences on outcome.

It is equally important to understand the factors in children, and in their environment, which can contribute to the growth of competence and socially skilled behaviours. Hence we have also analysed the factors that lead to social, psychological, and academic competence in the children as they develop, with a particular focus on temperament. The question of what helps children to remain resilient and coping well when challenge and adversity arise in their environment is also part of this research.

In the more recent years of the life of the project, many individual children have written to us and sent poems, drawings and photographs of themselves. With their permission, we include a selection of these personal contributions.

In the final part of the report, we summarise the main contributions of the Australian Temperament Project and suggest how this research will be valuable in furthering our understanding of the ways in which social and emotional development may be enhanced in children. In particular, this story teaches us much about the role which temperament plays in intra and inter-personal development across the span from infancy to adolescence.

About the authors

Professor Margot Prior is Director of Psychology at the Royal Children's Hospital, Melbourne, and is a member of the Departments of Paediatrics, and of Psychology, at the University of Melbourne. She is a Fellow of the Academy of the Social Sciences of Australia. Formerly a professional musician, she began her career in developmental and clinical Psychology in the 1970s, and has taught Psychology at LaTrobe, Monash and Melbourne universities. She has published books on Learning Difficulties, and on Hyperactivity, as well as many book chapters and papers in international journals. She is regularly invited to speak at national and international conferences. She has held visiting Research Fellowships at the Universities of Padua, Italy; London, UK; Oregon, USA; and Otago, New Zealand.

Associate Professor Ann Sanson is the Principal Research Fellow leading the Children and Parenting research program, and Acting Research Manager, at the Australian Institute of Family Studies. She is also an Associate Professor in the Department of Psychology at the University of Melbourne, where her teaching and research have been in the areas of developmental psychology, developmental psychopathology and conflict resolution. She has published numerous book chapters and papers in international journals and been invited to speak at national and international conferences. She is a fellow of the Australian Psychological Society, and has had leadership roles within the Society, including terms as Vice-President and Director of Social Issues. She is a member of the Committee for the Psychological Study of Peace, and has acted as a consultant for the Christian Children's Fund in conflict situations (for example, East Timor and Kosovo.

Mrs Diana Smart studied Psychology at the University of Melbourne, completing a Master of Arts degree and Diploma of Education. She held positions in the Victorian Department of Education's Curriculum and Research Branch and the Royal Melbourne Institute of Technology's Education Unit before joining the Australian Temperament Project in 1988 as the Research Manager. Since that time she has overseen the day-to-day running of the project and managed the various data collection waves. She has presented results from the study at national and international conferences and published papers in international journals.

Professor Frank Oberklaid is the Director of the University of Melbourne's Centre for Community Child Health, located at the Royal Children's Hospital. He is an internationally recognised researcher, the author of two books, numerous book chapters and over 100 scientific papers on various aspects of paediatrics. In addition to undertaking editorial duties for a number of international journals, he is the Founding Editor of a series of five national child health publications directed to general practitioners, pharmacists, community nurses, hospitals and child care centres. Professor Oberklaid has received state, national and international awards, lectureships and visiting professorships, including a Medal in the Order of Australia in 1998.

Preface

In the late 1970s, when planning for the Australian Temperament Project began, rigorous research in the psycho-social area was rare. Biomedical research reigned supreme and social epidemiology was undervalued and not understood. Although some notable national or large cohort studies had been conducted in Great Britain, USA and New Zealand, in Australia it was novel to bring cohort methodologies to address important questions about temperament and its impact on children and their families.

There is now a blossoming of excellent research in psycho-social arenas. The wider research community is more informed and appreciative of the importance and value of research which aims to elucidate the variety of causal pathways to the heterogeneous group of child and adolescent behavioural problems. That there is a global epidemic of these problems means that we are even more desperate for data such as the Australian Temperament Project provides to inform possible preventative strategies. All this fans our admiration for those with the vision and foresight to establish the Australian Temperament Project.

This study is recognised as a flagship. Acknowledged nationally and internationally, the data have been used to describe the profiles and natural history of temperament in infants, children and adolescents. The researchers have identified important developmental trajectories and how they are influenced by various family, social and other environmental factors. And, as importantly, those factors which enhance the resilience of the child and its family have been identified as a basis for intervention to improve outcome.

This ongoing activity has been a multi-disciplinary research success. Psychologists, developmental paedatricians and allied health professionals have worked together to enable this important cohort to be followed regularly, with little attrition. The output in papers and presentations, added to by research theses (Masters and PhDs), has been an outstanding contribution to knowledge.

The most important winners, however, are families with children. With this publication, we and they can acknowledge and salute the Australian Temperament Project.

Professor Fiona Stanley
Director, TVW Telethon Institute for Child Health Research
The Variety Club Professor of Paediatrics
The University of Western Australia

1 Introduction to the Australian Temperament Project

Background to the research

The Australian Temperament Project (ATP) is a major longitudinal study of the development of Victorian children, which began in 1983 with the enrolment of 2443 families into the project. This unique research has so far studied the development of the children from the first year of life up to the eighteenth year of life. Children in the project are now in the final years of secondary level education or at the beginning of a work career.

This book is designed to give an accessible account of the many studies we have done so that parents and young people involved in the project, and a range of health and education professionals as well as other parents, can overview the study, its methods and its findings. This book is a summary of a large body of research, but at the end of each section we cross-refer our published papers so that those who want to read further may do so by accessing these papers. A full list of our measures and our publications is included at the end of the book.

Aims and interests of the Australian Temperament Project researchers

We have been the first research team to carry out a large-scale longitudinal study of temperament and its relationships with the emotional and behavioural development of Australian children from infancy to adolescence. When we initiated the project, a great deal of the information used to make assertions and recommendations about the social, developmental, and educational needs of our children and their families came from work with children from other countries, predominantly the United States of America. We felt it was time to learn more about the development of Australian children. We know that Australian culture is not the same as US culture, and that we cannot just transfer research findings from one country to another without questioning their relevance and 'truth' for our own communities.

There have been some small scale studies of Australian children, but nothing with a combined comprehensive paediatric and psychological focus like the ATP. The Australian Institute of Family Studies produces valuable sociological and psychological data on Australian families but there is very little pertaining to the youngest developmental stages studied over time. The study most comparable to ours is the Dunedin Multi-disciplinary Child Development Study in New Zealand, which has followed 900 children from the age of three into adulthood. A further NZ study, the Christchurch Health and Development Study, has also reported on many of the developmental and clinical questions of interest to us, with a sample of 1000 children. In some cases we have been able to compare our results to those from our NZ neighbours. Through our research publications we have compared our findings with those from other populations in other parts of the world.

Our early aims were to study the nature of temperament and how it affects a child's adjustment in the family, in school and in the wider social environment. As the children grew older, we could identify ages and stages of particular interest such as the transition to school, and significant aspects of peer relationships. We could study groups of children, such as those who developed problems of one sort or another or those whose families suffered from stress or disadvantage. These interests led to a large number of clinical studies within the larger overall project.

The measurement of temperament in childhood is not a simple matter. Three main methods have been used by researchers, sometimes singly and sometimes in combination. These are: a) using questionnaires or rating scales through which parents, teachers, or children report on characteristic behaviours in everyday situations which represent temperamental styles; b) observation of children's behaviour in naturalistic situations, such as during play; and c) systematic or controlled observations of behaviour in laboratory-based situations.

With such a large sample of children and families in our study we opted to base our research on the questionnaire method. However, while most of our data have been collected by mailing out questionnaires to all the families in the project, we have also carried out a substantial number of more in-depth studies, with smaller sub-samples of children and families addressing questions of particular interest. These studies have focused on selected questions concerned with specific developmental and clinical themes. Our studies of children with learning difficulties provide examples of these kinds of theme-based studies. In the smaller, in-depth research projects, we have visited the families and interviewed the children, and there have been some observational studies.

We have taken a particular interest in some special groups of children such as those born prematurely, those with parents not born in Australia, those who have problems of hyperactivity, aggression, anxiety, or chronic illness, and many other concerns relevant to child and adolescent development.

Temperament – what is it and how does it influence development?

A major focus of the project has been the influence of a child's temperament on health and development in both the short and longer term, and the ways in which it affects pathways to adjustment and maladjustment.

The word 'temperament' is often used in everyday language as if people are confident that they know what they mean by this concept. It seems to represent the characteristic and predictable personality or behavioural style of a child, so that we say, 'she's got a placid temperament', or, 'he has an excitable temperament', or, 'she's always negative about everything'. Temperament has the feeling of permanency, as a known, accepted, and commonly observed style of behaving which makes each individual their own unique self. It is often used interchangeably with the term 'personality'. But when you look carefully at the two concepts it seems that personality includes a broader range of attributes of the person, and is perhaps a more comprehensive description relating to development into a mature person. Personality can include attributes like a person's intellectual level, their motivations and attitudes to work, their social values, and their bank of memories, learning, and life experiences, which go to make up a picture of the characteristics of a mature individual.

There are no clear ways of making distinctions between these terms, but there is reasonable agreement that temperament more closely represents an inborn 'style' of behaving, something which is observable in early childhood, well before an individual has had time to amass enough experience to have formed a personality. So it has a strong

sense of being connected to the biological bases of behaviour, and as having physical expression via the characteristic patterns of nervous system reactivity and regulation which then influence and are influenced by events in one's life.

There is no agreement on exactly how much of temperament is biology and how much is the product of experience. It is now recognised that it is some combination of these influences. What we do agree about is that it is an observable and very significant characteristic (or set of characteristics) of each individual, and that it has powerful effects on the way a person interacts with the world.

Temperament is about the style of behaviour, not the content of the behaviour, that is, *how* children react and behave rather than *what* they do in a situation. For example, it can refer to the way in which children show their likes and dislikes (for one child, definitely and intensely, and for another, quietly and gently) rather than whether they do or do not like something. A well-accepted definition of temperament is: *individual differences in attentional, emotional, and behavioural self-regulation, along with the relative level of emotional reactivity, which together give a unique flavour to an individual.*

Temperamental style tends to remain similar for an individual across life, but it is nevertheless modifiable, not fixed. One research interest in this domain is to discover what kinds of experiences help children to modify less socially adaptive or difficult temperament characteristics so that they can adjust more happily to their environments.

Temperament plays a very important role in how children develop, especially in the social and emotional area, and it has long-term effects on how well they adjust to life in the family, at school, and in the wider environment. For instance, a child who is persistent in temperament, and stays with a new activity or task until it is mastered, may learn new skills more effectively than a child who is easily bored or frustrated by a challenge, and changes activity as soon as things get difficult. Children who can regulate, or manage their own natural reactions and emotions may adjust more easily to demands of parents and teachers (at least in our culture) than those who loudly protest when things are not going their way. People in a child's environment react differently according to the temperament of the child they are interacting with, and are likely to be warmer and more positive about a cheerful, sociable child, than they are about a negative, withdrawing one. So temperament affects the way other people shape and modify their relationships and reactions to an individual child. These patterns continue across the life span.

A negative and difficult temperament may be a risk factor for ongoing difficulties in relationships in the family and the wider world. On the other hand, a positive and engaging temperament may protect children living in situations of deprivation and adversity, by allowing them to grapple with and overcome obstacles, and to maintain positive relationships and self-esteem even in difficult times.

In our project, we planned to investigate whether children with particular kinds of temperaments were at higher risk for developmental and behavioural problems. Further, we wanted to see whether children with easy and positive temperament characteristics had an easier passage through development, and were 'protected' in their adjustment to life, against the negative effects of any difficulties they might encounter.

Further reading
See items 8, 11, 32, 33, 41 and 60 in the list of Australian Temperament Project publications at the end of this book.

2 Beginnings
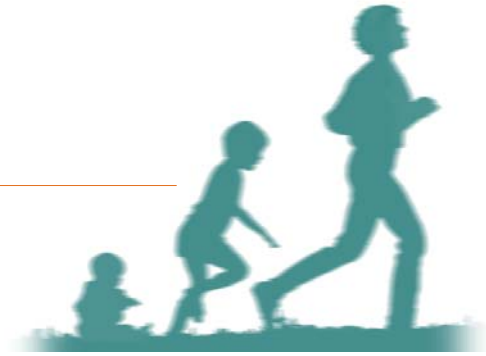
How did we enrol the ATP sample?

The families enrolled in the study came from 67 local government authorities across the whole state of Victoria, selected upon the advice of the Australian Bureau of Statistics, to give a true and unbiased representative sample of the whole population of Victoria. Twenty of the selected areas were urban (1604 children) and 47 were rural (839 children). This paralleled the urban/rural population balance in the state in 1983 when we began the project.

Method of recruitment of the study sample

We were able to contact the families with the assistance of the Maternal and Child Health Division of the Victorian Health Commission in 1982. The Infant Welfare Centres (IWCs) which are provided by this service (now called Maternal and Child Health Centres) establish contact with 94 per cent of families with a new infant in Victoria.

The mother of every 4–8-month-old infant who attended an IWC in one of the selected local government authority areas in the two weeks between 22 April and 6 May 1983 was handed an Australian Temperament Project questionnaire by the Infant Welfare Sister for completion and return in a pre-paid envelope.

The Infant Welfare Sisters also completed a brief questionnaire covering the child's birth history, current weight, type of feeding (breast or bottle), a rating of each child's temperament (from much easier than average, through average, to much more difficult than average), and a rating of their perception of the current adjustment of the mother-baby pair. They also let us know if they thought that any of the mothers had difficulties completing the questionnaires because of reading or English language problems.

Some sample characteristics

The total number of children involved at the first (infancy) stage of the research was 2443. Fifty-two per cent were male and 48 per cent were female.

Table 1 summarises the characteristics of the original Australian Temperament Project sample.

- There were 28 sets of twins.
- Average birth weight of the infants was 3400 grams.
- One hundred and twenty-six infants were pre-term, that is, born at 36 weeks gestation or less (5.7 per cent of sample); of these, only one had birth-weight less than 1000 grams, while five were below 1200 grams.

- Forty-three per cent were being breast fed, 30 per cent were bottle fed, and 23 per cent had begun with breast feeding but had moved to bottle. About 5 per cent of mothers were using both methods of feeding at the time of the infant survey.

Mothers provided ratings of three key infant difficulties. These indicated that:

- almost 30 per cent of infants had moderate or severe colic problems;

- 17 per cent had moderate or severe sleep problems; and

- 13 per cent showed moderate or severe difficulties with excessive crying.

Table 1	Cohort characteristics	
Children		
Age in 1983	Average: 176 days (25 weeks) Range: 15–40 weeks (approx. 4–8 months)	
Birth Order	**Percentage**	
First-born	46.5	
Second-born	29.1	
Third-born	15.3	
Fourth-born or later	9.1	
Families		
Age in 1983	**Mother** Average: 27.9 years Range: 16–45 years	**Father** Average: 30.5 years Range: 18–57 years
Occupation in 1983	**Percentage**	**Percentage**
Professional	26.8	40.2
Clerical and skilled	51.6	41.4
Unskilled and semi-skilled	21.5	18.4
Education in 1983		
Tertiary	24.0	29.9
Year 11 or 12	42.0	44.2
Year 10 or less	34.0	25.9
Country of Birth		
Australia	79.9	73.2
New Zealand	0.9	1.0
United Kingdom	6.0	7.3
Other Northern European	1.9	3.8
Italy	2.9	5.3
Greece	1.2	1.9
Yugoslavia	0.9	1.1
Other Southern European	1.4	1.5
Lebanon	0.6	0.6
Turkey	0.4	0.4
Other Middle Eastern	0.5	0.5
Vietnam	0.1	0.1
India, Pakistan, Sri Lanka	0.7	0.7
Other Asian	1.6	1.3
North America	0.2	0.3
South America	0.3	0.4
Africa	0.5	0.5

Source: Australian Temperament Project 1983–2000.

Survey points across age

From infancy onwards, families have been contacted with requests to complete questionnaires at roughly 15–18 month intervals. Survey points and numbers successfully followed-up at each stage are listed below.

- 1983: In infancy, 2443 families were initially contacted and provided the sample cohort for our longitudinal study.

- 1984: In early toddlerhood, when children were 18–24 months, two-thirds of the sample were asked to complete questionnaires and 1280 families (of a possible 1453 families) did so.

- 1985: The remaining one-third, plus one-half of the 1984 sample were asked to complete questionnaires when the children were 32–36 months of age and 1360 did so.

- 1986: When the children were 3–4 years old (pre-school age); 1716 families.

- 1988: When the children were 5–6 years old (usually Preparatory Grade); 1721 families.

- 1990: When the children were 7–8 years old (usually Grade 2); 1605 families.

- 1992: When the children were 9–10 years old (usually Grade 4); 1545 families.

- 1994: When the children were 11–12 years old (usually Grade 6); 1470 families.

- 1995: When the children were 12–13 years old (usually Year 7); 1280 families.

- 1996: When the children were 13–14 years old (usually Year 8); 1400 families.

- 1998: When the children were 15–16 years old (usually Year 10); 1375 families.

- 2000: When the children were 17–18 years old (usually Year 12); data currently being collected.

Because of the very large sample size and limited research budgets, all of these whole-sample surveys have been by mail. Parents have received a package of questionnaires and rating scales which we have asked them to complete about their project child and return to us. It is usual in studies of this kind for families to have missed at least one survey point due to family pressures at a particular time. Nevertheless, our response rate has been around 80 per cent at every survey wave, which is a very good participation rate.

Neither we nor the families enrolled in the project in 1983 realised at the time we began that we would continue the study for so many years. But since we had developed such an excellent representative sample and were able to learn more and more about the children, we realised how important it was to continue on through the school years, and to see how the children developed in later childhood and adolescence.

Approximately 15–20 families moved each month, at least in the early years of the project. By the time the children were 9–10 years of age, two-thirds of families had moved house at least once; 17 per cent had moved three or four times and 3 per cent had moved five or more times. We have managed to maintain contact with most of these families, but some became 'lost' to us as they moved house. There have also been some families who have decided to withdraw from the study during the 18 years of its existence. In this group there has been a somewhat greater loss of families with non-Australian parents, and less-advantaged circumstances. However, two-thirds of the original sample are still participating and they are broadly similar in family characteristics to the original complete sample. Nevertheless, we are aware that some of the families now lost to the study are those who have experienced difficulties of one kind or another. This situation is consistent with the experience of similar studies across the world. Our retention of 67 per cent (approximately 1650 families) is an excellent rate of commitment to the research programme, which we know asks a great deal of the project families.

In the first sampling stage, approximately 45 per cent of families were non-metropolitan residents. In the 1994 and following surveys, we categorised our sample into four groups, as a way of capturing the differing areas of residence. These were: Melbourne metropolitan, outer metropolitan (for example, Belgrave, Melton, Cranbourne), large provincial cities (such as Bendigo, Ballarat), and rural.

In 1994, when children were aged 11–12 years, 53 per cent lived in the metropolitan area, 8 per cent in outer metropolitan areas, 8 per cent in large provincial cities, and 31 per cent in rural areas. This corresponds well to the population of Victoria as a whole. A number of families in our sample are now living interstate or overseas, but remain enrolled in the study and continue to complete questionnaires. In 1994, 90 per cent of the sample were living in owner-occupied homes, a very high proportion of the community by comparison with the situation in most other countries.

Some figures on unemployment and family constellation in the 1990s

Unemployment: In the following years, the following percentages were reported as unemployed and looking for work.

- 1992 (children aged 9–10 years); 11 per cent of fathers and 9 per cent of mothers;

- 1994 (11–12 years) 8 per cent fathers, 7.5 per cent mothers;

- 1995 (12–13 years) 9 per cent fathers, 7.5 per cent mothers;

- 1996 (13–14 years), 9 per cent fathers, 8 per cent mothers;

- 1998 (15–16 years) 7 per cent fathers, 6 per cent mothers.

Separation and divorce: At each survey point, we asked parents to report on their marital and family status. By 1994 (late childhood), approximately 15.6 per cent of children were not with both biological parents. Eighty per cent of these children were with their biological mothers, either in a single parent family or with mother and a stepfather. The number of families where it was reported that parents had separated or divorced went from 47 in 1986, gradually increasing at each survey point to 152 families by 1998. A current study is focused on the reactions and adjustment of project children whose parents have separated or divorced and this will be reported in the near future.

Teacher contributions

From the pre-school stage onwards, we asked parents to let us know the name of the child's teacher, and to give us permission to contact the school so that we could gather information about the child's adjustment and progress in school. We then sent packages of questionnaires relevant to the age and stage of enrolled ATP children to the teachers in schools across the state (and sometimes interstate and overseas). This has given a more complete picture of children's development.

At the secondary school level, we ceased sending questionnaires to teachers because the secondary system involves each child having different teachers for different subjects. It is harder to identify a teacher who might know an individual child sufficiently well to be able to report on temperament, behaviour, peer relationships, and school progress.

Child self-reports

At each survey point from the age of 11–12 years (usually Grade 6) we have asked the children to complete questionnaires, so that we can discover their views of themselves at this point in their lives. Some of their responses have been delightful; besides their

questionnaire responses some children have sent photographs, poems, letters, and short biographies, and in a later section we give some examples of how our project children have seen themselves. Since the children reached secondary school, we have routinely included them as respondents in all surveys, as informants on themselves.

3 Measures

Details of the measures and instruments used in the project are included in a list at the end of this book.

We include here only a broad summary of measurement of temperament across the years; measures of behavioural adjustment across the years; and additional themes and measures at different time points which applied to the whole sample.

Measures used in specific smaller studies can be found in the numbered references to our publications at the end of each sub-section in this report.

Temperament

Our childhood measures of temperament were based on the model of temperament developed by Thomas and Chess (1977), and put into a questionnaire format by Carey and colleagues (Carey and McDevitt 1978).

Dimensions of temperament covered in our questionnaires included:

Sociability – tendency to approach new people and situations versus shyness and withdrawal;

Adaptability – ability to adapt over time to new foods, new experiences, and new life challenges;

Mood – whether positive or negative on a day-to-day basis;

Intensity – of responses to everyday occurrences and experiences, such as crying or protesting very lustily, or responding in a mild way;

Distractibility – the ease with which a child can be distracted or comforted when needed;

Persistence – the ability to remain focused on an activity or a task;

Rhythmicity – the regularity and predictability of the child's usual pattern of activities, including eating and sleeping schedules;

Reactivity – the readiness with which a child reacts to a particular stimulus or event;

Activity – the amount of body movement and activity level on a day-to-day basis.

Parents responded to our temperament surveys by rating their child's behaviour on questions concerned with usual patterns of behaviour. Some examples are: for infancy, 'the baby moves a lot, e.g. squirms, bounces, kicks, while lying awake in the cot' (this is a measure of the Activity dimension); 'the baby adjusts within ten minutes to new surroundings, e.g. home, shop, play area' (this measures Sociability); 'the baby ignores voices or other ordinary sounds when playing with a favourite toy' (Persistence); 'the baby wants daytime naps at differing times (over one hour difference) from day-to-day' (Rhythmicity); 'the baby does not react to differences in taste or consistency of food or

drink' (Reactivity); 'the baby reacts strongly to feeding, whether positively, e.g. smacks lips, laughs, squeals, or negatively, e.g. cries' (Intensity). For each age level, the questions were modified to reflect the kinds of behaviours appropriate to the age of the child. However, the core dimensions of temperament that we measured remain similar.

The temperament questionnaires used in our research were originally developed for use with American families. Where necessary we adapted them to fit an Australian audience ('nappy' for 'diaper'). At every survey we analysed the responses to our temperament questionnaires to discover what were the typical kinds of temperament dimensions which were clearly shown by Australian children.

The various questionnaires parents have filled-out were originally designed to describe 7–9 separate temperament dimensions, but when we analysed our Australian temperament data, we usually found a smaller number of dimensions emerging. This is similar to the results of other researchers in other countries. The main dimensions of temperament which emerged consistently in our research, from infancy through adolescence were called: Sociability/Approach, Irritability, Rhythmicity, Persistence, Reactivity, Flexibility, and Activity (shown in Table 2 below).

Some of the temperament dimensions identified in earlier research by Thomas and Chess (1977) seem to combine together, rather than remain distinct, for example, Adaptability and Sociability usually combine into a single temperament dimension which we usually call Sociability. Surprisingly, high levels of Activity tend to be associated with an easy, rather than difficult temperament style, a uniquely Australian finding. There is quite substantial commonality between the factors which emerge in our temperament studies and those reported by other research groups from the United States and Europe (see Prior, Kyrios and Oberklaid 1986; Rothbart and Bates 1998).

We also have a Teacher Temperament Questionnaire (Keogh, Pullis & Caldwell 1982), which we have used in each school survey. The dimensions of interest in this questionnaire are Task Orientation (the child's characteristic ways of attending to and persisting with school learning requirements); Reactivity (the child's usual way of reacting to changing events, experiences and demands in the classroom) and Flexibility,

Table 2	Temperament factors found at each age level in the ATP			
Infancy 4-8 months STSI [1]	Toddlerhood 18-36 months STST [2]	Early Childhood 3-8 years STSC [3]	Mid-childhood 9-10 years EAS [4]	Adolescence 11-16 years SATI [5]
Approach	Approach	Approach	Sociability Shyness	Approach
Irritability	Irritability	Inflexibility	Emotionality	Negative Reactivity
Cooperation-Manageability	Cooperation-Manageability			
Activity - Reactivity	Activity - Reactivity		Activity	Activity
Rhythmicity	Rhythmicity	Rhythmicity		
	Persistence	Persistence		Persistence
	Distractibility			

[1] Short Temperament Scale for Infants [2] Short Temperament Scale for Toddlers [3] Short Temperament Scale for Children
[4] Emotionality, Activity, Sociability (EAS) Temperament Scale [5] School-Aged Temperament Inventory

Source: Australian Temperament Project 1983–2000.

(the child's sociability and adaptability in interacting with others). These kinds of characteristics are obviously particularly relevant to how well the child copes with life at school.

As the children have matured, our temperament questionnaires have changed to fit their developmental stage. In the latter part of primary school and through early secondary school, for example, we used the McClowry School-Age Temperament Inventory (McClowry 1995), which included the temperament dimensions of Negative Reactivity (responds intensely to frustration); Persistence (doesn't give up when working on a difficult job); Approach/Sociability (seems uncomfortable when at someone's house for the first time); and Activity (moves fast to get to where he/she wants to go).

At the adolescence stage we asked parents and adolescents to complete a measure of personality (as well as temperament) about the teenagers, and this is described on page 13. The list of Measures and Instruments used in the ATP (at the end of this book) gives references for these measures.

Behaviour

At each stage of the project we have asked parents to report on the behavioural development of the children with an emphasis on problem behaviours. This strategy was designed to allow us to investigate the early signs of good and poor adjustment, and to look at child and family factors which might be associated with a child's psycho-social health and wellbeing.

In infancy we asked parents to report on whether their baby had sleep problems, colic, or excessive crying. These are the common difficulties during the first year of life. For the toddler-age period we asked for ratings on a range of problems common to this age group: temper tantrums, shyness, dependency, accident proneness, excessive crying, mood swings, sleep problems, and overactivity (the children were 1–2 and 2–3 years old).

At 2–3 years, parents completed a Behaviour Checklist with 20 items concerning common emotional and behavioural problems. This gave us an estimate of the level of adjustment of each child by comparison with 'normal' levels. The questions covered issues such as activity, settling at night, concentration, tempers, and fears. Parents made ratings on a 3-point scale of 'never', 'sometimes' and 'often'. At this stage a number of children were rated as having moderate to severe problems on various scales, for example: sleep (17 per cent); excessive crying (12 per cent); temper tantrums (30 per cent); excessive shyness (19 per cent); overactivity (30 per cent); with 5 per cent having severe problems with dependency. Other difficulties rated by some parents as severe at 2–3 years included: eating fads, (18 per cent); night wetting (30 per cent); day wetting (10 per cent); bowel training (10 per cent); getting to sleep (8 per cent); waking at night (10 per cent); sleeping with parent (15 per cent); and clinging (5 per cent). The relatively high rate of concerns on some of these behaviours indicates that for many children, they are relatively common aspects of the developmental process at this age.

Because the development of aggressive behaviour is of special interest in its long-term influence on social adjustment, we also used an 'Aggression Questionnaire' at 2–3 and 3–4 years in which we asked mothers to rate the levels of cooperative, sharing, and hostile-aggressive behaviour. Examples of questions are: 'when there is competition for a special toy, my child is determined to win'; 'my child refuses to do as he/she is asked' and 'my child shows that he/she is very sorry if he/she causes any trouble', with ratings on a 5-point scale ranging from: 'not at all true', 'sometimes true' to 'very true'.

From pre-school age until adolescence, our measures of behaviour problems have been standard questionnaires used in many studies across the world. These have included the

Rutter Child Behaviour Questionnaires, and for the adolescent phases, the Quay and Peterson Revised Behaviour Problem Checklist. Parents and teachers were asked to rate the child on a range of questions covering hyperactive and inattentive behaviour, expressions of aggression and hostility, and signs of anxious, withdrawn, fearful and depressed behaviour. We can calculate a 'behaviour problems' score from this list of questions, for each child. Children from 11–12 years onward have also rated their own behavioural adjustment on these questionnaires.

Other key aspects of development assessed

Mother's overall temperament rating: At each survey, we have asked parents to give an overall rating of their child's temperament when compared with other children of the same age. We have found this rating to be most valuable because it represents the mother's feelings about the overall difficultness or easiness of her child and will reflect how comfortable it is for the mother and child to get along together.

Children's health: When the children were 5–6, 7–8, and 11–12 years, we asked parents about their child's health, covering the main illnesses and problems (such as asthma, excema, epilepsy). From this we were able gain a picture of health levels and problems among Victorian children.

Family stress: A measure of the stresses being experienced by families has been collected in the surveys since the children were 7–8 years. We asked parents to report any life changes or problems, for instance, loss of job, or income, or house; or death or illness of members of the family; and to tell us how serious and worrying these events had been.

School readiness: Preparatory Grade teachers filled out a short questionnaire when the child was 5–6 years which aimed at finding out how the child was adapting to life at school. Ratings covered aspects such as 'concentration', 'self-reliance', 'cooperation with other children', 'physical coordination'. We used a 5-point scale ranging from adapting 'very well', through to 'considerable difficulty'.

School adaptation: At 7–8 years, teachers gave ratings about how the children were progressing at school and about their attitude and capacity to manage schoolroom routines. Some of the items were: following a series of directions; getting things in correct order; reading comprehension; arithmetic skills; spelling skills; motivation; and enthusiasm (using a 4-point scale, ranging from 'strong' to 'very poor').

Reading: When the children were 7–8 years old, their teachers gave them a 20-item graded test of reading which was devised for Australian children, in which the child had to choose from three words the one closest in meaning to a given word. Examples are 'cattle' (the given word) with 'milk-grass-cows' (the words to choose from); 'tale' with 'end-story-sleep'; and 'replied' with 'answered-listened-surprised'. In Grade 6 we again asked the teachers to administer a similar reading test appropriate to this age and stage of schooling.

Social behaviour: (measured at 7–8, 9–10, 11–12, 13–14, and 15–16 years). We asked parents, children and teachers about how the child behaved in social situations such as in the family, with friends, and in the classroom using the Gresham and Elliott Social Skills Rating System. The questions covered issues such as self-control, confidence and skills in social situations, cooperation and responsibility and academic competence. Examples of items are: 'accepts friends' ideas for playing'; 'asks permission before using another family member's property'; and 'receives criticism well'. Teachers also gave ratings of specific social behaviours when the children were 7–8 years old covering aggressiveness and general sociability.

Adolescent measures

As the children entered the teenage years, our range of questions broadened to include:

Personality: The dimensions of personality we studied were Extraversion (energy, outgoingness); Agreeableness (cooperative, kind); Emotional Stability (emotionality, contentment); Conscientiousness (reliable, organised); and Openness to Experience (curious, reflective). We have also included other aspects of behavioural style such as sensation and thrill seeking (willingness to do adventurous or frightening things); and control of emotions (able to keep feelings under control, can calm down when tense).

Behavioural and emotional problems, substance use: The teenage behaviours we included here covered eating behaviours and body image, anti-social behaviour, substance use (smoking, alcohol, marijuana, other drugs), and depression, as well as the measures of anxiety, hyperactivity, aggression and oppositional behaviours we have included from early childhood onwards. For eating behaviours and body image, we asked teenagers and parents to choose one of nine silhouettes (ranging from very thin to very large) that they judged to be closest to the teenager's body size. We also asked teenagers about their feelings about their body size and shape (whether they thought they were too fat, or skinny, or not muscular enough); attitudes towards weight (whether they worried about weight gain, thought about dieting); and eating behaviours (bingeing, eating sweets without worry). Anti-social behaviours were measured by questions about fighting, vandalism, stealing, running away from home, police contact. For substance use, we asked questions about how often and how much teenagers had smoked, used alcohol, sniffed, used marijuana or other drugs (such as speed, ecstasy) during the past month. We measured depression by asking questions about feelings of sadness, tiredness, crying, loneliness, and negative mood.

Peer relationships: Parents, teachers and children answered questions about popularity, peer networks, and closeness of relationships with friends from the time the children were 11–12 years of age. In more recent years, teenagers have answered questions about their perceptions of friends' support, intimacy, trust, and communication. We have also asked how often the teenagers' best friends were involved in anti-social behaviours or substance use.

School adjustment: Here we asked parents and teenagers about how the teenagers were getting on at school, covering aspects such as understanding the work in class, getting homework and assignments done, managing school rules and routines, getting on with teachers, and making and keeping friends.

Parenting: The questions assessing parent-adolescent relationships and parenting style covered aspects such as: use of reasoning, warmth of parent-child relationship, type of discipline, use of punishment, monitoring (knowing where the teenager goes and with whom), communication and family conflict.

Social responsibility and civic mindedness: From 15–16 years onwards we have been interested in teenagers' perceptions of themselves as members of the wider society and how active they are in community projects and endeavours. Issues covered included: being involved in fund-raising or voluntary activities, being concerned about environmental issues, being interested or involved in national or international politics, and having a religious commitment.

Further reading
See items 11, 21, 24, 41, 53, 56, 57, 58, 61, 65, 66, 68, 69, 70, 75, 76 and 80 in the list of Australian Temperament Project publications at the end of this book.

4 Structure and stability of temperament in infancy and early childhood

Although we began our studies by using temperament measures which came from previous US research, we were able to develop measures more suitable for Australian children as we went along. For the infancy period, for toddlerhood and for school-aged children up to 7 years, we developed shorter versions of the original questionnaires which put together the best items identified in the research with this sample, as representing measures of temperament in Australian children.

Infancy and toddlerhood

We found that five particular temperament dimensions best characterised the infants in our sample: Approach (shy versus outgoing); Rhythmicity (regularity of biological functions such as sleeping); Cooperation/Manageability (ease of adaptation to everyday events such as nappie changing,); Activity/Reactivity (active reaching for objects, and intensity of reactions); and Irritability (crying and fussing). We developed a 30-item Short Temperament Scale for Infancy which is being used by many researchers across Australia. Using three of the temperament dimensions, Cooperation, Irritability, and Approach, we also developed a composite 'Easy-Difficult' Temperament scale. Children scoring at the difficult end of this scale were more likely to show problems such as colic, crying and sleep difficulties. As expected, we also showed that our infants were different from those in the original US temperament study samples, in terms of their temperament profiles.

We carried out similar analyses for the data on temperament in toddlers and found that similar dimensions best represented temperament in the sample one to two years later in development. The major dimensions listed above also appeared in the toddler study with the addition of a dimension called Persistence. This led us to the development of a Short Temperament Scale for Toddlers which, like the infant scale, provides normative data for Australian children. This allows comparisons across studies from different research groups examining temperament in young children.

We also found some social class differences in children's temperament. Families from higher socio-economic status levels; i.e. those with more years of education and more skilled/professional types of employment, tended to rate their children generally as somewhat easier in temperament. Temperamental differences between our Australian and the US samples of children were again evident at the toddler stage, with Australian children somewhat more easy-going and less active than those from the US.

Early childhood: 3–7 years

Beginning with another US instrument, the Childhood Temperament Questionnaire (Thomas and Chess 1977), we analysed the temperament profiles of children across the 3–7 year age span, and again derived a shorter form of the scale suitable for Australian children. The temperament dimensions which emerged at this age-range were:

Inflexibility (difficulty in dealing with anger and frustration, and adjusting to challenges); Persistence (a steady approach to tasks and the capacity to persist to completion); Sociability (reactions to new people and situations, friendly-confident, versus shy); Rhythmicity (eating and sleeping routines); Activity/Mood (cheerful liveliness versus negative mood and unresponsiveness); and Threshold (level of sensitivity to noises, and discomfort). Boys tended to be rated slightly more towards the difficult end of these temperament dimensions, especially on flexibility and persistence. That is, they were perceived as less flexible, adaptable and persistent, compared with girls. There were also some social class differences with higher socio-economic level children rated as more persistent, sociable, flexible, and active/cheerful, but these differences were quite small.

Stability of temperament

The question of how stable or similar across time child temperament might be is important, because if an individual's temperament style is very variable across time and across situations it can be argued that it is a very weak and fragile concept, and that it is not likely to be a strong predictor of later social and psychological wellbeing. We explored the stability of our maternal ratings of temperament from infancy to eight years. Similar dimensions of temperament, broadly speaking, emerged at different age levels, that is, the dimensions remained constant as described in the previous section. We found a substantial level of stability of temperament among the children on the major temperament dimensions. Those children who were at the extreme ends of temperament dimensions such as Persistence and Adaptability, that is, were very persistent or very adaptable, tended to stay that way over time; those who were around the middle tended to change to some extent. The temperament dimension showing the greatest stability over time was Rhythmicity. This may not be surprising since it is a relatively concrete factor, measuring clear behaviours such as patterns of sleeping, eating and toileting. It may also reflect stable family routines as well as 'innate' or inborn characteristics. Persistence increased in stability over time, perhaps because it becomes more and more relevant as a behavioural style which is important in schooling. Approach and Inflexibility temperament dimensions also showed substantial stability across time. In other words, the child at the shyer end of, for example, the Approach dimension, was likely to stay that way, and the child at the more sociable end of this dimension was similarly likely to remain so.

Validity of temperament ratings: are we really capturing the 'nature' of the child?

One of the challenges of temperament research is that we are reliant often on reports of temperament-related behaviours from mothers, fathers, or teachers. Are these reports a true assessment of the child's temperament? It seems reasonable to argue that mothers generally know most about their young children and that they are the best sources of information on early development. Teachers see the children in different environments and have a wider range of children for comparison. Each rater contributes important information.

One question we considered was whether these perceptions truly reflected the nature of the child as shown in objectively-observed behaviour. To investigate this question we observed and videotaped the behaviour of forty 7-year-olds and their mothers in interaction at home, as they completed some problem-solving tasks. About half of the children had shown a consistently difficult temperament and half had shown a consistently easy temperament over previous years. (It is important to note that the person doing the observations did not know to which group any child belonged.)

Analyses of the video-taped observations showed that the children with a difficult temperament were more negative and argumentative than the easy temperament group. Mothers reacted to the characteristics of the children in response to their negative behaviours in a variety of ways which demonstrated individual styles in their efforts to manage the child – that is, there were no systematic differences between mothers of easy and mothers of difficult children in the way they responded. This study also showed that the children with observed difficult temperament were much more likely to have behaviour problems (almost all of the 'difficult', compared with none of the 'easy' children). Here we were able to show that maternal ratings of difficult temperament characteristics had validity, in that they were consistent with the actual behaviour of the children as rated by a person who had no knowledge of their temperament profile.

Further reading
See items 11, 18, 19, 21, 24, 37, 41 and 43 in the list of Australian Temperament Project publications at the end of this book.

5 Cross-cultural comparisons

Comparison of infants across countries

In planning our research we have asked the question, 'Do Australian children differ in their temperamental styles from children from other cultures?' There have been a number of studies of temperament in children from different countries including the USA, Scandinavia, Taiwan, Africa, Canada, the UK, and Germany. Some of these studies are hard to compare with our own because they use different methods of measuring temperament, and children of differing ages. However, we were able to make some comparisons between Australian, American, Greek and Chinese infants where the same questionnaire (Revised Infant Temperament Questionnaire, Carey and McDevitt 1978) had been used, either in English, or in translation, with children in the first year of life.

We found considerable cross-cultural variation in temperament, confirming the belief that temperament should not be considered in isolation from cultural context. In this study the most alike groups were Australian and Amercian infants, although the American infants were more active, rhythmic, and intense. The Greek infants showed a more negative temperament profile overall, especially on the dimensions of Mood, Approach-Withdrawal, Distractibility, and Adaptability. Chinese and Greek infants were rated as least active and did not differ from each other in Activity. Chinese infants were also more reactive and intense than all other groups and, like the Greek infants, they were rated as more negative in mood. The closer parallels between Australian and American infants may reflect similarities in cultures where sociability, extraversion and a positive outlook are valued and encouraged.

Comparisons of project children born in Australia with families from different ethnic backgrounds

Approximately 25 per cent of the families in the study had one or both parents born in a country other than Australia. This is approximately the same proportion as is found across the whole Australian population. We compared the temperament and behavioural characteristics of the various ethnic sub-groups in our sample. These included a Mediterranean group (Italian, Greek, Yugoslavian and Lebanese, comprising 11 per cent of the sample); those of British origin (Britain, New Zealand and Ireland, 12 per cent of the sample); and smaller sub-groups from the US, Africa, Northern and Southern Europe, and the Asian sub-continent.

From infancy up until pre-school age, we found some significant differences between the various groups in the profiles of temperament of their children. For those families with parents originating from Britain and Northern Europe, temperament profiles did not differ from those for Australian-origin children. Children with one or both parents coming from a Mediterranean country (Italy, Greece. Yugoslavia, Lebanon) were more likely to be reported as having a difficult temperament, and a higher level of behavioural

difficulties. Infant welfare sisters and pre-school teachers also reported similar kinds of differences for this group.

There is evidence for a distinctive profile of Australian children as reported by their mothers. For example, they seem to be somewhat more 'easy-going' and less active and intense than North American children were 'easier' to manage and had fewer adjustment problems than a comparison sample of infants with Greek parents.

However, by the time the children reached primary school age, the group differences in temperament and behaviour that had been previously seen had mostly disappeared. It was also the case that some of the ethnic group families dropped out of the study relatively early, so group numbers became too small to allow us to make further comparisons.

European and Australian infants and toddlers

Working with colleagues in psychology in Europe (Dr Giovanna Axia from the University of Padua, Italy; and Dr Andreas Demetriou, from the University of Thessaloniki in Greece), we have further studied the question of ethnic differences in temperament, through studies of infants and young children born and reared in Greece and in Italy. We compared these groups using the same measures and methods of analyses. Greek infants in Greece were rather like Greek-family infants in Australia despite their different environments. Generally they were rated as having more problems than were reported for Australian infants.

In the study of a group of toddlers from Italy, compared with toddlers from Italian families in Australia, and with toddlers with two Australian parents, we found that sociable, intense, reactive, and 'emotional' temperament characteristics were typical of Italian-born toddlers. They differed quite considerably from wholly-Australian-family toddlers. The Italian-Australian toddlers, that is, those with one or more parent born in Italy but living in Australia, were in between these two groups in their temperamental profiles. Hence this study suggested some interaction between environmental influences and biological dispositions in young children, and it also supported the cultural expectation of higher emotionality in Italian children.

There are many possible reasons for these ethnic differences within the Victorian population. One strong possibility is that different cultural backgrounds are associated with different values and expectations for child behaviours. What is 'difficult' behaviour for one culture may not be so for another. In one of our smaller studies for example, we found that Australian mothers are more likely to stress the importance of personality or temperament features in their judgement of a young child's manageability and likeableness. By contrast, parents born in Southern European countries placed more emphasis on 'biological' factors such as ease of feeding and sleeping routines. These comparative studies highlighted the interaction between 'nature' and 'nurture' factors in child development.

Further reading
See items 5, 13, 21, 22 and 34 in the list of Australian Temperament Project publications and Lusnats, 1988 in the References at the end of this book.

6 Health and development issues

Children born prematurely

It is often thought that infants born prematurely, especially those whose birth weight is very low (below 1000 grams) are at some risk for problems in development, such as slower-than-normal physical development, language delay or difficulties, intellectual handicap, and slowness-in-maturation in social and emotional areas. Sometimes their early months are spent in hospital and it can be hard for parents to be close to them in this critical early period.

Almost six per cent of the infants in our sample were considered premature; that is, they were born at 36 weeks or less gestation. We made a special study of the temperament and behavioural adjustment of these infants and then followed-up when they were toddlers to see whether they were showing systematic differences from the rest of the sample who were not born prematurely. That is, our question was, are these children at risk for social and emotional difficulties? At the infancy stage we found that there were no differences between premature and full-term infants on any of our measures. They were not more likely to have a more difficult temperament, nor to be more difficult to manage, and they did not show a greater number of developmental problems such as colic, sleep problems and excessive crying.

This finding is a much more positive one than has been reported in North America, where premature infants have been extensively studied, with findings of developmental disadvantage being common (for example, Minde 1984). One possible explanation is that, in Australia, we do not have the extremes of poverty and disadvantage in such large numbers as are found in some North American groups. The Australian families also tend to be well functioning, with relatively few of the social disadvantages which are commonly associated with prematurity and low birth weight. Premature infants in Australia also receive intensive high-quality postnatal care, including attention to the need for early contact and bonding between the infant and the family. Thus these findings suggest that prematurity itself may not be a risk factor, but rather that it is the social and economic context of 'at risk' families which have the most powerful influence on their future development and adjustment. In our study, the factor of prematurity increased risk for behavioural maladjustment in the children only when it was associated with the mother's perception of her child as difficult to manage.

Analyses of the data in toddlerhood showed that the premature group were continuing to develop well and to show no differences from the remainder of the sample on any of our measures. Of the 53 children born prematurely for whom we had reading ability scores at 7–8 years, 11 were experiencing problems (21 per cent). This is a just a slightly higher proportion than for the rest of the sample. In general this sub-group in the sample did not show any overall specific short or long-term disadvantage although, of course, there may be some individuals within the group who did so.

Children with a chronic health problem

There is limited information in Australia regarding the prevalence of chronic health problems (asthma, epilepsy) in childhood and its effects on development. This study gave us the opportunity to examine whether children with chronic conditions were at risk for psycho-social and learning problems.

In 1990–1991 when the children were 7–9 years old, we sent the families the Child Health Questionnaire (16 per cent of the sample). Parental responses to this questionnaire allowed us to identify children with medical conditions that were recurring or persistent, or which required hospitalisation. For asthma and for hearing problems we provided more detailed questionnaires to give further information. The survey identified 263 children with a chronic health condition. By far the most common condition among these children was asthma – 66 per cent of those who reported health problems. Other conditions were relatively rare, although 8.6 per cent had ecxema/dermatitis, 9 per cent had digestive or bowel problems, 7.6 per cent had hearing difficulties, and 7.6 per cent had heart problems.

We then compared this group with a group of children without health problems, on reading ability, behavioural adjustment, and self-esteem measures. We also had measures of socio-economic status and intelligence for each child. Very few differences between chronically-ill and well children emerged. However children without health problems had a somewhat lower level of emotional and behavioural difficulties than was reported for the children with chronic health problems. Those children who had both asthma and an additional condition (35 children) were more likely to have problems. The level of severity of the reported illness did not appear to affect psychological adjustment.

In general, the children with a chronic condition appeared to be doing well in all the domains we measured, despite their health status. It is possible the families with the very ill and problematic children, and those who were particularly stressed, did not participate in this study, or dropped out of the project early. Hence our report may under-estimate both the number of children with chronic illness and the disadvantages they suffer. It is also known that it is children with disorders involving the central nervous system and brain (affecting mental functioning) who are most at risk for a poor outcome, and there were very few children in that category in our sample. The overwhelming majority were children with asthma, and there is no expectation that this group is at particular risk for academic problems or emotional and behavioural difficulties.

Growing pains

Many children report pains in various limbs, for which there seems to be no explanation. Traditionally these have been described as 'growing pains' although they have little do to with growing. Parents of 183 children in the project (11 per cent) reported such pains in their children through the Child Health Questionnaire completed when the children were 7–9 years of age. The pains were most commonly felt in the lower limbs, were usually described in vague terms, and had lasted for between one month and seven years. There was a family history of such pains reported in 66 per cent of cases. More than half had seen their doctors about the pain and had been told that they had growing pains.

This group of children was compared with a group without such pains on a variety of our measures. The children with reported pains appeared to be more negative in mood and to be more intense in temperament. They were also more likely to be rated as having behaviour problems, although only for aggression were their scores above the average

for the whole sample. The only teacher-reported difference was in anxious-fearful behaviour, but again the differences were relatively small. These comparisons suggested that children with 'growing pains' might be more likely to have temperamental and behavioural characteristics which made them more vulnerable to experiencing and reporting pain. However there were no differences in teacher ratings of social skills, temperament, or academic achievement, indicating that any problems were more likely to be seen at home. The study suggested that there could be psychological influences on this particular complaint of childhood but, of course, it does not answer any questions regarding the origin of such pain experience.

Children with early language problems

Language and speech normally develop naturally and gradually over the first years of life, with comprehension usually being ahead of speech in the early stages. Girls are often (but not always) ahead of boys in the early stages of language development. Language skills have powerful and long lasting effects on the individual's ability to cope with life, not only in school-based learning, but also in the ability to reason, to learn, to solve problems, and to communicate successfully in interpersonal relationships. Therefore it is a very significant aspect of development. Because of the large sample spread across Victoria, we were not able to actually observe and test the language development of each child. However, when the children were 3–4 years, we asked the mothers to report to us whether their child had signs of delay in developing language, or whether they had other problems like stuttering or poor articulation, such that they were hard to understand. We also asked mothers to tell us if the child had ever had any speech therapy. The results using this method of reporting may not be completely accurate because mothers may not always recognise when a language problem exists. Thus, we might have had an underestimate of language problems.

Boys and girls differed significantly at 3–4 years in the proportions having difficulties. Thirteen per cent of boys were reported to have definite or suspected problems in language development compared to four per cent of girls. More boys were reported by their mothers as having been slow to talk (ten per cent of boys, three per cent of girls).

Because children with early language difficulties are at risk for later learning problems (especially with reading), we have tried to follow-up the children with early language problems to assess their progress. Forty-three children from the metropolitan area, whose mothers had reported that they had language problems when they were 3–4 years of age, were visited at home when they were in Grade 3 (around 8–9 years of age). At this time they were given tests of language development, intellectual ability, reading, and spelling. Almost 90 per cent of these children still had some difficulties with language in Grade 3. This was particularly the case for what is called 'phonological' ability. This ability includes knowing how words are made up of a number of sounds (such as c-u-p = cup); how to analyse printed words into their component parts, such as letters and syllables; and how to put together parts of words so that they make sense. Such skills are very important in learning to read.

We found that 20 per cent of the group had reading problems, and 42 per cent had spelling problems at this stage, especially if their language was still behind age-appropriate levels. However the positive side of this story is that 80 per cent of these children were reading well and did not differ from the average child in the classroom. The best predictor of reading progress was our measure of phonological ability, that is, children with better-developed phonological skills were more likely to be reading well, although other language abilities were also important in affecting whether a child made

good progress. This study confirmed the importance of specific language abilities in success in reading and spelling among a group of children with early signs of language problems.

A substantial proportion of these children were reported to have hearing problems between pre-school and Grade 3 and this would, of course, be a factor in their language problems. Hearing problems were reported in half of the 20 per cent who were having reading problems. Our results emphasise how important it is to be alert for delay and difficulty in early language development, and to provide assistance such as speech therapy. Some children will need special help at school when their language problems have not resolved, in order to help them to achieve as well as they can.

Further reading

See items 17, 27, 28, 36, 52, 66 and 77 in the list of Australian Temperament Project publications and Gore, 1992 in the References at the end of this book.

7 Temperament and psycho-social adjustment

Children of older mothers

These days many people are delaying beginning a family, sometimes because parents wish to develop their careers before giving time to raising children. Many are interested in whether having an 'older mother' affects the development of the child or the family in any particular way. We selected out from the sample all mothers who were 32 years or more, when their first child was born. This gave us a total of 79 families. We compared the children of these mothers with a group of 79 first-born children whose mothers were 25 years or younger when they were born. Children from the two groups were matched for gender, and families were matched on socio-economic status.

There were minimal differences between the two groups of children in temperament, or in behavioural development, suggesting that there is no particular effect on the child's psycho-social development, or on the mother' perception of the child, if the first pregnancy occurs in the over-30 age range. Hence our answer to the questions raised about older mothers is that, once you allow for the influences related to parental socio-economic status (for example, older mothers tended be of higher socio-economic status in our sample and this influences many aspects of health), and to child gender, the children do not differ at all from those of younger mothers in their temperament and their psychological health.

Rural versus city families

There is some literature suggesting that rural children may be at greater risk for adjustment problems than are those living in cities. Defining what is 'rural' and what is 'city' is not a simple task. We compared four groups of children; those who lived in the metropolitan area, outer metropolitan area, provincial cities, and rural areas, on our temperament and behavioural measures. We found virtually no differences between children from these differing geographical areas. So, at least in our sample and in the 1980s and 1990s, we could say that that rural or non-metropolitan children were not disadvantaged in terms of any of our measures of temperament, family characteristics, or child adjustment.

Infant temperament and other factors as predictors of adjustment at the pre-school age

To what extent are a child's emotional and behavioural problems predictable from their temperament when they are infants? How does temperament operate in combination with other significant influences in a child's early development to increase risk for problem outcomes? We examined these questions in children with serious behavioural difficulties when they were 4–5 years of age. Fourteen per cent of children were in this category according to parent ratings from the Pre-school Behaviour Questionnaire.

As our measure of temperament in infancy, we used our Easy Difficult Temperament Scale which allowed us to identify children with temperament characteristics of low cooperation, irritability, and high shyness. Around 15 per cent of children were rated as having a 'difficult' temperament on this scale. Other possible risk factors included in this study were:

- infant developmental problems including colic, sleep problems, and excessive crying;

- prematurity, perinatal stress, and male sex (because we know that boys are at greater risk than girls for problems in the early years);

- relationship factors including the mother's overall rating of the child on a scale of perceived difficulty; the Maternal and Child Health nurse's overall rating on infant difficulty, and her assessment of the level of adjustment of the mother-baby pair;

- aspects of the family environment, such as family socio-economic status, parental country of origin.

Factors which increased the likelihood of pre-school behaviour problems beyond that found in the whole sample (more than 14 per cent), were called 'risk factors'. Difficult temperament by itself was only a small risk for a problematic outcome at 4–5 years (23 per cent of 'difficult' infants had behaviour problems at 4–5 years). Indeed, most of our risk factors, by themselves, conferred a very small risk. The strongest single risk factor was the mother's overall rating of infant difficulty (26 per cent had later problems), which we take to reflect how easy or difficult the mother finds it to relate to her child. Other factors found to be risks were developmental problems, prematurity, perinatal stress, being male, a more problematic mother-baby relationship, nurse's overall rating of child difficulty, lower family socio-economic status and non-Australian parent, with rates of later problems ranging from 15 per cent to 19 per cent for these individual factors. Thus, these single factors in infancy were not very predictive of 4–5 year outcome.

However, when several risk factors co-ocurred, the level of prediction was much more powerful. Rates of later problems ranged from 29 per cent to 45 per cent when two infancy risks were present, and from 33 per cent to 68 per cent when 3 or 4 risk factors co-occurred. Interestingly, difficult temperament or mother's overall rating of infant difficulty always featured as one of the co-occuring risks that were highly predictive of maladjustment in the child four years later.

This study illustrated the fact that it is temperament in context, or as part of a range of child and family features, which affects development, through its influence on a range of other factors, especially mother-child interactions.

Stability of behaviour problems

The early developmental years are especially important in the learning of patterns of social behaviour. We know that once a child reaches the age of 7 or 8 years with a history of consistent and serious adjustment difficulties then it is quite difficult to make substantial changes to entrenched problem behaviours. We need to understand more about the ways in which things can go wrong, in order to improve our capacity to help children and families with difficulties.

We looked particularly at the stability of problem behaviours from infancy to school age by comparing three groups of children.

Group A: stable behaviour problems (defined as having problems, as rated by mothers, two or more times since infancy);

Group B: temporary or transient problems (rated as having problems only once since infancy), and

Group C: never rated as having problems.

We were looking for indicators in the children's developmental histories, which might assist us to identify those who could be at risk for entrenched problems.

Mothers of children in Group A had consistently found them more temperamentally difficult over the years, and this group had also shown more aggression in the toddler and pre-school period compared with Group C. Group B generally were rated somewhere between A and C on most measures of behaviour. There was also a trend for Group A to be rated by teachers as having greater difficulties, including a poorer relationship with teachers. An additional trend was for Group A to be of lower socio-economic status. The most salient characteristic of the children with stable behaviour problems was the greater severity of their difficulties. The transient group had shown difficulties but these were much less severe.

In an extension of this study we assessed the influence of family factors within a smaller sub-sample of children. Here, we found that mothers of children in Group A reported themselves to be more stressed, to have poorer life satisfaction and wellbeing, and a lower level of social support. There were no differences reported by the fathers of children across the three groups, and no clear associations with reported child-rearing practices. Temperamental difficultness, a lower level of positive adaptive behaviour, and teacher-reported problems including hyperactive-distractible behaviour characterised the Group A children in this study. Characteristics of the mothers' positive or negative life adjustment were clearly important in relation to child adjustment, once again emphasising the mix of influences which are associated with the development of problems.

Gender differences

In infancy there were very few differences between boys and girls on any of our measures. However, with each year of development, more and more differences began to emerge, most of them in the direction of girls being advantaged. It is important to remember that when we talk about gender differences, we are talking about average figures across a very large group of children, and our conclusions will not hold for each and every child. Looking at averages does not tell us much about any individual child; hence when we say, for example, that boys are more aggressive on average, this does not mean that every boy is more aggressive than every girl. But, for example, looking across the scores on aggression for the whole sample, boys as a group tend to have more problems than do girls as a group.

On average, girls tended to be more socially mature at younger ages than boys, that is, they were more skilled (or practised) at taking responsibility, such as doing small chores. This may be because parents expect and encourage their little girls to be responsible more than they do with their little boys, although we had no measures of this possible source of difference. There were no cognitive and learning ability differences between the sexes on the tests that we gave to 300 children from the project who completed full assessments during home visits between 3 and 7 years. But teachers reported that the boys had more difficulties adjusting to school. They showed poorer task orientation, were less socially competent, were more prone to hyperactivity and aggression, and some seemed less 'ready' for the demands of the classroom in the early years of school. Their ability to control or regulate their own behaviour was seen as somewhat behind that of girls.

In comparing the pathways across time which related to adjustment difficulties at age 8, we found that temperamental inflexibility was the best predictor for both boys and girls. In other ways the pathways were very different. Throughout development, temperamental inflexibility and poor persistence predicted behaviour problems for boys. However for girls, a more complex mix of factors was predictive, with child-rearing factors such as punishment and lower child-centredness being important. This suggested greater sensitivity to family variables for girls in their psycho-social development.

The study of pathways to different types of disorders in middle childhood, which is described below, also found that boys with adjustment problems tended to have a greater number of risk factors in their developmental histories, than had girls with adjustment problems. This indicated somewhat greater vulnerability to difficulties for boys.

Differences between boys and girls have persisted over the late-childhood period and into adolescence. Parents, teachers, and the children themselves have rated boys as having higher levels of aggression and hyperactivity. In terms of temperament characteristics, boys as a group have consistently been reported to be less persistent and more active than girls. We have found no differences between boys and girls on anxiety, but from 13–14 years onwards, girls have reported higher levels of depression than boys, and this difference appears to be increasing as the teenagers move through the adolescent years. Ratings from parents, teachers and children show that girls tend to have closer friendships and to be more cooperative, responsible and empathic than boys. Boys and girls were reported to participate equally as often in organised peer group activities such as sports clubs or community groups.

Prediction of externalising and internalising behaviour problems

Although we have plenty of evidence that adverse temperamental characteristics are associated with the development of behavioural and emotional difficulties in general, we also needed to question whether there are specific connections with particular kinds of problems.

In this study we examined the influence of early temperament and other factors on the development of *externalising* problems, such as aggression, oppositional behaviour, hyperactivity and attention problems. These are the so-called 'acting out' disorders which bring the child into conflict with the environment. We similarly investigated the precursors to the development of *internalising* problems. These problems include anxiety, depression, and social withdrawal, that is, problems which are internally troubling for the child. We looked at the degree to which these problems could be predicted by child-related attributes such as temperament, behaviour, school readiness, school achievement, and health, as well as by family factors such as the mother-child relationship, socio-economic status and family stress.

In general, we could predict outcome at 11–12 years quite well from as early as 3–4 years. Some risk factors were similar for internalising and externalising problems and this should not surprise us since one third of the sample had problems in both categories. But we also found some distinct patterns of risk factors for internalising and externalising problems. Boys and girls with externalising problems in late primary school had been more hyperactive from 3–4 years of age. Boys and girls with internalising problems had been more anxious-fearful from the same time period. Around 50 to 60 per cent of children with both externalising and internalising problems had shown these difficult behaviours in the earlier years, whereas for children with only one of these problems the rate of difficulties at any particular earlier time point was generally around 30 per cent.

Some gender differences were evident. For girls, but not boys, lower socio-economic status and lower reading skills at 7–8 years were risk factors for externalising problems (although relatively weak). Teachers rated externalising boys as being lower on task orientation, whereas there were no such differences for externalising girls. For boys, the internalising group had more problems on temperament dimensions such as Approach (shyness) at 1–3 years, Persistence at 3–4 years, Inflexibility at 5–6 and 7–8 years and Emotionality 9–10 years, perhaps indicating a more 'difficult' temperament profile overall.

The development of aggressive and anti-social behaviour

One group of children who are at considerable risk for maladjustment, continuing on into adolescence and adult life, are those who show serious levels of aggressive and anti-social behaviour such as destructiveness, fighting, lying, and defiance when they are young. Of course, most children will show some of these behaviours at some time. For example, we are familiar with the problems of the 'terrible twos' when children are especially likely to have tantrums, and to test out their parents' patience about rules, and acceptable behaviour. They may also try hitting parents, siblings, and other children just to see what sort of a reaction they get. This is part of learning what is permitted and what is not. There are some children who are rather aggressive in the early stages but who improve as they mature. But there are also those children who are notably aggressive and uncooperative from early in life who do not grow out of it and who may become worse. There is abundant evidence in the developmental literature that this group is at risk for difficulties at school age and in later life.

At 9-10 years of age (usually Grade 4 stage), we followed up some of the children who had been reported to have aggression problems in toddlerhood and during pre-school and Preparatory Grade. Those children whose patterns of aggressive, anti-social behaviour had persisted were:

- more likely to be boys;

- likely to have histories of difficult temperament and difficult mother-child relationships;

- likely to show more hostile interactions with brothers and sisters;

- subject to more severe parental disciplinary practices than comparison children. (The latter, of course, should not be surprising, since they are difficult to manage);

- more likely to get into trouble at school and to have difficulties with learning and with getting along with other children. A few of the boys in the study were reporting some pre-delinquent behaviours by the time they were in Grade 4, and their problem-solving and verbal abilities were below average.

In a further investigation of this particular problem, we looked again at a group of children who had shown high levels of aggression in Grade 6 (usually 11-12 years), and also in the first year of secondary school (about age 12–13). We measured anti-social behaviour, including fighting, destructiveness, lack of respect and rudeness, bullying other children, and lying. Looking back across development we found that:

- these children had early patterns of aggression which were very predictive of persistent anti-social behaviour at the early adolescent stage. These findings were true according to reports from all informants: parents, teachers, and the children themselves;

- most of the children with anti-social problems were boys;

- in general, aggression was not the only problem for these children, as they often had a combination of behavioural difficulties, and many had learning difficulties as well. They did not get on well with other children and their problems had been evident for many years;

- temperament differences were also evident on the Activity, Reactivity, Persistence, and Sociability dimensions;

- these children were less socially competent according to all three raters (parent, teacher and child); and also differed from non-aggressive children on mother's overall rating of child difficulty. Mothers and teachers reported them to have school problems and difficulties with peer relationships.

The early onset and persistence of anti-social behaviours which we have demonstrated so clearly in this project is consistent with findings from international research. It is clear that we should be attempting to intervene with the children and families early in development, before these kinds of problems become entrenched and difficult to modify.

Attention deficit hyperactivity problems

Hyperactive, impulsive, distractable behaviour along with difficulties in focusing and sustaining attention combine in a syndrome known as Attention Deficit Hyperactivity Disorder (ADHD). This set of problems attracts a good deal of attention in the community and is seen as a rather common problem in school-aged children in Australia. We have carried out a number of studies looking at various facets of the development of children in the project who developed symptoms of ADHD. As is commonly reported in international studies, many of these children also have learning difficulties and sometimes aggression and/or anxiety problems as well. In a study of the early signs or precursors to hyperactivity and aggression at the age of 7–8 years, we looked at the earlier histories of children who scored high on either our hyperactivity scale or our aggression scale, or on both scales, at several time points in the study. We compared these groups with children who were problem free.

Looking back at the histories of the children who had aggression problems (with or without co-occurring hyperactivity) indicated that in infancy and toddlerhood they had shown difficult temperament characteristics such as low cooperation-manageability, high activity-reactivity, and irritability. At 3–4 and 5–6 years mothers had rated them as more inflexible and less persistent in their temperament. The group with the most negative temperament attributes early in development was the one where the children had both hyperactivity and aggressive behaviours.

In addition to these temperamental differences, we identified other risk variables which appeared to contribute to their poor adjustment. These included parental perceptions of difficulty in the child from infancy onwards, greater socio-economic disadvantages in the family, more negative life events, and poorer self-perceived coping skills in the parents. The combination of difficult temperamental characteristics and adverse family factors seemed to produce children with problems in regulating their behaviour, that is, hyperactivity and aggression problems. Non-compliant behaviour was a strong feature of the histories of these children.

For the children with hyperactivity only, there was a trend for them to have suffered from some pre and peri-natal disadvantage in early life. They had been less problematic in behaviour in the early years of development by comparison with those children who were also aggressive.

Teacher data tended to confirm the reports by parents, although they reported an overall lower level of problem behaviour than did parents. They too found the children with

both sets of difficulties much more problematic, illustrating the cross-situational nature of their difficulties. In general, this study showed that it was the aggressive behaviour of the children which distinguished them from other children from early in life, rather than hyperactive behaviour. All three problem groups however, were reported to have academic difficulties.

Cheryl Clarke, in her PhD research at LaTrobe University, assessed a number of children from our study who had histories of aggressive and/or hyperactive behaviour, when they were 13–14 years of age. She used some neuropsychological tests, which tap into different brain functions and attention processes. She found that adolescents with both current and previous ADHD problems, whether they had additional anti-social behaviour or not, had many difficulties with planning and organising their approaches to the cognitive tasks and problems she asked them to complete. They were poorer than non-problem children in developing strategies for goal setting and problem solving, and in monitoring their performance. These cognitive tests showed in a more formal way some of the everyday problems children with ADHD have in managing their daily life, their school work and their homework, and we know this leads to great frustration for the children, their parents and their teachers.

In our most recent study of the series focusing on attention deficit hyperactivity problems, we were able to combine our data with that from the Dunedin Multi-disciplinary Study of Health and Development which has been going on in New Zealand now for more than 25 years. This group has followed almost 1000 children from the age of 3 years, and the members of their sample are now adults and establishing their own families. This research group too has measured behavioural and learning problems throughout childhood. We used data from both studies to investigate outcome in adolescence for children who had hyperactive behaviour and reading problems at 5–8 years of age. We found that early hyperactivity was associated with later behaviour problems of the anti-social type, and with persisting literacy difficulties and attention deficits, as well as with lower socio-economic status. If these children also showed anti-social behaviour and reading problems, they fared worse in adolescence than did those with just hyperactivity. This suggests that it is the reading problems and anti-social behaviour which frequently co-exist with hyperactivity, which most strongly predict a poor social and academic outcome.

Temperamental shyness

Shyness is an important dimension of individuality in childhood. Our temperament dimension of Approach measures this characteristic. We have carried out some studies of the stability of this trait and its effects on adjustment in children, from infancy to 7 years and onwards. These studies have shown that shyness is moderately stable for the first 6–7 years of life, especially for children at the extremes of this dimension. That is, very shy children tend to stay that way, and very outgoing, sociable children also tend to stay that way. Children in the middle range of this dimension are more likely to show some change. More girls than boys showed a pattern of consistent shyness.

We looked at the effects of parenting behaviours on the stability of shy behaviour. In this study we assessed the children's behaviour through home observation of a small sample of 7-year-olds, to see whether parent ratings of shyness/approach were consistent with how the children actually behaved when observed at home. Observational data matched well with the parents' ratings, adding confidence to the findings based on parent reports. For example, shy children were observed to talk less, to make fewer spontaneous comments, and to be slower to respond to a stranger, compared with non-shy children.

We found that some family factors such as the experience of stressful life events and some parenting practices did influence shyness and its stability. Late-onset shyness and stable shyness were associated with particular child-rearing practices, including lower child-centredness, greater use of physical discipline, and control through guilt and anxiety. Children who had been shy as infants but were no longer shy tended to have parents who did not make them feel guilty or anxious, were warm and nurturing, and who did not push them to be independent too soon. These findings serve to remind us of the importance of the 'fit' between a child's temperamental style and a parent's child-rearing style. However, there were no effects on the child's propensity for shyness of socio-economic status, birth order, family size, maternal shyness, or ethnicity.

Shyness and the development of anxiety

One question of interest to developmental and clinical researchers is the extent to which having a shy-inhibited kind of temperament in early childhood predisposes a person to develop anxiety problems in later life (Kagan 1994). We looked at this pathway by tracing the development of children in our sample who had much higher than average levels of shyness in the early years. We could do this in two ways: looking forward from infancy to adolescence to see how many shy children had developed anxiety problems in adolescence; and looking backwards to see to what extent anxious adolescents had a history of shy-inhibited temperament. We based our analyses on temperament ratings from mothers throughout childhood, and on both parent and adolescent ratings of anxiety symptoms at 13–14 years of age.

Being shy earlier in life, especially from the age of 9 years onwards, did increase a child's chances of having a clinical level of anxiety problems in adolescence. In fact, 42 per cent of children who were frequently rated as having a very shy temperament had anxiety problems at 14 years. However, of those children who had a clinical level of anxiety problems at 14 years, only 20 per cent had been consistently shy in early childhood. So the answer to the question differs depending on whether you look forwards or backwards in time. In general, we can say that persistent shyness is a risk factor for later anxiety, but most shy children do not become anxious adolescents.

Clinical diagnoses in early adolescence

In an in-depth study covering the period of transition into adolescence (11–14 years), we followed the progress of a group of project children considered to be 'at risk' for psychological problems. They were selected in Grade 6 because they had higher-than-average scores on our behaviour problem measures, as reported by two or more informants (parent, teacher, self). They were assessed at 11–12 years and then followed up in Year 8. This group was compared with children from the study who did not have any significant problems according to the same rating scales.

Trained psychologists visited the children at home where they completed some cognitive and academic assessments, and an individual interview designed to explore behavioural and emotional difficulties in greater depth. Parents also provided information about the family environment, and about the child's temperament at this pre-adolescent stage. Analyses showed that:

- almost half of our selected 'at risk' children received a clinical diagnosis (such as anxiety disorder, or conduct disorder); this was more common for boys than for girls;

- just under half of the diagnosed children had more than one kind of disorder;

- the most common diagnosis at 11–12 years was anxiety disorder. This was the only category to show a slight preponderance of girls;

- almost all the children with 'acting out' problems, such as ADHD, oppositional and conduct disorders, were boys;

- among comparison (not at risk) children, we found very few (9 per cent) who on interview turned out to have a diagnosed disorder, most often an 'internalising' type (anxiety, phobia, depression);

- the 'at risk' group of children was different from the non-problem group on the temperament dimensions of Reactivity, Persistence, Activity, and Sociability. In addition, they were less socially skilled, and less well adjusted in their peer relationships.

The boys (but not girls) tended to come from families of lower socio-economic status. Overall, the problem group also differed from the non-problem group on mother's reports of family and parent adjustment measures, with the former group characterised by more reported parental personal and family difficulties, along with less perceived coping ability, parental report of more use of punishment, and less warmth towards their children. These family differences applied predominantly to the problem boys.

For the most part, 'at risk' children who met criteria for a formal clinical diagnosis based on the child interview did not differ from those who did not warrant a diagnosis, either at 11–12 years, or in their earlier histories. This suggested that the rating scales we used were very efficient and economical in identifying children with significant adjustment difficulties.

We conducted a further series of analyses of the histories of these same children to identify predictors from our earlier measures of their adjustment at 11–12 years of age. The best predictor of current problems was the existence of earlier adjustment difficulties; that is, difficulties had been persistent over time and they predicted ongoing problems. As an example, if a child had behavioural difficulties at 3–4 years of age, that child was five times as likely to have such problems at 11–12 years, compared with a child without problems at 3–4 years.

While the problem and non-problem groups differed in terms of their earlier temperamental styles, those differences were less powerful predictors than earlier behavioural and emotional difficulties. The most important temperament factors in our prediction analyses were self-regulation characteristics, such as inflexibility, and poor task persistence, and also negative emotionality.

The limited measures of family factors used in this study had rather weak predictive power for pre-adolescent problems, with the only significant predictor being parent report of family life stress and coping. The child's temperament and behavioural characteristics were more powerful predictors, and this was the case using both parent-reported, and teacher-reported information. Several additional measures provided by the teachers were predictive of problems for boys in particular. These were lower school-readiness as rated in the first year of school, temperamental task orientation, and reading and academic skills in Grade 2.

The majority of 'at risk' children had consistent histories of adjustment difficulties going back to their early developmental stages. Mothers of these children had usually rated them as more difficult than average. The findings were mirrored in the school-based information and painted a picture of early emerging, widespread, and enduring differences on school adjustment and learning measures in those children showing significant adjustment difficulties at 11–12 years of age. This study using detailed assessments and interviews confirmed that for some children, problems can be identified early in life; they are persistent and they are predictable from pre-school age onwards.

Follow-up in adolescence

The children in this same study were visited and interviewed again two years later to assess stability and change in adjustment over this important adolescent transition period. During these two years they had moved from the relatively sheltered environment of the primary school into the secondary level of education, where more independence is required. For many children, this also represents a significant transition period in development, with the onset of puberty. An important question was whether the children who had clinical diagnoses at 11–12 years remained in the risk range for psychological problems, or had improved; and also whether the pattern of disorders in the group had changed across the two-year transition period.

Among the group originally selected as 'at risk' for disorder in 1994, there were some changes in the types of disorders found two years later. There was a lower level of anxiety disorders and a higher level of externalising disorders at 13–14 years. Very few children were depressed, although the number was slightly higher than at 11–12 years. We have summarised and simplified these results by grouping problems as 'externalising' (hyperactive, oppositional, anti-social), 'internalising' (anxiety, phobias, depression), or 'both types' when children had an externalising and internalising problem. Thus among 'at risk' children, we found:

Of those who were problem-free at 11–12 years, at 13–14 years
78 per cent remained problem free
19 per cent had an externalising diagnosis
2 per cent had an internalising diagnosis
1 per cent had both types of diagnoses

Of those with an externalising diagnosis at 11–12 year, at 13–14 years
31 per cent were now problem-free
61 per cent still had an externalising diagnosis
4 per cent had an internalising diagnosis
4 per cent had both types of diagnoses

Of those with an internalising diagnosis at 11–12 years, at 13–14 years
55 per cent were now problem-free
14 per cent had an externalising diagnosis
24 per cent still had an internalising diagnosis
7 per cent had both types of diagnoses

Of those with both types of diagnoses at 11–12 years, at 13–14 years
31 per cent were now problem-free
15 per cent had an externalising diagnosis
15 per cent had an internalising diagnosis
39 per cent still had both types of diagnoses

One way of looking at these results is to ask (ignoring type of diagnosis for the moment), if a child did, or did not, have a diagnosis at 11–12 years, how likely was that child to be in the same situation two years later? Our answer to this is there seems to be high stability, since almost 80 per cent of those who did not have a diagnosis were still in this category two years later. Seventy per cent of those children who had 'externalising' or 'both types' of diagnoses at 11–12 years still had a diagnosis of some kind two years later. A smaller proportion, but still a majority, of children with an earlier 'internalising' disorder were also diagnosed two years later.

However when we look at stability in type of diagnosis, we find greater variability: 60 per cent of 'externalising', 24 per cent of 'internalising' and 39 per cent of 'both types'

showed the same pattern of diagnoses two years later. Thus we found a high level of 'sensitivity' in diagnosis (good ability to identify children with, or without, ongoing significant problems), but a low level of 'specificity' (ability to accurately identify specific, stable types of diagnoses), since children often moved from one category of problem to another. There were no differences between boys and girls in terms of stability or change.

How did the children who were not considered 'at risk' for diagnosis at 11–12 years fare two years later? We found a very similar picture to their earlier state, since only 9 per cent of comparison children had a diagnosis at follow-up. Thus among comparison children too, there was high 'sensitivity' of status (that is, stability of 'diagnosis' or 'no diagnosis').

In summary, there was considerable stability in whether or not a child had a diagnosis across the two years, but notable change in types of disorders for those who had a diagnosis at both 11–12 and 13–14 years.

Further reading
See items 23, 28, 30, 38, 39, 44, 47, 48, 53, 55, 56, 59, 64, 67, 73 and 78 in the list of Australian Temperament Project publications and Cann (1991) in the References at the end of this book.

8 Temperament and social competence

It is just as important and interesting to understand how socially competent behaviour develops in children, as it is to explore the pathways to the development of emotional and behavioural problems.

At regular intervals from 9–10 years onwards we obtained measures of social skills from parents, teachers and the children themselves. We report here some summary data from those studies where we measured the factors of assertiveness, cooperativeness, empathy, self-control, academic competence, responsibility, and overall social skills levels.

There was a trend for our children to score more highly, that is to appear more socially skilled, than do children from the US where our measurement scale originated; this was especially the case at the age of 11–12 years. In summary:

- Girls were consistently rated as more socially competent than boys overall, although the differences were generally only in the order of a few percentile points.

- Teachers reported a greater percentage of very socially competent girls (43 per cent) compared with boys (18 per cent). This may reflect the greater maturity of girls at the end of primary school, and the fact that teachers found them more cooperative and socially easy to get along with.

- On teacher-rated academic competence, boys and girls were equivalent at the end of primary school.

- Ratings at 13–14 years provided by parents and from the children themselves showed some shifts in scores. According to parents, the adolescents now appeared to have similar levels of social competence to those in the US. There was a slight trend for teenagers to rate themselves as more competent than did their US counterparts.

- Gender differences were small at 13–14 years, but still in favour of girls on teenager reports. There were similar proportions of boys and girls in the high empathy category but a greater proportion of boys with a low level of empathy (28 per cent) compared with girls (18 per cent).

- Parent report showed a greater proportion of girls (24 per cent) with high capacity for responsibility compared with boys (13 per cent) at 13–14 years.

- There were no differences in the proportion of boys and girls categorised as high, average or low in overall social competence at 13–14 years by parent report.

Prediction of social competence across time

A major question in this research programme concerned the contribution of our measures of temperament and other variables in predicting positive social adjustment or competence. We can look at associations between child and family characteristics at the same point in time and also across time. The research on resilience and coping, as reported later in this chapter, is an example of prediction to competence across time within particular selected groups of children.

Using the whole sample of children, we found high levels of association between both temperament and peer relationship factors with social competence at the 11–12 year age level. The temperament factor of Persistence along with positive ratings of peer relationships were the main predictors of parent or teacher-rated social competence. When we combined reports of social skills from parents, teachers and the children themselves in a predictive analysis, the same factors emerged and were powerful predictors of the combined social competence score. Teacher-rated peer relationships was the strongest predictor, followed closely by parent-rated temperamental persistence.

Longitudinal prediction of social competence at 11–12 years from measures we obtained when the children were 7–8 and 9–10 years was much weaker than when we looked at the same point in time. The best predictor of social competence across these four years of development was mother's overall rating of temperamental 'easiness' at 9–10 years; followed by teacher rating of temperamental task orientation at 7–8 years, mother's rating of child empathy and caringness at 9–10 years, and temperamental flexibility at 7–8 years.

Similar analyses of social competence ratings obtained at 13–14 years showed that the most significant parent-rated predictors at this point in time were the temperamental dimensions of Negative Reactivity and Persistence, and peer relationships. For teenager ratings of themselves, peer relationships and school adjustment were the best predictors of social competence. Pooling together information from both informants indicated that parent ratings of temperamental persistence, along with feelings about family attachment as rated by the teenager, were the most substantial predictors of social competence. Parent-rated negative reactivity in temperament was also influential in outcome to some extent.

These analyses make good sense in showing that positive, easy, flexible, and caring children are likely to develop valued social skills, and to be seen as competent as they mature. Again, it is clear that temperamental features contribute to this positive aspect of development.

Resilience in children

One issue of special interest in many overseas studies and in our project has been the question of resilience in children who experience adversity in their early development. When children grow up in situations of family disadvantage and stress, such as in poverty, or when they lose a parent, or if parents are seriously ill or drug-addicted, what helps them to cope well and remain competent and well adjusted, despite adversity?

Why do some children survive well despite such disadvantage and difficulties, and others develop problems and find it very hard to cope with life? We thought that temperament might be an important factor, and we wanted to know what other aspects of the child or the family situation might be influential in 'protecting' a child from any ill effects of adverse life events and experiences. Two studies were focused on these questions.

(i) Resilience Study One

A small number of families in our project did have severe disadvantages and we made a special study of these families. Jan Smith, the Senior Psychologist in the Child and Adolescent Psychiatry Department of Monash Medical Centre, carried out this research for her PhD.

There were 18 families from the project who were identified as severely stressed at the time of this study (early 1990s), and between them they had 40 children of school age. Another 14 families, not from the project but referred to the study by professional

workers, were added to this sample, making a total of 81 children from 32 families. The stresses experienced by the families included such things as chronic illness, low income, drug addiction in parents, marital disruption, housing difficulties, unemployment, single parenthood, and loss of significant family members or friends. We included in this study every child of school age, in each of the families, not just the identified project or referred children experiencing significant stressors. This way we could compare how children in the same family, exposed to similar stresses, were coping.

We assessed each child's temperament, intelligence, behavioural adjustment, performance at school as judged by teachers, and children's own perception of their strengths. We also assessed the mental health of the mothers and fathers; their self-perceived levels of stress and coping, and perceptions of social support; mother's level of warmth and acceptance of their children; and their ratings of family support and 'togetherness'. We found that:

- 38 of the 81 children from these families were judged as resilient in the home environment; that is, they had no adjustment problems at home despite their disadvantages;

- 43 children were judged as having a significant level of difficulty and could be described as not resilient;

- the resilient children were particularly characterised by an easy-going and positive temperament, and a very warm mother-child relationship;

- 51 children were judged resilient according to reports from their schools and these children were characterised by a more easy-going temperament, higher mother-child warmth, fewer negative life events, and lower reported stress levels than in the non-resilient group;

- the level of stress that a mother was experiencing and how well she felt she was coping were related to how many of her children were resilient, especially in the school environment;

- in only two families were all the children resilient;

- in 16 families, none of the children were coping well;

- in the remaining 14 families, between one-quarter and two-thirds of the children were coping well overall;

- it was apparent that there were complex relationships between the factors influencing resilience. The more positive and easy-going children seemed to be able to attract and maintain positive attention and appreciation from their parents, teachers, and others, thus providing happy relationships which diluted the stresses in their lives, and helped them to feel that they were doing well.

(ii) Resilience Study Two

In a different kind of study focused on the same question, we used data from the whole project sample to identify children whose families were suffering from risk factors when they were 9–10 years. These difficulties included factors such as large family size, unskilled or semi-skilled father, many changes of residence, divorced or single parents, and two or more negative life events (serious illness, loss of significant other, major drop in income, etc.). Two or more of these problems were reported in 201 families and, for most of them, the stresses were persistent.

To assess the effects of these adversities over time, we focused on outcome for the children of these families at 13–14 years, that is, 4 to 5 years after the reports of stress. This sample of children could be divided into three groups: those who were coping very

well according to our adjustment and competence measures, despite earlier family adversity; those who were clearly not coping well; and those children who were in the average range. Competence (our measure of coping) was defined as high scores on parent and self-rated social skills including factors of cooperation, assertion, self-control, responsibility, and empathy. We found that:

- the highly competent/coping children had been consistently competent over the period from 9–10 years through into adolescence, that is, coping well was an enduring characteristic;

- the poorly coping children, on the other hand, had consistently more adjustment difficulties and poorer social skills across time; their poorer level of adjustment was persistent;

- temperament factors were important in differentiating these groups. The highly competent children were better at regulating and modifying their emotions and their behaviours in response to environmental demands. They showed greater emotional control, were more task focused, and able to persist with their interests and activities. Their mothers found them easier to live with. They were also more successful academically, their family and peer relationships were better, and their communication skills were also very positive. Poorly coping children were having difficulties in all these domains;

- teachers' ratings of these children in their final year of primary school were consistent with those made by parents and by the children themselves. Teachers reported the high coping group as having more positive temperament features, and good academic and social competencies.

In general, it appeared that the coping skills of the resilient group were present early and consolidated over time, while the poorly coping children fell progressively further behind. Comparisons between the children from adverse family circumstances who were not coping well, and poorly coping children from non-problem circumstances showed no differences on our measures of adjustment. Hence early adjustment difficulties in children in non-adverse circumstances were similar to the adjustment problems characterising those who did suffer from disadvantages.

From the point of view of the importance of temperament in these pathways to resilience, those characteristics which we call temperamental self-regulation (persistence and flexibility) and positive emotionality clearly play a very significant role as 'protective' or supportive factors for individuals experiencing adversity, in helping them to remain well adjusted.

Further reading
See items 46, 47 and 60 in the list of Australian Temperament Project publications at the end of this book.

9 School: social and academic issues; peer relationships

Learning progress at school, especially literacy

We have completed six studies of the children's progress in reading. Two of these occurred at the Grade 2 and Grade 6 stage, with all of children in the project included. The other four were smaller studies of children who were having problems of one kind or another and these were aimed at increasing our understanding of why some children do not do well at school. In all of these studies we have looked at the relationships that exist between academic difficulties and behavioural difficulties. These frequently co-exist in the school-aged population.

Reading Study 1 (Reading and spelling in Grade 1)

Within a smaller study of 300 children selected from the total sample for an in-depth study of development from 3 to 7 years of age, we tested all children on intelligence, reading, letter knowledge, school readiness, temperament, and family factors, when they were in mid-to-late Grade 1. Predictors of reading ability in Grade 1 were the child's intellectual abilities, letter-sounding skills, auditory discrimination and blending, teacher rating of the child's academic skills, and the child's own rating of his/her cognitive competence. We could predict whether children were struggling readers or good readers with almost perfect accuracy on the basis of their scores on these language and intelligence factors.

There were 52 children who were slower-than-average to learn to read (approximately 22 per cent of the sample). Assessment of these struggling readers, showed that they tended to be of lower intelligence than normally reading children (although still in the average range) and that they were more likely to have a higher level of behaviour problems, especially attention deficits and hyperactivity. They were also children who had been more difficult to manage during the pre-school years.

We visited these children at home a little over a year later (most were in Grade 2), and measured their intelligence, their reading and spelling, and their knowledge of the sounds and shapes of language and print. This latter aspect included seeing what they could identify by sound, for instance, sounding out letters, or knowing if two words sounded the same or different (these are phonological skills). We suspected that the children who remained delayed in reading would have poorer knowledge of language in sound as well as in print, compared with those who were now progressing at a rate appropriate for their age.

When we assessed them in Grade 2, almost one-third of these children had 'caught up' or almost caught up, and were reading at an age-appropriate level. However the other two-thirds were still behind. Those who had caught up were likely to have better knowledge of language as shown in their ability to sound out the letters of the alphabet, just as we had predicted. Those who were still struggling tended not to have well-developed phonological skills to help with reading of new words. They were also more

likely to have behaviour problems such as inattention and disruptiveness in the classroom, which may have hindered them from successful learning. They tended to show more difficult temperament characteristics, and teachers had rated them as having poorer language skills, and as being less 'ready' for school. Half of the 52 problem readers from this Grade 1 study were included in our Grade 6 assessment (see Study 4 below), and 70 per cent of them were found to be still below-average in reading.

This study highlighted the influence of early behaviour problems and of phonological skill acquisition in the early stages of learning to read. For many children with these early difficulties it was very difficult to 'catch up'.

Reading Study 2

The second reading study was carried out using the survey method with the larger sample.

With parents' permission, we asked all the teachers of the project children when they were in Grade 2 to report on progress at school and on their behavioural adjustment, and to give each child a brief reading test. In this test the children had to pick out from a list of three alternatives the word closest in meaning to the target word they had to read, for example, tale (end-story-sleep); paddock (fence-sheep-field). Some 1205 teachers (almost 75 per cent of those asked) sent in the reading test data. Table 3 shows the range of reading skills among our children at 7–8 years of age.

The average number of correct answers for the whole sample of Grade 2 children was 14 out of a possible 20. However 16 per cent of the sample (or about four children in every classroom in the average school population) could only recognise 8 words or less; that is, they were very much behind in their reading (see Table 3). The average for this 'reading disabled' (RD) group was 4.9 words correct out of 20. Almost three per cent of

Table 3	Reading achievement at 7–8 years of age			
Reading Score	Number of children with this score	Percentage of children with this score	BOYS percentage	GIRLS percentage
0	29	2.4	66	34
1	10	0.8	50	50
2	4	0.3	25	75
3	12	1.0	50	50
4	14	1.1	64	36
5	25	2.0	60	40
6	23	1.9	48	52
7	38	3.1	50	50
8	52	4.3	63	37
9	47	3.9	50	50
10	67	5.5	66	34
11	78	6.4	54	46
12	47	3.9	53	47
13	67	5.5	52	48
14	78	6.4	55	45
15	94	7.7	50	50
16	116	9.5	47	53
17	146	12.0	56	44
18	139	11.4	50	50
19	136	11.1	40	60
20	82	6.7	43	57

Source: Australian Temperament Project 1983–2000.

project children could not read any words at all. Teacher ratings showed that the RD children were poorer on a range of specific academic skills (reading, spelling, writing, and maths), on language development, and on overall progress in learning. Of the RD children, 56 per cent were boys and 44 per cent were girls, so there was just a slight (non-significant) preponderance of boys. Among the best readers (19 or 20 words correct), significantly more were girls (59 per cent versus 41 per cent).

Forty per cent of the RD boys, and 15 per cent of the RD girls, also had behaviour problems. These were of many kinds but were more likely to be hyperactivity, attention difficulties, and conduct problems. Hence there was a strong association between failing to learn to read at a normal rate, and having behaviour problems, especially for boys.

All of our work in the project has shown that having behaviour problems in the years just preceding school entry and continuing on into the first few years at school is a powerful risk factor for the development of learning difficulties, especially in boys. Girls are at much less risk for this association with behaviour problems, even if they are slow to learn to read. In addition, we, like many others, have confirmed that progress in reading can be greatly helped if children have some knowledge of letters, and a good vocabulary when they begin to learn to read; and if parents themselves are interested and encouraging about reading with their children.

Reading Study 3
Our third study of school progress was again carried out with a smaller sample of children whom we studied in greater depth in a follow-up of reading progress from Grade 2 to Grade 4.

When the children from the Grade 2 survey study were in Grade 4, we followed-up approximately half of those who had been struggling to read in Grade 2 (some were not able to be contacted, or their parents declined to have them included, and some lived too far away to be visited). We also included for comparison two other groups of children: those who had behaviour problems but were reading normally in Grade 2; and a comparison group of children who had neither reading nor behaviour problems in Grade 2. We saw a total of 156 children. All the children were visited at home and assessed with the Neale Analysis of Reading Ability Test, the Schonell Spelling Test, and a brief test of their intelligence. Parents and teachers rated the adjustment of all the children at home and at school.

The first important finding was that very few RD children 'recovered' between Grade 2 and 4. Five children with RD but no behaviour problems in Grade 2 (14 per cent) were reading at a normal level in Grade 4; four children with both RDs and behaviour problems likewise (11 per cent). Seven of the RD only children (19 per cent), and 3 (8 per cent) of the RD plus behaviour problem group were 'borderline', that is, they had moved closer to a normal reading level but were considered still 'at risk' . Hence the study showed that it is not the case, as is sometimes claimed, that children 'grow out' of their learning problems.

Overall, spelling was much worse than reading among the RD children at Grade 4, with almost all being at least 18 months behind the appropriate age-level of skill. Improvement in reading was not related to severity of early reading problems, nor to gender, nor to whether the child had received any special help. Importantly, the group with RD plus behaviour problems had made significantly poorer progress than the RD only group.

Those children who had improved were more likely to have parents of higher education and occupational status. While we have no direct evidence on this from the project, it may suggest that if parents encourage and assist their children, and value reading achievement very highly, this may be helpful in some cases. There are other children, of

course, who continue to have difficulties no matter how concerned and active their parents might be.

Another interesting finding was that children with behaviour problems who were reading well, improved in their adjustment by Grade 4; almost half were reported to be significantly better adjusted in their behaviour in the classroom. So good progress in reading may help a child to make a better adjustment in the school, in spite of early problems.

Looking back at the early histories of the children with behavioural difficulties (many of whom also had RDs), showed that they could be distinguished from non-problem children by a history of difficult temperament, and problems with behaviour as far back as toddlerhood. This is further evidence that, for some children, early behavioural difficulties lead them into school learning difficulties. Without some help in learning to manage their behaviour, before they begin school, there is a risk of longer-term problems. A particular focus that is needed to help with this risk situation should be on problems of attention, concentration, distractibility, persistence, compliance, and general self-regulation of behaviour.

The children who had just reading problems could not be distinguished from the normally reading comparison children on any early variables, so we could not have predicted their reading difficulties from our knowledge of their temperament and early socio-emotional development. However, as seen in the studies of language-delayed and Grade 1 RD children reported earlier, there are some hints that when phonetic and language abilities are delayed in their development, these children are 'at risk' for continuing RD.

Reading Study 4
Our fourth study of learning problems came from a further survey of reading progress when almost all of the children were in Grade 6. This was part of our 1994 survey of all project families.

Again, we asked teachers from across the state to give a reading test (Australian Council for Educational Research Word Knowledge Test, Level D) to the project child in their class. This 40-item test was similar in format to the test used in Grade 2. The child had to choose the word closest in meaning to a specified word; for example, for 'berthed', the options were 'reached', 'docked', 'settled', and 'camped'. Scores for the ATP cohort ranged from 0 to 37. A quarter of the project children were very much below-average for their age (below the 20th percentile), and most of this group were boys (64 per cent versus 36 per cent girls). At the other end, 16 per cent of children were very much above-average (above the 80th percentile), and almost equal numbers of boys and girls were above-average, or very good readers. As expected, boys seemed to have 'caught up' to girls in their reading skills by Grade 6, for the most part.

We had data for 147 of the RD children from study 2. Most of these were still experiencing difficulties: 44 per cent were very much below-average, 22 per cent were below-average, 14 per cent were average, and 6 per cent were above-average readers. These data showed just how persistent reading problems are, even though some children do 'recover'.

Reading Study 5
The fifth study was carried out by Sharon Waring for her Masters research thesis in Clinical Neuropsychology.

A smaller group of the project children who had shown reading problems in Grade 2 were visited at home and completed some neuropsychological tests, and tests of reading progress in Grade 6 (end of primary school). We were investigating whether there were

particular cognitive abilities (such as memory) which were associated with recovery from early reading difficulties.

About one-third of this group of children with early reading problems were reading at age-appropriate levels in Grade 6. The remainder were still behind, particularly in their spelling ability levels. The best predictor of recovery for boys was the absence of persistent behavioural problems, rather than specific cognitive abilities. Phonological skills also affected progress, in that those who were still RD had not managed to develop phonological skills sufficiently well to help them to achieve normally by Grade 6. For girls, none of the factors we measured were associated with recovery, so the origins of their difficulties remain somewhat of a mystery to us. It may be that there were other attributes that we had not measured in detail in our study (such as early language deficits) which played an important role in reading achievement for girls.

Reading Study 6
Our final reading study occurred when the children were 13–14 years old and most were in Grade 8.

We visited as many of the children whom we knew to have had early reading difficulties as we could (133 teenagers). We tested them all on word and sentence reading, written arithmetic, and written spelling. Almost half of the children who had been behind in reading in Grade 2 still had reading difficulties at 13–14 years, while almost two-thirds had spelling and/or maths difficulties. Overall, more than 80 per cent had learning difficulties of one kind or another. Whether or not they had received remedial assistance did not seem to affect outcome.

For boys, the strongest risk factors associated with persistence of learning difficulties were vocabulary knowledge and earlier behaviour problems, with family socio-economic status also adding a small amount of risk. However, again we found no clear specific predictors of outcome for girls, even though, as with the boys, the more risk factors they had, the more likely they were to have continuing difficulties. The pathways to reading difficulties for girls remain poorly understood, and deserving of further research.

Characteristics of children who were reading well at 7–8 years

Of course, the majority of children in the sample were reading at an average or above-average level in Grade 2 (see Table 3 above). We looked back at the histories of the children who were reading very well during this third year of primary education, that is, those who had made a good start in the critical early years of education. The good readers differed from struggling and average readers as follows:

- they had lower levels of behavioural difficulties at all ages;

- they had more positive temperamental characteristics at all ages;

- they had more positive ratings by teachers from school entry onwards on, including readiness for school, temperament characteristics, behavioural adjustment, social skills, and academic competence;

- they came from more advantaged family environments.

Our follow-up studies all showed that very few children who began well later developed either reading or behavioural difficulties, thus indicating that a successful start augurs very well for continuing good academic and psycho-social adjustment. Social class clearly exerted a persistent effect, with children from families whose parents were better educated and of higher occupational status having an advantage from the beginning of life in their chances of success at school. This unsurprising finding is repeated in studies

all over the world. It was also noticeable that good readers in Grade 2 had consistently been rated as more temperamentally persistent by both parents and teachers, over the early years. Thus temperament, particularly the capacity to control, focus and maintain attention, also influenced early learning progress.

Peer relationships

To have satisfactory relations with children of one's own age is a very important aspect of children's social adjustment, and becomes increasingly central as children move into adolescence. We thought that child temperament characteristics might have a significant impact on the development of both good and problematic relations with peers (age-mates). At 11–12 years, we obtained information about peer relations from the children, their parents, and teachers. We asked how popular the children were with their peers, how much they interacted with peers, how many friends they had, and how easy they found it to interact with peers. From these measures, we formed three groups of children: those who appeared to have very good relations with peers, those with problematic relationships, and an average group.

We looked at the temperament characteristics of these three contrasting groups at six previous survey points from infancy to 9–10 years. There were only slight differences between groups at infancy. But from 1–3 years, children who went on to develop problematic peer relations were more irritable, uncooperative and inflexible than those who went on to develop average or good relations. Prominent among those who later developed peer problems were early-emerging behavioural difficulties like aggressive behaviour, and anxious-fearful behaviours, and their parents had regarded them as more difficult children from early childhood. At the start of school age, their teachers reported them as less ready for school, and as having less social competence. Thus, from early childhood, children who later had problems with their peers appeared to had have more difficulties adapting to change and in fitting-in with others' expectations, as well as more acting-out and emotional problems, and signs of immaturity. Presumably these characteristics contributed to their emerging difficulties with peers.

Some differences in predictors were found between boys and girls. Most notably, boys who later developed peer problems were less persistent and less able to stay on-task than those with good or adequate peer relations, whereas these factors were not predictors for girls. Irritability and inflexibility discriminated between groups of boys more strongly than they did for girls, suggesting that temperamental dimensions may have a stronger impact on boys' social relationships than on those of girls. Levels of shyness and sociability did not differentiate between those with good and poor peer relations. In contrast to overseas studies which have suggested that school failure leads to rejection from peers, we found that poor performance at school work was not related to peer relations. Neither were socio-economic status nor family life stress related to peer relations.

At 11–12 years, the children with peer problems were less assertive, more anxious and fearful, had poorer self-control and were less cooperative, compared with those with average or very good peer relations. Boys with peer problems also had more conduct problems and reported a poorer relationship with their parents. Thus their problems with peers were part of a constellation of adjustment difficulties. These findings suggest that the best way to help young children with problems with their peers might be to address their general social skills and behaviours, rather than focusing specifically on how they relate to other children.

Another facet of peer relations is the impact on children of having friendships with children who engage in socially maladjusted or unacceptable behaviour such as

delinquency and substance use. Considerable work in the US has documented the risk involved in a child associating with what are known as 'deviant peers'. By asking project teenagers about the behaviours of their best friends, we have been able to determine the extent to which they associate with 'deviant peers', and whether this is related to their own behavioural adjustment. As will be seen in the section on adolescence below, one important finding here is that a major risk for teenage substance use and delinquency is having a friendship with a substance-using or delinquent peer.
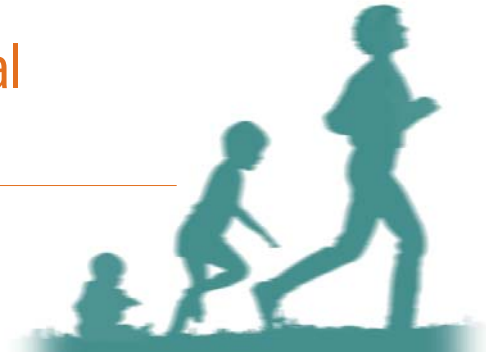
Further reading

See items 42, 45, 49, 50, 51, 54, 57, 65 and 68 in the list of Australian Temperament Project publications and Nursey (1993) in the References at the end of this book.

10 Temperament and social responsibility

An important developmental task for adolescents is to begin to play a part in the wider society. How do our adolescents see their roles in relation to the community, the nation and the world? At the ages of 15–16 and 16–17 years, we asked them questions about their awareness of and interest in politics, their involvement in political activity, and in voluntary community activities of various sorts. Other questions tapped their beliefs about where responsibility lies for addressing social issues, and whether individuals' actions can have an impact. We also asked parents to give their perspective on their adolescent's attitudes and behaviour in several of these domains.

The ATP adolescents expressed considerable concern about what the world will be like in the future: 52 per cent reported they 'sometimes' worried about this, and 26 per cent said they worried 'very often'. They also showed feelings of responsibility for helping other people (69 per cent 'sometimes', 23 per cent 'very often' felt responsible in this way). This was not limited to a personal sense of responsibility. The great majority expressed beliefs indicating that it is everyone's responsibility to address global social problems, and that individual action can make a difference. Only 10 per cent strongly endorsed the belief that finding solutions to problems is the responsibility simply of world leaders.

In terms of their actual behaviour, two-thirds of the adolescents reported following international news (although only 15 per cent reported doing so 'very often'). Rather fewer reported following Australian political news. Politics, whether local or international, evoked strong feelings in one-third, although only 9 per cent reported strong feelings 'very often'. The proportion who showed any active involvement in political affairs, such as attending meetings or rallies, and writing letters to local councils or Members of Parliament, was even smaller – 14 per cent 'sometimes', and 3 per cent 'often' or 'very often'.

Higher levels of activity at more local levels were evident, including quite high levels of engagement with school activities – 55 per cent were involved in the school organisation (being a class or sports team captain or a member of the Students' Representative Council). A similar proportion also reported active support, through voluntary work or giving money, for organisations which help disadvantaged people. Most were also involved in fund-raising activities; these were probably mostly school-organised projects such as the 40-hour Famine (to support World Vision), Red Nose Day (to support research into Sudden Infant Death Syndrome) and Community Aid Abroad's Walk Against Want. Over a quarter reported visiting elderly or disabled people to cheer them up, which is impressive (many of the visits may be to grandparents). One in five reported being active in a group working for social change, such as environmental or community groups. Thus a somewhat higher level of activity is evident where the focus is on local issues rather than national or international issues.

We included two questions concerning environmental problems in this questionnaire. Just over half of teenagers reported that they sometimes, or very often, encouraged others to conserve resources, while two-thirds said that they tried to protect the environment. On each of these questions, significantly more girls than boys endorsed

these views. Parents reported that 70 per cent of their daughters encouraged others to recycle, sometimes or often, while 52 per cent of their sons did so.

The Australian figures on attitudes to social issues are fairly comparable to data on social responsibility among US adolescents. Nevertheless, the discrepancy between the 80 per cent who are concerned about the future and the 20 per cent who are active in working for change is notable. We explored factors which might explain why some adolescents were active in these domains, and others were not. Socio-economic status of the family was not related to the adolescents' beliefs or behaviours in this area. A substantial number believed there were not enough opportunities available for them to engage in socially responsible behaviours, although these beliefs were not related to whether they were in fact active in this domain. A cooperative versus competitive orientation appeared to be one factor involved in adolescents' civic responsibility: those who most preferred to work in a cooperative environment were also more likely to be politically and socially aware and active.

Gender was clearly another relevant factor. This has been found by others (Bowes et al. 1996, in Australia, and Rosenthal et al. 1998 in the US), with girls reporting considerably more socially responsible attitudes than boys, along with stronger beliefs in the responsibility of everyone to work for a better world, and in the ability of individuals to make a difference. In contrast, although boys and girls themselves did not self-report any differences in levels of political awareness, parents reported boys to be more politically aware than girls.

Other important influences on teenagers' levels of social responsibility were patterns of behaviour, parenting styles, and relationships with peers. Adolescents showing more oppositional and hyperactive behaviour, tended to show less political awareness, less pro-social community behaviour, and less belief in the responsibility and efficacy of individuals' actions. Similar but slightly weaker and less consistent relationships were found for depression and anxiety.

Temperamental persistence at 15–16 years (sticking at tasks until they were completed) was related to higher levels of social responsibility overall. Shyer children were less likely to be involved in pro-social community activity. More active children tended to engage in less pro-social community activity.

In terms of parenting, adolescents whose parents reported higher warmth towards them, and who monitored their children's behaviour, tended to have higher levels of pro-social community activity and stronger beliefs in the responsibility and efficacy of individuals. Parents who were more likely to explain and discuss issues with their children had adolescents who were more politically aware/active. Parents using high levels of punishment had adolescents who were less politically aware/active, less pro-social, and with weaker beliefs in individuals' responsibility and efficacy.

The strongest single predictor of whether the project teenagers engaged in socially responsible behaviours was whether their friends did so. This again illustrates the influence of peers on behaviour at this adolescent stage.

Looking backwards in time at the earlier histories of young people with high levels of civic responsibility in mid-adolescence, we found that they had been very well functioning in a number of facets of their lives. They had been doing well at school and valued their school experiences, they tended to be caring and confident, had close friendships with peers, were interested in intellectual pursuits and came from more advantaged families.

Further reading
See items 71 and 75 in the list of Australian Temperament Project publications at the end of this book.

11 Adolescent issues

Temperament and personality

Temperament is sometimes considered as the early form of personality, the biological blueprint perhaps. Personality is a more elaborated development as it incorporates the effects of experience and learning over time, in the development of a more mature and expanded characteristic individual style. At the adolescent stage of development, we assessed the relationships between temperament and personality, and between personality and psycho-social adjustment. In the first study (a sub-sample of 148 members of the cohort) mothers reported on both temperament and personality of their child at age 13–14 years, while at the same time, both child and mother reported on emotional and behavioural adjustment.

The personality measure we used was based on the personality system of Goldberg (1992). The dimensions are Extraversion (out-goingness); Agreeableness; Emotional Stability; Conscientiousness/Self-Control; and Intellect/Openness to Experience (creativity, imagination and open mindedness). The temperament measure was the School-Age Temperament Inventory (SATI: McClowry 1995), with the four dimensions of Activity; Negative Reactivity; Persistence, and Approach (sociability)/Withdrawal.

At 13–14 years we found many relationships between specific temperament and personality dimensions. Extraversion or out-goingness was related to temperamental sociability and to Activity. Agreeableness was related in a negative direction to temperamental Reactivity, that is, a negatively reactive temperament style was associated with a lesser degree of Agreeableness, as one might expect. Negative Reactivity was also related to anti-social behaviour and to total behaviour problems as reported by the mother. Emotional Stability was positively related to Approach, and negatively associated with Reactivity, anxiety and total behaviour problems. Correlations between temperament dimensions and Openness to Experience were very modest, but there was some association with Reactivity and Persistence dimensions. Conscientiousness was also related to the temperament dimensions of Persistence and Reactivity. It was also negatively related to attention problems, to behavioural difficulties as reported by mother, and to hyperactivity as reported by the child. This dimension of Conscientiousness was the most strongly related to the child-rated behavioural measures and is clearly associated with children's capacity to self-regulate their behaviour and to adapt to the social and task demands of the environment in which they live.

Overall, each individual personality dimension showed some relationships to specific aspects of temperament and to behavioural difficulties. The most substantial relationships were between: Approach and Extraversion; Persistence, attention problems and Conscientiousness; and anxiety and Emotional Stability. All these connections are reasonably to be expected given the content of the temperament and the personality measures.

In the second study, from the 1998 survey, when adolescents were aged 15–16 years, we asked parents to again rate the personality of their children. We included the whole sample this time, thus providing a substantial data set with which we could look at personality and temperament associations. We examined both concurrent associations between temperament and personality (same point in time); and also the extent to which previous childhood temperament characteristics could predict adolescent personality. In summary, for the concurrent data, we found:

- Agreeableness in personality was strongly associated with temperamental Negative Reactivity and Persistence, and to a small extent with Approach;

- Extraversion was strongly associated with Approach and Activity, and more weakly with Persistence;

- Conscientiousness was closely related to Persistence;

- Emotional stability was associated with Approach and Negative Reactivity;

- The personality dimension of Openness to Experience showed only weak relationships with temperament dimensions, particularly with Persistence and Approach.

What is perhaps of greatest interest is how well we can predict personality at 16 years from temperament measured earlier in development. We looked at the temperament data from the 11–12 and 13–14 year-old surveys to assess these relationships across time. In summary:

- Agreeableness at 16 years was predicted by the temperament dimensions of Negative Reactivity at 13–14 years and Persistence at 11–12 years;

- Extraversion was predicted by Approach and Activity at 13–14 years and Persistence at 11–12 years;

- Conscientiousness was predicted by Persistence at both 11–12 and 13–14 years (this was the most substantial association);

- Emotional Stability was predicted by Approach and Negative Reactivity at 13–14 years;

- Openness to Experience was only very weakly predicted, by Persistence and Approach at 11–12 years.

This study showed that there are long-term relationships between temperament and personality; these are strongest for Extraversion and for Conscientiousness with the expected relationship between temperamental Approach (Extraversion), and Persistence (Conscientiousness). There are two temperament dimensions which appear almost every time. Persistence appears as a predictor of almost every personality dimension except Emotional Stability (which is related to anxiety and Negative Reactivity), while Approach is related to three of the five personality dimensions (Extraversion, Emotional Stability, and Openness to Experience). Temperamental Persistence emerges as an important dimension so frequently in our studies from school-age onwards, that it is clearly a very salient attribute in many domains of development.

Pathways to the development of eating problems

Having longitudinal data gave us the opportunity to investigate early signs of dieting and any risk factors for later eating problems. While we expected very few of our children to have serious eating disorders, it is likely that childhood experience and perhaps temperament may dispose some children to such problems in late adolescence

or adulthood. With LaTrobe University colleagues, Simone Blaney, Geoff Martin and Eleanor Wertheim, we explored the relationship between childhood temperament and the later development of eating and body size worries in adolescence.

In a study of 1228 12–13 year old project children, we found that girls with higher scores on a scale measuring 'drive for thinness' were more likely to have shown higher levels of the temperament dimension called Emotionality from 3–4 years onwards. This temperament dimension is made up of attributes such as the propensity to get very angry when frustrated, to respond negatively and intensely, and being moody or cranky. Those girls who were the most dissatisfied with their bodies were the ones showing the highest levels of negative Emotionality at 12–13 years of age. There were no consistent patterns of relationships between temperament and eating/body concerns for boys. This is perhaps not surprising since boys reported significantly fewer dieting behaviours and body concerns compared with girls.

We also examined some aspects of the transmission of values from parent to child, which may provide some explanation of the way in which eating concerns develop during childhood and adolescence. In our sample, encouragement to diet on the part of either mother or father was associated with a daughter's body dissatisfaction and drive for thinness. The 49 per cent of girls who had reached puberty were at somewhat higher risk for eating problems if their mother was dieting. However, only a minority of parents reported that they encouraged their children to diet, and there was no greater pressure on girls versus boys to diet. In addition, it was the larger children whose parents were more likely to be concerned about their weight, hence watching food intake may have been a rational health concern. It should be noted that these studies were concerned with a community sample of children who did not have eating disorders, hence the focus was only on possible precursors to potential later problems.

Negative Emotionality and lower Persistence at 3–4 years also predicted higher 'drive for thinness' among girls at 15–16 years of age. Additionally, these same two temperament dimensions measured at 15–16 years predicted higher 'drive for thinness'. Thus high levels of negative Emotionality seem to be one of the major risk factors for eating problems, just as they do for a range of other problems.

When assessing stability of eating concerns from 12–13 and 15–16 years, we found:

- more girls at age 15–16 years than at 12–13 years reported wanting to be thinner, binge-eating behaviour, more frequent dieting, and more concerns with body shape;

- girls who reported a high level of concern about body shape and size, at 12–13 years tended also to report similar degrees of concern at ages 15–16 years.

Pathways to adolescent anti-social behaviour and depression

Our longitudinal study gives us the opportunity to chart the development of teenage anti-social behaviour and depression and to look at pathways to these two types of problems. Table 4 shows how often the teenagers in our study had engaged in anti-social behaviours.

We examined the precursors to depression and anti-social/delinquent behaviour at 15–16 years. At 15–16 years we found that:

- 14 per cent of teenagers reported involvement in 4 or more anti-social acts (such as theft, vandalism, assault) during the past 12 months (See Table 4 below for examples). Of these young people, 62 per cent were boys and 38 per cent were girls. These

adolescents were judged to have a significant level of anti-social behaviour. About 20 per cent of this group also had depressive symptoms.

- Fifteen per cent of teenagers overall reported symptoms which indicated that they had a serious level of depression. The gender ratio was quite different here, with 75 per cent of this group being girls. About 20 per cent of this group also had anti-social problems.

For our analyses of these pathways, we selected out the 640 project members for whom we had absolutely complete data from parents, teachers and children at 15–16, 13–14, 11–12, and 7–8 years, thus allowing us to look back at earlier factors in their development. We checked our full longitudinal data set and ascertained that this group of 640 young people was representative of, and similar to, the total sample. The nature of the pathways leading to depression and anti-social behaviours was analysed using earlier measures of temperament, behaviour problems, socio-economic status, mother-child relationships, association with 'deviant peers' (this refers to other adolescents/friends who engage in anti-social behaviour or use drugs), parenting practices, family attachment, and school achievement.

In the pathways to anti-social behaviour at 15–16 years of age, the strongest risk factors were previous oppositional behaviour, poor school adjustment and association with 'deviant peers' at 13–14 years. A low level of parental monitoring of behaviour was also influential in this pathway. Temperament dimensions, including low Persistence and Negative Reactivity, did not contribute directly to anti-social behaviour at 15–16 years, but were important further back in the chain, in their associations with earlier externalising behaviour problems. These problems had persisted through to adolescence and contributed to current anti-social problems. The mother-child relationship measure also featured in the developmental pathway as did earlier academic achievement across the years from 7–14. Low socio-economic status was predictive at 7–8 years but not thereafter. Hence for this study it appeared (yet again) that previous maladjustment predicted current maladjustment, with additional contributions from peer influences, temperament dimensions, school factors and to a lesser extent, parenting factors.

In the pathways to depression in adolescence, the best predictors were earlier anxiety problems and low attachment to family (this refers to low levels of communication and less closeness); along with poor school adjustment at 13–14 years of age. Temperament

Table 4	Frequency of anti-social behaviours at 13-14 and 15-16 years			
Anti-social Behaviour	13-14 years		15-16 years	
	1 time percentage	2+ times percentage	1 time percentage	2+ times percentage
in a physical fight	21	13	19	13
damaged something in a public place	11	3	13	8
stolen something	11	5	11	9
driven car without permission	2	1	4	3
suspended/expelled from school	3	1	5	2
graffiti in public place	6	2	6	3
carried weapon	4	2	4	1
wagged school	7	3	11	16
shoplifted	not asked		6	7
run away from home	not asked		2	1
contact/cautioned by police	not asked		11	3
charged by police	not asked		1	0.5
been to court as offender	not asked		0.4	0.2

Source: Australian Temperament Project 1983–2000.

dimensions including low Sociability, and Negative Reactivity were important predictors earlier in the child's history. Academic difficulties, and peer relationships problems were also part of the pathway leading to depression.

Prediction and patterns of substance use

Some level of experimentation with drugs during adolescence and even later appears to be a fairly normal aspect of development in Western society at least. We have assessed this phenomenon in our sample from the age of 13–14 years. Self-report and parent-report data on use of tobacco, marijuana, alcohol, and other substances were collected at ages 13–14 years and 15–16 years (see Table 5 for details). This has allowed us to look at rates of substance use at both these stages, trends in use across this period, early and current predictors of substance use, the characteristics of teenagers who use hard drugs, and evidence for theories about how drug use develops over time.

Relatively few teenagers were using substances at 13–14 years, with cigarettes (around 10 per cent) and alcohol (about one-quarter of teenagers) being the most frequently used substances 'in the previous month'. At 15–16 years, there was an increasing pattern of substance use. While almost half the sample reported that they had never smoked, some had experimented with smoking, approximately one-third were recent or ongoing smokers, and 15 per cent reported that they smoked every day. With regard to alcohol, 75 per cent said yes when asked if they had ever had alcohol in their lifetime. Of those who had tried alcohol, 15 per cent had not drunk at all in the past month, 45 per cent had drunk alcohol on one or two occasions and 40 per cent had drunk alcohol on three or more occasions. Thus, half the sample were social or experimental drinkers. A moderate level of drinking to intoxication was reported. However, there was a small group of heavy and chronic drinkers who may have had some degree of alcohol dependence.

Marijuana had been tried by 25 per cent at some time, while 11 per cent had used this substance recently, with 4.5 per cent using often. Other substances used by a number of teenagers included anti-depressants (3 per cent), sniffing (7.4 per cent), and a range of other substances including acid, stimulants, heroin and cocaine (2 per cent). Notably, all members of this latter group had also used other drugs. This particular finding may

Table 5	Patterns of substance use at 13-14 and 15-16 years as reported by teenagers	
	13-14 years percentage	**15-16 years percentage**
Smoked 3+ cigarettes in life	21	44
Smoked in last month	12	27
Drank 3+ alcoholic drinks in life	42	74
Drank alcohol in last month	25	59
Intoxicated 1+ time in last month	7	38
1+ day binge drinking in last month	not measured	30
Tried marijuana 1-2 times	5	not measured
Tried marijuana 3+ times	1	not measured
Tried marijuana in life	not measured	25
Smoked marijuana 1+ day in last month	not measured	13
Tried sniffing 1-2 times	7	7
Tried sniffing 3+ times	1	0.7
Tried other non-medical drugs	0.3	2
Anti-depressants	not measured	3

Source: Australian Temperament Project 1983–2000.

support the 'gateway' theory of substance use; that is, any drug use increases the chance of trying other types of drugs, or, to put this another way, the use of 'softer' drugs opens the possibilities of use of 'harder' drugs. In general, these data suggest that by 15–16 years of age, a moderate degree of substance use is relatively normative.

We investigated the predictors of substance use in the mid-teens by examining characteristics of the sample two years earlier at 13–14 years of age. The most significant predictor of use at 15–16 years was the adolescent's report of anti-social behaviour at 13–14. Substance usage was also associated with maternal smoking and drinking; being a later-born child in the family; having a higher attraction to thrill and adventure seeking; showing more aggressive and hyperactive behaviour; higher sociability; poorer quality of friendships; less attachment to family; and being male. Having a high level of emotional control was a protective factor, i.e. decreased the chances of using substances. Having friends who engaged in anti-social behaviour or used substances was a strong risk factor for substance use.

Within a small group of multi-substance users from the sample (used four or more substances at 15–16 years), their earlier histories had shown that temperamental features of high Reactivity, high Sociability and low Persistence, along with higher aggression, mother-rated difficultness, poorer school attitudes and relationships, and 'deviant' friendships were risk factors for later substance use.

We compared the 28 teenagers who reported hard-drug usage (heroin, amphetamines, speed, Ecstacy) with the rest of the sample. The hard-drug users showed a range of more problematic personal, family, and social characteristics, compared with non-users. These included: more difficult temperament characteristics by mother report, with greater Irritability (Negative Reactivity), and lower Persistence; less Agreeableness and Conscientiousness; more depressive symptoms, delinquency and aggression; and associations with peers with similar behaviours. These studies are helpful in clearly delineating the individual and social factors which signal high risk for problems with substance use in adolescence. They also suggests points for intervention in our attempts to reduce these health risk behaviours.

Relationships between temperament, parenting style and emotional and behavioural problems at 13–14 years of age

Understanding the complex relationships between the characteristics of the child and the effects of parenting styles on psychological adjustment is a major challenge. In one of our studies we attempted to analyse our data in a way that would help us understand these associations. We selected the five outcomes of Oppositional and Conduct Disorder (CD); Hyperactivity/Attention Deficits (ADHD); Depression; Anxiety; and Substance Use (alcohol, tobacco, marijuana, and sniffing). We then asked which temperament dimensions and parenting styles were particularly associated with risk for these five outcomes in early adolescence.

The parenting scales included were: 'warmth of relationship', 'use of inductive reasoning' (use of explanation, discussion), 'physical punishment', and 'parental monitoring' (knowing whereabouts and activities of the child). We found differing associations between these factors and the kinds of adjustment problems reported. In summary:

- the temperament dimensions of Negative Reactivity, low Persistence, and high Activity were associated with externalising behaviour problems (CD and ADHD) at 13–14 years;

- low Sociability and Negative Reactivity were associated with internalising problems (Depression and Anxiety);

- parenting styles of low warmth, high use of punishment and low monitoring of the child's behaviour, were associated with externalising behaviours and with substance use;

- no parenting scales predicted anxiety, and low warmth was the only one associated with depression.

Finally, we looked at the combined influence of temperament and parenting in predicting the problem outcomes. Our analyses indicated that in a situation where a child was temperamentally 'at risk', that is, had some of the more 'difficult' temperamental characteristics such as low persistence, then their risk of CD was further increased by the use of parenting practices such as punishment, low monitoring and low warmth. However if they were not temperamentally 'at risk', but were average or highly persistent, then variations in parenting practices made little difference to outcome. Experimenting with alcohol, and smoking, was more likely to occur in children who were low in persistence and whose parents reported low monitoring, that is, not keeping a close eye on their activities.

Overall, it appeared that if children already had more 'difficult' temperament qualities (especially those involving self-regulation dimensions such as Reactivity and Persistence), which put them at risk for emotional and behavioural difficulties, then parenting appeared to have more impact on their outcome. In other words, the style of parenting used seemed to matter much more for these temperamentally 'at risk' children.

School adjustment during the adolescent years

Our questionnaires from Year 7 onwards asked for parent and child ratings of school adjustment, including reports of how well the children got on with peers and teachers; understood class work; managed school rules and routines; homework and assignments; achieved a satisfactory standard of work; and how children felt about life at school. The data are very consistent across the period 12–16 years and can be summarised thus:

- generally boys experienced more problems than girls: they enjoyed school less, got into trouble with teachers more often, and felt less confident about their ability. Around one-third of boys at each survey point were having problems with completing homework and assignments;

- one-third of children did not rate school as being enjoyable for them in year 10, and reported negative feelings about a number of facets of school life;

- generally, teenagers felt positive about their relationships with peers. Most felt they could talk about their concerns with friends and felt that their friends were understanding and respected their point of view. A small number (4 per cent), reported that they did not have a best friend;

- there were no gender differences in the teenagers' capacity to make and keep friends, with 80 per cent saying this was not a problem for them;

- around 25 per cent of teenagers reported the experience of being bullied between 12 and 14 years of age, more commonly boys; and 5–6 per cent noted that this was quite a serious problem for them.

These findings are somewhat troubling with regard to boys' feelings about how they were coping with the demands of secondary education. However, as with the findings for psychological adjustment reported in previous pages, we should not forget that the majority of boys and girls felt positive about school and valued the learning opportunities provided.

Parent-adolescent communication

When the teenagers were 12–13 years of age, we asked both them and their parents how often they discussed, or felt they could discuss, topics such as the teenager's feelings about him/herself, problems with friends, school, smoking, drinking, puberty, sex, and health.

First, *for parents*, we found that:

- about two-thirds to three-quarters felt that their teenager would 'definitely' or 'probably' talk with them about personal issues, friendships, body changes, smoking and drinking, sexual and health issues;

- almost all felt that their teenager would talk with them about schoolwork difficulties and career aspirations;

- slightly more parents of girls than parents of boys thought their teenagers would discuss problems with them.

Secondly, *for teenagers*, we found that:

- about half had talked with their mother, one-quarter with their father, and about half with their friends, about personal concerns. Girls were more likely to talk with their friends about how they were feeling than were boys. Most teenagers felt that they could talk with their mothers about their feelings, and a slightly lower number felt they could talk with their fathers about this (more boys than girls);

- teenagers were more likely to talk about friendships and peer problems with their parents than with their friends;

- most had talked with their mother, and about half with their father, about school issues and schoolwork and what they might do when they left school;

- a minority had talked with their parents about smoking cigarettes and drinking alcohol. However most felt they could talk about this with either parent;

- about half had talked with their mother, and one-quarter with their father, about puberty changes. About three-quarters felt they could talk with their mother, and just under half with their father, about this;

- just under half had talked with their mother, and one-fifth with their father, about sex and sexual diseases, while three-quarters felt they could talk with their mother, and about half with their father, about this. Not surprisingly, more girls felt they could talk with their mothers, and boys with their fathers, about these issues.

Overall, most parents and teenagers believed they could talk to each other about a range of personal and social issues, and that they had good communication, particularly about the teenager's friendships, personal wellbeing, and long-term aspirations.

Year 1999 Family Study

In 1999, more than 600 project families from metropolitan and country areas took part in a home-visit study, in which a parent and teenager were video-taped while they talked about their day-to-day lives (what they enjoy doing together, family rules and expectations, use of free time, and accomplishments and disappointments). The teenagers were also interviewed about how they would manage some particular social situations, about their current life, and their future hopes and dreams. Important recent life events included starting VCE, getting L plates for driving, leaving school and looking for work, having a girl/boy friend, and going out/socialising more. Some teens were clear about their career aspirations, others were still undecided; a number already had apprenticeships or traineeships.

One part of the home-visit study focused on communication patterns and parenting styles and how they are related to adolescent wellbeing. We found considerable diversity in styles of communication. Using both the questionnaire data and video-taped interactions, we found a trend for adolescents with adjustment difficulties to experience less warmth in their relationships with their parents, and their families appeared less cohesive than adolescents who did not have adjustment difficulties. It seemed that the styles of parenting experienced by teenagers with anti-social problems were somewhat harsher and more inconsistent, and parents monitored their behaviour less. Teenagers with depression problems were less likely to have warm, close relationships with parents. Of course, any influences are likely to be two-way: parents are as likely to be responding to their teenagers' behaviour as much as influencing it.

More analyses of these data are currently underway, and will be reported in later publications and newsletters.

Parent-adolescent conflict

In another part of the 1999 Family Study, we asked parents and teenagers to fill out questionnaires about the types of issues they had disagreements about, and the intensity of such disagreements. They then took part in a discussion (which was video-taped) about the three most troublesome topics they had identified. They were asked to share their perceptions of the problem and to try agree on a solution to the issue. There has been great variety in the way parents and adolescents approached this task, and we are still analysing this information.

Table 6 shows the six most common areas of disagreement (in order of importance).

Table 6	Most common areas of conflict		
Teenagers	**percentage**	**Parents**	**percentage**
School grades or homework	18	School grades or homework	22
Fighting with brothers/sisters	18	Chores	17
Chores	11	Fighting with brothers/sisters	14
Money	8	Attitudes, respect	6
Attitudes, respect	7	Money	5
Transportation	5	Swearing/talking back	4
Source: Australian Temperament Project 1983–2000.			

Frequencies of disagreement

For teenagers:
- around 25 per cent of teenagers and parents disagreed 'quite often' or 'all the time' about school grades/homework and attitudes/respect;

- about 30 per cent of teenagers and parents disagreed 'quite often' or 'all the time' about fighting with brothers/sisters and doing chores;

- about 20 per cent of teenagers and parents disagreed 'quite often' or 'all the time' about money and transportation.

For parents:
- around 33 per cent of parents and teenagers disagreed 'quite often' or 'all the time' about school grades/homework, and doing chores;

- about 25 per cent of parents and teenagers disagreed 'quite often' or 'all the time' about fighting between brothers and sisters;

- about 20 per cent of parents and teenagers disagreed 'quite often' or 'all the time' about attitudes/respect and money;

- about 15 per cent of parents and teenagers disagreed 'quite often' or 'all the time' about swearing or talking back.

Overall, it seemed that for the majority of parents and teenagers in this home-visit study, the degree of family conflict and disagreement was mild, since 60 per cent to 70 per cent of parents and adolescents seldom or never had disagreements.

Further reading:
See items 6, 61, 63, 69, 70, 72, 74, 76, 80 and 81 in the list of Australian Temperament Project publications at the end of this book.

12 The genetics of temperament and behaviour problems

In collaboration with Professor Tony Jorm and Professor Simon Easteal from the Australian National University in Canberra, we are carrying out some exploratory studies of the genetics of temperament and behaviour. There is increasing world-wide interest and research activity in the genetic or inherited bases of behaviour. The Australian Temperament Project provides a golden opportunity to test out some of the existing theories about the genetics of temperament, personality and behaviour. Because the genetic links to behavioural traits may vary with age and stage of development, the project is especially important in its capacity to contribute to this kind of research, since we can look at relationships across time. Using cheek swabs to obtain saliva samples, we collected DNA (genetic material) from 660 children from the project.

One aspect of the serotonin transporter gene (5-HTTLPR) has been reported to be associated with anxiety-related personality traits in adults. Our first set of analyses investigated this relationship in the project sample. We did not find the same results as had previous studies of this relationship. However we did find that at ages 13–14 years and 15–16 years, the long/long genotype was associated with higher anxiety and temperamental shyness.

We have tested out another gene behaviour association reported by international researchers. This concerned a possible relationship between a particular region of the dopamine transporter gene and Attention Deficit Hyperactivity Disorder. We also looked for possible connections with temperamental features and with other types of behaviour problems. We found no evidence for particular associations for the dopamine transporter gene with any temperament or behaviour characteristics at any age, in our sample. Differences between our results and those of others may be because the associations found by others are not reliable, or because we were looking at a normal population with a lower rate of problems, rather than a sample of individuals referred to clinics for diagnosis and treatment, among whom such associations might be more evident.

We are currently analysing a number of other genetic associations, including those of the monamine oxidase A, dopamine D3 receptor, catechol-O-methyltransferase, apolipoprotein E, mu-opioid receptor and estrogen receptor genes. We will continue to explore genetic influences on temperament and behaviour in ongoing analyses.

Further reading
See items 62 and 79 in the list of Australian Temperament Project publications at the end of this book.

13 Children's voices, parents' views

Throughout the project, children have sent the Australian Temperament Project team letters, photos, drawings and poems. These have given us glimpses of their lives and insights into their views of the world. For us, this has been a valuable and delightful aspect of the study. We have also found it rewarding and inspiring to read the comments made by parents as they reflect back on their child's life, their experiences as parents, and their participation in the project. We include here a small selection of these letters and comments.

Children's voices

"I really enjoyed answering your questionnaire. It probably makes me sound like a bit of a goody two shoes. Oh well, I don't care. I *hate* smoking and I *hate* getting drunk. I like to get good grades even if I do get called a square a bit. I sometimes tease and play practical jokes on certain people, but it's only a joke and they don't get offended. I'm a little bit of a dare-devil, and I'd love to do a lot of wild things (only if they're safe). I'd probably chicken out on some of them though. I go on lots of wild rides at fairs etc., but not the ones that go round and round in circles and make you feel sick. Anyway, now you know a bit more about me. I hope this helps with your study." (Girl, aged 13-14 years, 1996)

"I'm just writing to let you know that I am enjoying my participation in this survey. I have enclosed a poem that I have written about one part of my life that I wish could just disappear. I have been severely bullied over the last two years. It has been really hard for the people helping me to resolve this situation and sometimes I feel that I would just like to go far away from these girls. Anyway I just thought I would write to let you know that if you get letters from anyone else that is getting bullied, let them know that one day it will all get better if you stay strong. That day hasn't come for me yet, but I'm still hoping it will soon." (Girl, aged 15-16 years, 1998)

"I am writing this letter because I want to ask some questions. One thing is, how many people are in this group that I am in? And I want to tell you that when you send those forms to me that I have to fill in, well I like filling them in – it is fun. And once I remember that when I was in grade three, a lady came to my house and I had to do lots of puzzles and the lady timed how long it took me to do the puzzle. I thought it was a lot of fun. Will someone be coming to my house to do that again? Anyway, that was all I wanted to know. So I'd better go now." (Girl, aged 11-12 years, 1994)

"Just thought I'd write a quick letter to tell you a little more about myself. I belong to a volunteer group for people aged 15-25. There are around 10-12 regular leaders and we run holiday programs for kids. We also run a junior leadership program for 11-14 year olds. I'm a member of my school SRC and am in school sports teams. I wish I was playing competitive sport outside of school, but I work as a supermarket deli assistant turned checkout-chick. School isn't something I'd say I look forward to, except to see my friends, but I don't mind going and don't have trouble with the work. I have a cool load of friends. Not all in the same group though (which is a good thing). I always have something to do or somewhere to go. It's cool to get your questionnaires every now and then, and it's no trouble filling them out." (Girl, 15-16 years, 1998)

"It has been my meaning to write to you for the last two years that I have received these fantastic questions. I would just like to thank you for trying to understand us. We are a continuing breed, but we do chose to change over the years and I hope you have what you've been looking for. I continue to be pleased to receive anything from you that I may be able to help you with." (Girl, aged 13-14 years, 1996)

"I'd like to say that I think the temperament project is a really good idea and could be put to good use. I sincerely hope this information is not just put into storage as 'information'. I would be interested to know exactly what you do and what you plan to do with all the input. I'd also like to say that I enjoy answering the questions and look forward to the next survey." (Girl, 15-16 years, 1998)

"Hi, my name is [name] and I am 13. My interests are roller blading, ice hockey and playing computer games. I live in [name] which is a small town in Victoria. It is nice here and I have lots of friends. Kids here play a lot of sport – football and cricket are the main ones . . . I think it's important that adults understand children nowadays, so we don't do anything stupid. My school . . . is a really good school, you don't have to worry about being bullied or anything like that. The teachers are really nice . . . With the questions I was given, I tried to answer as best as I could, but some I'm not sure about. I'd better go now. I am looking forward to more questionnaires in the future." (Boy, aged 13-14 years, 1996)

"Hi, I've just finished the questionnaire and I thought I would write a short letter to tell you more about what I really like doing. I absolutely love reading . . . I love writing too . . . I learn Japanese at school and really love it. *Konnichi Wa!* I take part in Speech and Drama lessons in school and just did an exam (I passed!). My biggest passion in life is my dancing. I learn classical ballet, jazz and I did tap for a while too. I've been dancing for almost ten years. I have proper pointe shoes and the blisters to prove it . . . Anyway, nice to hear from you again – it was a pleasure doing the questionnaire." (Girl, aged 13-14 years, 1996)

"I would like to thank you all for letting me participate in this project. I enjoy doing them very much and if I could be of any further assistance I would like to help. Doing your project not only helps you, but it makes me realise what I should be concentrating on in my school and social life." (Girl, 15-16 years, 1998)

"The following are my personal observations on teenage problems. I hope it may be of use to you. I go to an all-girls school and one day in one of my classes the teacher asked who smoked, as a part of a study we were doing. Four girls put their hands up, yet I knew there were more. These four girls did smoke and were proud of it – it was part of their image . . . A few other girls who did smoke did not put their hand up as I think they were afraid it would taint their image. These girls try hard at school and do well, but out of the teachers' sight they act rebellious. They lead the life of a perfect student and a rebel . . . We have a semi-formal this year and I have noticed that the majority of the grade are trying to lose weight or tone their body for the semi. I have also noticed that girls with boyfriends are more conscious of their weight than other girls . . . One girl who wanted to be a model could not become one because of her size. This girl was already slim, but because of the waif requirement of modelling agencies, she was not accepted. Her mother gave her a gym membership for her birthday. She began not to eat. For lunch she would have lettuce. Her school work began to disintegrate and she made new friends. Now she's trying to pick up her school work. She's slowly managing . . . I hope I've helped somehow." (Girl, 15-16 years, 1998)

"My parents split up last year and just got divorced. I don't know if that affects anything [questionnaire answers]. It's been really hard 'cos I lost a lot of friends because they didn't know how to help me deal with it. A lot of girls just decided they wanted to hate me, and my best friend at school went off with another girl and ignored me completely. She didn't even tell me she didn't want to hang around with me any more! I was very upset. I think part of the reason was the way I was acting to cope with the divorce, but it was still really horrible of them. I have a few friends now but I'm not really happy . . . " (Girl, 15-16 years, 1998)

"With cigarettes, alcohol and even marijuana, I think it was a bit misleading asking if you had been doing it in the last month. You may not have drunk at all in the last 30 days but you may have drunk heaps before that. It would be better if you asked us how much we drink/smoke on average. At this age most people drink for the fun of getting drunk. Very rarely do you come across an 'alcoholic' kid. However, you do come across quite a number of kids who actually are addicted to tobacco, as opposed to the number who are just experimenting. Marijuana is similar to alcohol, although you find that more people just try it once or twice." (Boy, 15-16 years, 1998)

"As far as I understand, I've been a part of this since birth. Will this continue on, and if so for how long? . . . This year's questions were really interesting and definitely thought provoking . . . Keep up the tremendous work that everyone is doing who is involved with the Australian Temperament Project. All the best for the future." (Girl, 15-16 years, 1998)

Parents' views

"Overall I feel extremely lucky at the way this child has turned out. Compared to others of the same age I feel the problems we have encountered are mild and part of growing up. It has not been a difficult experience [being a parent]. If my child continues to follow the path he is currently taking in life I would be very happy. Both parents have played a big part in this by the rules and boundaries and support given even though we divorced. I am a very proud parent and consider myself privileged to have such a child."

"After all the ups and downs I'm pretty pleased with the way he is going. I think he will be a happy, positive adult and really that's all I can hope for. If he achieves that, I've done my job okay."

"Thank you for the opportunity to be part of the Australian Temperament Project. We found it interesting this time when [son's name] said it was a 'wank' wanting to know if his thighs were too big, was his bottom too big. His comment was 'I couldn't care less – why did they keep harping on it?' Although *we* could see why, it was hard to explain it to him. Again thanks, because it makes us think as well."

"Even though at times parenting can be very challenging, it can give pleasure, especially at observing our ATP child's progression through stages of life. It can also make one reflective about one's own life."

"As she becomes independent, it gets more complex. She is less difficult but more determined."

"Thank you for the opportunity of answering another of these questionnaires. It provides the opportunity to stop and consider subjects which may easily become buried with the busy lives we lead."

"We were very close when he was younger. We are still close, but not as much. We seem to have more conflict these days – maybe it's because he has grown up and doesn't need me as much, and I feel a loss. Being my eldest, I might be finding it hard to let go."

"Life is certainly not boring living with someone who is about to become an adult!"

"At age 12 and 13, I thought, 'How am I going to get through?' The older she has got the better it has become . . . She is growing into a very likeable adult."

"My daughter is far more critical of what I say and do now, whereas this was not so when she was a child."

Parents' views

"From a young child through to year 8, he was very close to me . . . Through years 8, 9 and 10 he pulled away to establish his independence and while we were still close, he liked to appear as though he was totally independent and 'cool'. In year 11, I have noticed an increase in his confidence in himself and we are now very close again, and he shares everything with me again."

"She wants to make her own decisions . . . I don't exercise much control over her but I'm hanging in there to be someone to turn to if she needs someone. Rather than exercise control I'm trying to get her to look at the consequences of her actions."

"My son had a terrible time over a two-year period entering high school and I worried for his future. But he has such an inner strength that he came through assuredly and clear on his directions for life."

"As a teenager she has become very determined to do *as* she wishes *when* she wishes, despite what I think is safe. This has led to a lot of conflict . . . I am often very worried about her behaviour."

"Due to his secretive, stubborn attitude, a barrier to free communication is forming, hence our bond is constantly under pressure . . . I guess I am just another frustrated parent experiencing life through the teenage/adolescent cycle."

"I think I have been blessed having such a great boy. Sometimes I think it's hard to raise the kids but when I compare with others, I got an easy lot."

"She is a lovely, caring girl. A little quiet and keeps a lot of things to herself, or shares them with her peers. Very responsible and well-liked. Seems to look for validation of herself, comparing herself to her girlfriends."

"Thank you for the opportunity to take part in this program . . . I hope my daughter will remain in it for many years to come – she takes a great interest in it."

"This questionnaire was so true to what life is like with my teenager now. Is every family the same? Maybe."

"My teenager has always been difficult, but at the age of 11, 12, 13 we had a very bad relationship . . . We have come a long way and our relationship is very good now."

"I am most proud of my son as he was such a handful as a younger child and now he is a valued member of his school, his athletics club and his parish."

"The changes have reflected his growing independence and my learning to let him be independent. Closeness, warmth and conflict are those emotions most tested and stretched in growing up."

"He is very independent and wants to assert that constantly – wanting very little input from me/us."

Parents' views

"Filling in these questionnaires over the last 17 years is a task that I have enjoyed as it makes me stop and think about elements of our family life."

"We, as parents, have found the questionnaires over the years to be very thorough. They have made us think about our children's development, and how they compare with other children and teens of their age group at each particular time. Similarly, the occasional reports of the results have been interesting and useful. I understand that the research will be used and disseminated in the professional and academic sectors, but also hope that Mr and Mrs Ordinary can benefit as they struggle to raise their children with little or no preparation or support of a meaningful nature. I also believe that perhaps a modified from of the questionnaires could be used on a broader scale to actually help parents to be more aware, more observant with regards to their children's growth and development. Just a thought or two!"

"Thank you for the opportunity of answering another of these questionnaires. It provides the opportunity to stop and consider subjects which may easily become buried with the busy lives we lead."

"I'm not perfect, he's not perfect, we learn together as we go along, the younger siblings *watching carefully* the decisions we make!"

"He's so much easier now that he's grown up to be a sensible person. As a toddler, he was a terror and quite difficult to handle."

"Congratulations on the way you have maintained engagement. I think you have done it very well."

14 Summary: temperament and developmental pathways

Does temperament matter?

One of the original aims of this project was to discover to what extent temperament influenced development in both positive and negative ways. The studies reported in this book have shown that temperament does exert effects on children's propensities to develop particular kinds of adjustment difficulties. These effects are seen in both home and school settings, and are apparent across time. Temperament has also a significant long-term influence on positive adjustment and socially adaptive behaviour, as shown particularly in the studies of resilience in the face of adversity.

Few other studies of development over time have consistently collected detailed information on children's temperament, although some have used global concepts like 'difficult temperament' at one or two time points. Several of our studies document the value of measuring and analysing temperament dimensions separately, since specific dimensions have specific influences. For example, while inflexibility in temperament appears to relate to a wide range of later adjustment difficulties, non-persistence is linked specifically to later acting-out problems, while shyness or inhibition in early childhood is specifically linked to internalising (inward-directed) problems. These findings suggest that it is important to look at specific aspects of temperament and not just at global concepts.

The particular features of temperament which have proved to be of notable influence in the long term in the Australian Temperament Project, are persistence, flexibility, and reactivity or emotionality. An important component of these dimensions can be called temperamental 'self-regulation'. This is the capacity to regulate or self-manage one's physiological reactions to demands, environmental events, and interpersonal interactions, and to regulate and control one's outward responses and behaviours, which arise as a result of these events. At least in our society, it is clearly important to be able to regulate and control reactions, in order to fit comfortably within the social environment, and to adapt successfully to life tasks and challenges, which are part of the growing up process. Failure to develop both emotional and behavioural self-regulation skills can put the individual at odds with the expectations and values of society. There are, of course, cultural differences in these expectations and values which will affect the degree to which self-regulation is important, as we have seen in some of our cross-cultural comparisons.

So temperament matters in the developmental process, with negative, over-reactive, and non-persistent characteristics likely to put children at risk for the development of behavioural maladjustment. Such findings demonstrate the importance of attending to the individual characteristics of the child and responding to them with flexibility and understanding. For example, some children will need more support when entering new situations such as school, while others will revel in the novelty and challenge. Some will need to recognise their tendency to react to stress and frustration in a strong and

negative way, and to develop strategies to manage their reactions in a more acceptable style. Management strategies used by parents and teachers need to be responsive to these individual differences.

Temperament also works in context; it is almost never a simple or even powerful predictor of adjustment. It often impacts on development not directly but through its effect on parent-child and family interaction. An inflexible child finds it difficult to adapt to change and is irritable and resistant to control efforts. If parents fail to find an effective way of dealing with these predispositions, negative interactions which have been described as 'coercive cycles' are likely to develop, where both the parent and the child escalate their negative behaviours (yelling, tantruming, smacking) in their attempts to control each other. These patterns can then lead on to the development of aggressive behaviour problems.

Similarly, a child low in persistence finds it hard to stay on-task, which may pose direct limitations on their learning capacity but is also irritating to parents and teachers, and can lead to a negative perception of the child. So again this temperamental trait can lead the child onto a developmental pathway towards maladjustment. It is these interactional processes which we think explain much of the predictive power of child temperament.

For parents, clinicians and educators, it is important to take individual differences seriously, and to try to improve the 'fit' between a child and their social context to facilitate positive psycho-social outcomes.

Temperament matters too because its effects on adaptation emerge very early in life, and these effects are relatively stable. We have shown that by 2–3 years of age, the seeds are sown for good versus poor adjustment. This is not to say that behaviour is not going to change and develop in every child, but the risk factors are evident early for those children who are prone to a problematic developmental pathway. The positive aspect of such a finding is that it encourages us to plan appropriately targeted early intervention, which can help avoid later difficulties. This can be focused on both enhancing parenting strategies to help families to cope more effectively with the individual characteristics of the child, and on fostering and teaching self-regulation capacities in the child, in ways which will lead to more socially adaptive behaviour.

From a practical and policy point of view, these conclusions suggest that communities should be resourced to develop good support and services for families with young children. These need to be easily accessible, well accepted and sought after, and recognised as essential features of a healthy community. They would be best targeted at critical transition points in child and family development such as around the time of birth, entry to pre-school, primary school, and secondary school, and the middle-adolescent period. Parental guidance and support in the context of socially cohesive and strong communities can help to foster healthy physical, mental, and social development for children, and to prevent undesirable outcomes such as school drop-out, substance abuse and delinquency.

Benefits of our studies

Longitudinal studies are critically important in understanding child development. Looking at one point in time in development provides valuable descriptive data, but cannot provide information on pathways across time, and on relationships between various influences as they develop and interact throughout development. Longitudinal designs provide a method in which one can ask questions about possible causes of particular kinds of behaviour: how early do patterns become apparent, how stable are

they, what leads to what, what kinds of factors influence changes in pathways, how do risk and protective factors operate over time? Once developmental links are established in longitudinal studies such as the Australian Temperament Project, they can be tested by intervention studies which attempt to evaluate what happens if you make changes in children's circumstances, and in parenting.

The Australian Temperament Project has made a major national and international contribution to the understanding of temperament in childhood, and how it affects child development in different environments in both positive and negative ways.

Before the initiation of the Australian Temperament Project we had little knowledge of temperament and its role in development for our own Australian child population. Our cross-cultural comparisons showed that there are national differences in temperament dimensions and in their relative significance in children's development, as well as in their family settings. This study has emphasised the importance of temperament in context and has provided data useful for understanding many aspects of child development in the Australian culture. And, of course, it provides internationally comparative data, which can contribute to a broader body of knowledge in psychology, paediatrics, and education.

An important outcome from the project is that we have developed research and clinical methods and procedures which can be used by other researchers in Australia who are interested in infant, child, and adolescent development. We have developed measures which we know work well for Australian families at least at this point in time. This again allows comparisons with other similar research in child development, helping to build a body of comparable knowledge. Future research in child development can benefit from our contributions to the measurement of various aspects of child and family functioning. Our short temperament scales for various age groups, which are now being used in many parts of Australia, represent just one example of this contribution.

For the children and parents participating in our project, the experience has been of great interest. They have been active recorders of child development over time, and have been exposed to ways of looking at individuals which can help in understanding the particular characteristics of each child. Some parents and children have reported to us how much they have enjoyed completing the questionnaires, and talking to the various researchers who have visited them over the years. They report that they have been sensitised to a number of issues, such as the individual temperamental characteristics of the project child, the changes in behaviour and understanding at various developmental phases, and ways of describing the capacities of the child. Some families have benefited from help which followed the identification of learning or adjustment problems at some stage of development in their child.

From the point of view of helping parents with their task of child-rearing, our research provides insights into how temperamental attributes which are hard to deal with (such as a very high level of reactivity) may be recognised and described; and how they will need to be taken into account when observing, interpreting and modifying family interaction. This kind of understanding helps parents to decide, or if necessary to seek professional advice, about how such temperament and behavioural characteristics might be managed in an adaptive and harmonious way to improve the wellbeing of the child in their particular family, school, and wider environment.

The project research has also helped in the understanding of the early origins of both adaptive and maladaptive behaviours, and what kinds of factors influence their persistence or remission over time. It contributes to our capacity to predict risk for persisting problems in individual children, and shows that this is feasible from quite early in life.

The evidence about the close relationships between behavioural and learning difficulties in the school years has significant implications for education. It provides new knowledge and understanding for teachers, and can assist in the planning of interventions for both behavioural and learning problems which should improve outcome for children at risk in the school years. For example, we have demonstrated that early hyperactivity and attention problems are strong risk factors for the development of learning difficulties in boys, and that phonological skills are very important in helping children at risk for reading failure to overcome their problems. This has policy implications in the education field in highlighting the desirability of early intervention in both behavioural and language learning spheres in children at risk.

Analysis of the factors in peer relationships which affect, and are affected by, child and adolescent adjustment can provide indications of helpful and unhelpful influences, which can affect outcome, as well as highlight avenues for peer-focused intervention to improve adjustment. For example, peer relationships appear to be a crucial factor in the commencement and continuance of substance use.

Understanding of temperament, family, and other factors which are related to adjustment difficulties and risk taking behaviour during adolescence adds to the growing literature emphasising the need for appropriate and carefully designed approaches to enhancing positive development through this important life stage. In this era of considerable community concern for the health and wellbeing of adolescents, especially the need to reduce risk factors for mental health problems in this group, our studies of pathways to depression, anti-social behaviour, and substance use can offer significant insights into these problems. The important influence of success at school, positive relationships with peers, strong family attachment, and positive parenting practices for healthy outcomes are clearly identified for this Australian cohort, and indicate avenues for the development of programmes to maximise positive adjustment through adolescence and young adulthood.

The Australian Temperament Project provides insights into the psycho-social outcome of children who suffer from particular disadvantaged circumstances during the childhood period; these can inform community-based and clinical interventions designed to improve outcome for families at risk. Findings from the project can be used to inform and advise governments on significant factors in child development and family functioning which can be important in policy formation regarding family and social welfare in Australia. They can also offer pointers to family policy areas needing further exploration and research support.

15 The future of the Australian Temperament Project

It is always hard to predict the future. Where the Australian Temperament Project study will go will depend on funding and, of course, on the continued participation of our families who have supported us so magnificently up to now. As our teenagers move into their adult years, we have an exciting opportunity to observe how they adapt to life as workers, partners, parents, and citizens.

One recent development has been the inclusion of the Australian Institute of Family Studies as a collaborating group in the study. For the last 15 years, the Institute has been at the forefront of research on a wide range of issues relating to families. Its involvement is particularly valuable because its expertise is very relevant to the issues we will want to address in the future.

Some of these are:

• How do our young people handle the challenge of choosing and following an occupation or tertiary education? How is this related to their temperament and earlier developmental history?

• What helps some young people overcome earlier difficulties such as anti-social behaviour, depression, anxiety, drug use, etc. as they move into adulthood? What factors lead to the persistence or development of difficulties?

• How does an individual's developmental history over childhood and adolescence, especially their temperament, relate to the ways in which they go about forming intimate relationships in early adulthood?

• What are the characteristics in an individual's development which contribute to a healthy and satisfying role in adult society?

In the long term, as our young adults begin to have families of their own, we will also be able to address questions relating to adult development and family formation in the next generation. For example:

• How much similarity is there between the offspring's temperament and that of their mother or father?

• Does temperament influence an individual's parenting behaviour?

• How similar are the parenting practices of young parents to those of their own parents?

We hope, therefore, to continue following our project teenagers at least into their twenties, although we may be in contact a little less frequently than up till now. We would particularly hope to touch base at important milestones such as 21 and 25 years of age. As the Australian Temperament Project continues into the future, it will become an even more famous landmark study of the development of Australian children.

References

Bowes, J. M., & Goodnow, J. J. (1996). Work from home, school or labor force: The nature and sources of changes in understanding. *Psychological Bulletin*, *119*, 300–321.

Cann, W. (1991). Correlates of shyness among children with differing developmental histories of shyness. Master of Science thesis, University of Melbourne.

Carey, W. B., & McDevitt, S. C. (1978). Revision of the Infant Temperament Questionnaire. *Paediatrics, 60*, 735–739.

Goldberg, L. R. (1992). The development of markers for the Big-Five structure. *Psychological Assessment*, *4*, 26–42.

Gore, R. (1992). *The role of early language delay in subsequent reading disability.* Master of Psychology thesis, LaTrobe University.

Kagan, J. (1994). *Galen's prophecy: Temperament in human nature.* New York: Basic Books.

Keogh, B., Pullis, M. E., & Caldwell, J. (1982). A short form of the Teacher Temperament Questionnaire. *Journal of Educational Measurement, 19,* 323–329.

Lusnats, G. H. A. (1988). *Ethnic differences in mothers' concepts of easiness and difficultness of children's temperament.* Master of Psychology thesis, LaTrobe University.

McClowry, S. G. (1995). The development of the School-Age Temperament Inventory. *Merrill Palmer Quarterly*, *41*, 271–285.

Minde, K. K. (1984). The impact of prematurity on the later behavior of children and on their families. *Clinical Perinatology*, *11*, 227–244.

Nursey, J. (1993). *Correlates of reading disability: A two year follow-up*. Master of Psychology thesis, LaTrobe University.

Prior, M., Kyrios, M., & Oberklaid, F. (1986). Temperament in Australian, American, Chinese and Greek infants: Some issues and directions for future research. *Journal of Cross Cultural Psychology 17,* 455–474.

Rosenthal, S., Feiring, C., & Lewis, M. (1998). Political volunteering from late adolescence to young adulthood: Patterns and predictors. *Journal of Social Issues*, *54*, 477–498.

Rothbart, M. K., & Bates, J. E. (1998). Temperament. In W. Damon (Ed.), *Handbook* of *child psychology: Vol. 3: Social, emotional and personality development.* (5th Ed.) New York: Wiley.

Thomas, A., & Chess, S. (1977). *Temperament and Development.* New York: Brunner/Mazel

Australian Temperament Project publications

1. Oberklaid, F., Prior, M., & Clements, A. (1983). Validation of an infant temperament questionnaire for an Australian population. *Australian Pediatric Journal*, *19*, 193.

2. Oberklaid, F., Prior, M., Golvan, D., Clements, A., & Williamson, A. (1984). Temperament in Australian infants. *Australian Pediatric Journal*, *20*, 181–184.

3. Oberklaid, F., Prior, M., Nolan, T., Smith, P., & Flavell, H. (1985). Temperament in infants born prematurely. *Journal of Developmental & Behavioural Pediatrics*, *6*, 57–61. (Reprinted in S. Chess & A. Thomas, Eds. (1986). *Annual Progress in Child Psychiatry & Child Development*, New York: Brunner Mazel.)

4. Sanson, A., Prior, M., & Oberklaid, F. (1985). Normative data on temperament in Australian infants. *Australian Journal of Psychology*, *37*, 185–195.

5. Prior, M., Kyrios, M., & Oberklaid, F. (1986). Temperament in Australian, American, Chinese and Greek infants: Some issues and directions for future research. *Journal of Cross Cultural Psychology*, *17*, 455–474.

6. Prior, M., Crook, G., Stripp, A., Power, M., & Joseph, M. (1986). The relationship between temperament and personality: An exploratory study. *Personality and Individual Differences*, *7*, 875–881.

7. Oberklaid, F., Prior, M., & Sanson, A. (1986). Temperament of pre-term versus full-term infants. *Journal of Developmental & Behavioural Pediatrics*, *7*, 159–162.

8. Oberklaid, F., Sanson, A., & Prior, M. (1986). The development of Australian normative data for infant temperament. *Australian Pediatric Journal*, *22*, 185–188.

9. Sewell, J., & Oberklaid, F. (1986). Temperament in infants and young children. *Australian Pediatric Journal*, *22*, 91–94.

10. Prior, M., Sanson, A., Oberklaid, F., & Northam, E. (1987). Measurement of temperament in 1 to 3 year old children. *International Journal of Behavioral Development*, *10*, 121–132.

11. Sanson, A., Prior, M., Oberklaid, F., Garino, E., & Sewell, J. (1987). The structure of infant temperament: Factor analysis of the Revised Infant Temperament Questionnaire. *Infant Behavior & Development*, *10*, 97–104.

12. Northam, E., Prior, M., Sanson, A., & Oberklaid, F. (1987). Toddler temperament as perceived by mothers versus day-care-givers. *Merrill-Palmer Quarterly*, *33*, 213–229.

13. Prior, M., Sanson, A., Garino, E., & Oberklaid, F. (1987). Ethnic influences on 'difficult' temperament and behaviour problems in infants. *Australian Journal of Psychology*, *39*, 163–171.

14. Prior, M., Glazner, J., Sanson, A., & Debelle, G. (1988). Temperament and behavioural adjustment in hearing impaired children. *Journal of Child Psychology & Psychiatry*, *29*, 209–216.

15. Oberklaid, F., Prior, M., Sanson, A., Sewell, J., & Kyrios, M. (1988). Variation in toddler temperament ratings according to sex, socio-economic status and cultural context. *American Journal of Diseases of Children*, *142*, 381.

16. Oberklaid, F., Sewell, J., Prior, M., Sanson, A., & Kyrios, M. (1988). The effect of cultural background on temperament and behaviour in young children. *Australian Pediatric Journal*, *24*, 396.

17. Oberklaid, F., Sewell, J., Kyrios, M., & Prior, M. (1988). Temperament and behaviour of toddlers and pre-schoolers born prematurely. *Australian Pediatric Journal*, *24*, 391–392.

18. Sewell, J., Oberklaid, F., Prior, M., Sanson, A., & Kyrios, M. (1988). Temperament in Australian toddlers. *Australian Pediatric Journal*, *24*, 343–345.

19. Prior, M., Sanson, A., Carroll, R., & Oberklaid, F. (1989). Social class differences in temperament ratings of pre-school children. *Merrill-Palmer Quarterly*, *35*, 239–248.

20. Lancaster, S., Prior, M., & Adler, R. (1989). Child behaviour ratings: The influence of maternal characteristics and child temperament. *Journal of Child Psychology & Psychiatry*, *30*, 137–149.

21. Prior, M., Sanson, A., & Oberklaid, F. (1989). The Australian Temperament Project. In D. Kohnstamm, J. Bates & M. Rothbart (Eds.). *Temperament in Childhood*. Chichester, UK: Wiley, pp. 537–554.

22. Kyrios, M., Prior, M., Oberklaid, F., & Demetriou, A. (1989). Cross cultural studies of temperament: Temperament in Greek infants. *International Journal of Psychology*, *24*, 585–603.

23. Kyrios, M., & Prior, M. (1990). Temperament, stress and family factors in behavioural adjustment of 3–5 year old children. *International Journal of Behavioural Development*, *13*, 67–93.

24. Oberklaid, F., Prior, M., Sanson, A., Sewell, J., & Kyrios, M. (1990). The assessment of temperament in the toddler age group. *Pediatrics*, *85*, 559–566.

25. Sanson, A., Prior, M., & Kyrios, M. (1990). Contamination of measures in temperament research. *Merrill-Palmer Quarterly*, *36*, 179–192.

26. Sanson, A., Prior, M., & Kyrios, M. (1990). Further exploration of the link between temperament and behaviour problems: A reply to Bates. *Merrill-Palmer Quarterly*, *36*, 573–576.

27. Sewell, J., Oberklaid, F., Glazner, J., Pedlow, R., Carse, E., & Yu, V. (1990). The relationship between the health of infants born prematurely and their mothers' mental status. *Journal of Paediatrics & Child Health*, *26*, 300.

28. Sanson, A., Oberklaid, F., Pedlow, R., & Prior, M. (1991). Risk indicators: Assessment of infancy predictors of pre-school behavioural maladjustment. *Journal of Child Psychology & Psychiatry*, *32*, 609–626.

29. Oberklaid, F. (1991). The clinical assessment of temperament in infants. *Maternal & Child Health*, *16*, 14–25.

30. Prior, M., Smart, D., Sanson, A., Pedlow, R., & Oberklaid F. (1991). Transient versus stable behaviour problems in a normative sample: Infancy to school age. *Journal of Pediatric Psychology*, *17*, 423–443.

31. Oberklaid, F., Kyrios, M., Sewell, J., Sanson, A., & Prior, M. (1991). Temperament and behaviour of pre-term infants; A six-year follow-up. *Pediatrics*, *87*, 854–861.

32. Prior, M. (1992). Temperament: A review. *Journal of Child Psychology and Psychiatry*, *33*, 249–279.

33. Prior, M. (1992). Development of temperament. In P. Heaven (Ed.) *Life Span Development*. Sydney: Harcourt, Brace Jovanovich.

34. Axia, G., Prior, M., & Carelli, G. (1992). Cultural influences on temperament: A comparison of Italian, Australian and Anglo-Australian toddlers. *Australian Psychologist*, *27*, 52–56.

35. Oberklaid, F., Sanson, A., Pedlow, R., & Prior, M. (1993). Predicting pre-school behaviour problems from temperament and other variables in infancy. *Pediatrics*, *91*, 113–120.

36. Oberklaid, F., Amos, D., Liu, C. Y., & Jarman, F. C. (1993). Growing pains: Clinical and behavioral correlates in a community based sample of 8 year olds. *American Journal of Diseases of Children*, *147*, 446.

37. Pedlow, R., Sanson, A., Prior, M., & Oberklaid, F. (1993) The stability of maternally reported temperament from infancy to eight years. *Developmental Psychology*, *29*, 998–1007.

38. Prior, M., Smart, D., Sanson, A., & Oberklaid, F. (1993). Sex differences in psychological adjustment from infancy to eight years. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 291–304.

39. Sanson, A., Smart, D., Prior, M., & Oberklaid, F. (1993). Precursors of hyperactivity and aggression. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 1207–1216.

40. Sanson, A., Prior, M., Smart, D., & Oberklaid, F. (1993). Gender differences in aggression in childhood : Implications for a peaceful world. *Australian Psychologist*, *28*, 86–92.

41. Sanson, A., Smart, D., Prior, M., Oberklaid, F., & Pedlow, R. (1994). The structure of temperament from three to seven years : Age, sex and sociodemographic influences. *Merrill-Palmer Quarterly*, *40*, 233–252.

42. Prior, M. (1994). Reading disability in Australian children. *Australian Journal of Remedial Education*, *26*, 3–7.

43. Allen, K., & Prior, M. (1995). Assessment of the validity of easy and difficult temperament through observed mother-child behaviours. *International Journal of Behavioral Development*, *18*, 609–630.

44. Kingston, L., & Prior, M. (1995). The development of patterns of stable, transient and school-age onset aggressive behaviour in young children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*, 348–358.

45. Prior, M., Sanson, A., Smart, D., & Oberklaid, F. (1995). Reading disability in an Australian community sample. *Australian Journal of Psychology*, *47*, 32–37.

46. Smith, J., & Prior, M. (1995). Temperament and stress resilience in school-age children: A within families study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*, 168–179.

47. Sanson, A. & Rothbart, M. K. (1995). Child temperament and parenting. In M. Bornstein (Ed.). *Parenting* (Vol. 4). Hillsdale, NJ: Erlbaum, pp. 299–321.

48. Sanson, A., Pedlow, R., Cann, W., Prior, M., & Oberklaid, F. (1996). Shyness ratings: Stability and correlates in early childhood. *International Journal of Behavioral Development*, *19*, 705–724.

49. Sanson, A., Prior, M. & Smart. D. (1996). Reading disabilities with and without behaviour problems at 7–8 years: Prediction from longitudinal data from infancy to 6 years. *Journal of Child Psychology and Psychiatry*, *37*, 529–541.

50. Smart, D., Sanson, A., & Prior, M. (1996). Connections between reading disability and behaviour problems: Testing temporal and causal hypotheses. *Journal of Abnormal Child Psychology*, *24*, 363–383.

51 Waring , S., Prior, M., Sanson, A., & Smart, D. (1996). Predictors of 'Recovery' from reading disability. *Australian Journal of Psychology*, *48*, 160–166.

52. Oberklaid, F., Amos, D., Liu, C., Jarman, F. C., Sanson, A., & Prior, M. (1997). 'Growing pains': Clinical and behavioural correlates in a community sample. *Developmental and Behavioral Pediatrics*, *18*, 102–106.

53. Sanson, A., Prior, M., Oberklaid, F., & Smart, D. (1999). Temperamental influences on psycho-social adjustment: From infancy to adolescence. *Australian Educational and Developmental Psychologist*, *15*, 7–38.

54. Prior, M. (1998). Behavioural problems and learning difficulties in school aged children: Studies from the Australian Temperament Project. *Clinical Psychologist*, Winter, 8–10.

55. Sanson, A., & Prior, M. (1999). Temperamental and behavioural precursors to Oppositional Defiant Disorder and Conduct Disorder. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behaviour disorders.* New York: Plenum Press, pp. 397–418.

56. Prior, M., Sanson, A., Smart, D., & Oberklaid, F. (1999). Psychological disorders and their correlates in an Australian community sample of pre-adolescent children. *Journal of Child Psychology and Psychiatry*, *40*, 563–580.

57. Prior, M., Smart, D., Sanson, A., & Oberklaid, F. (1999). Relationships between learning difficulties and psychological problems in pre-adolescent children from a longitudinal sample. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*, 429–436.

58. Martin, G. C., Wertheim, E. H., Prior, M., Smart, D., Sanson, A. & Oberklaid, F. (1999). A longitudinal study of the role of childhood temperament in the later development of eating concerns. *International Journal of Eating Disorders*, (in press).

59. Prior, M., Smart, D., Sanson, A. & Oberklaid, F. (2000). Does shy-inhibited temperament in childhood lead to anxiety disorder in adolescence? *Journal of the American Academy of Child and Adolescent Psychiatry*, *39,* 4, 461–468.

60. Prior, M. (1999). Resilience and coping: The role of individual temperament. In E. Frydenberg (Ed.). *Learning to cope: Developing as a person in complex societies.* Oxford: Oxford University Press, pp. 34–52.

61. Wertheim, E. H., Martin, G. C., Prior, M., Sanson, A. & Smart, D. (2000). Parent influences in the transmision of eating and weight related values and behaviours: A study including daughters, sons and parents. *Eating Disorders: The Journal of Treatment and Prevention, (*in press.)

62. Jorm, A., Prior, M., Sanson, A, Smart, D., Zhang, Y., Easteal, S. (2000) Association of a functional polymorphism of the serotonin transporter gene with anxiety related temperament and behavior problems in children: a longitudinal study from infancy to the mid teens. *Molecular Psychiatry*, *5*, 542–547.

63. Toumbourou, J., Sanson, A., Siddons, H., & Smart, D. (1999). Social-emotional factors modifying the effect of sensation seeking and depression on early adolescent substance use, (submitted for publication).

64. Prior, M., Smart, D., Sanson, A., & Oberklaid, F. (2001). Longitudinal predictors of behavioural adjustment in pre-adolescent children, (in press: *Australian & New Zealand Journal of Psychiatry*).

65. Smart, D., Prior, M., Sanson, A., & Oberklaid, F. (2000). Children with reading difficulties: A six year follow-up from early elementary school to adolescence, (submitted for publication).

66. Sanson, A., Amos, D., Jarman, F. C., & Oberklaid, F. (1999). Psychosocial correlates of chronic illness in an Australian community sample: Behaviour, perceived self-competence and academic achievement, (submitted for publication).

67. Sanson, A., Oberklaid, F., Prior, M., Amos, D., & Smart, D. (1999). *Risk factors for 11–12 years olds' internalising and externalising behaviour problems*. Paper presented at the International Society for the Study of Behavioural Development Conference, August, 1996.

68. Sanson, A., Smart, D., Prior, M., & Oberklaid, F. (1999). *Early characteristics of 11–12 year old children with competent, average and problematic peer relationships*. Paper presented at the 26th International Congress of Psychology Conference, August, 1996.

69. O'Shea, M., Toumbourou, J., Sanson, A., Smart, D. & Oberklaid, F. (2000). Childhood behaviour problems and drug use in early adolescence: Risk and resiliency processes, (paper in preparation).

70. Sanson, A., Toumbourou, J., Smart, D., Siddons, H., Prior, M. & Oberklaid, F. (2000). The relationship between childhood temperament and adolescent personality, (paper in preparation).

71. Sanson, A., Johnson, L., & Letcher, P. (1999). *Civic responsibility and a culture of peace.* Paper presented at the 6th International Symposium on the Contribution of Psychology to Peace, July, 1999.

72. Smart, D., Sanson, A., Toumbourou, J., Prior, M., & Oberklaid, F. (1999). *Longitudinal pathways to adolescent anti-social behaviour and depression.* Paper presented at the Life History Research Society Conference, September, 1999.

73. Clarke, C., Prior, M., & Kinsella, G. (2000). Do executive function deficits differentiate between adolescents with ADHD and Oppositional Defiant/Conduct Disorder? A neuropsychological study using the Six elements test and Haylimg sentence completion test. *Journal of Abnormal Child Psychology*, (in press).

74. Williams, B., Sanson, A., Toumbourou, J., & Smart, D. (2000). *Patterns and predictors of teenagers' use of licit and illicit substances in the Australian Temperament Project cohort.* Report commissioned by the Ross Trust.

75. Smart, D., Johnson, L., Sanson, A. & Toumbourou, J. (2000). *Civic responsibility among Australian adolescents*. Paper presented at the 7th Australian Institute of Family Studies Conference, July, 2000.

76. Letcher, P., Toumbourou, J., Sanson, A., Prior, M., Oberklaid, F. & Smart, D. (2000). Parenting style as a moderator of the effect of temperament on adolescent externalsing and internalising behaviour problems, (submitted for publication).

77. Pedlow, R., Sanson, A., & Wales, R. J. W. (2000). Children's production and comprehension of politeness in requests: Relationships to behavioral adjustment in middle-childhood. *Journal of Language and Social Psychology*, (in press).

78. McGee, R., Prior, M., Williams, S., Smart, D., & Sanson A. (2000). The long-term significance of teacher rated hyperactivity in childhood: Findings from two longitudinal studies, (submitted for publication).

79. Jorm, A. F., Prior, M., Sanson, A., Smart, D., Zhang, Y., & Easteal, S. (2000). Association of a polymorphism of the Dopamine transporter gene with externalizing behavior problems and associated temperament traits: A longitudinal study from infancy to the mid-teens, (submitted for publication).

80. Smart, D., Sanson, A., Toumbourou, J., Prior, M., & Oberklaid, F. (2000). *Connections between parenting style and adolescent problem behaviours*. Paper presented at the International Society for the Study of Behavioural Development, July, 2000.

81. Blaney, S. M., Wertheim. E. H., Sanson, A., Prior, M. & Smart, D. (2000). *A longitudinal and concurrent analysis of the role of temperament characteristics in predicting the later development of disordered eating in female Australian adolescents*. Paper presented at the 35th Australian Psychological Society Conference, October, 2000.

Measures and instruments used in the Australian Temperament Project

1. 1983: 4–8 MONTHS

Parent (N = 2443)
1. *Revised Infant Temperament Questionnaire*
Carey, W. B. & McDevitt, S. D. (1978). Revision of the Infant Temperament Questionnaire. *Paediatrics*, 60, 735–739.
Sanson, A., Prior, M., Oberklaid, F., Garino, E., & Sewell, J. (1987). The structure of infant temperament: Factor analysis of the Revised Infant Temperament Questionnaire. *Infant Behavior and Development*, *10*, 97–104.
2. *Mother's Overall Rating of the Child's Temperament (MOR)* (ATP devised measure)
3. *Behaviour Problems* (ATP devised measure)
4. *Family Demographic Details:* birth order, number of children in family, marital status, living arrangements, parents' occupational and educational level, ethnic background.

Infant Welfare Sister (N = 2443)
1. *Nurse's Overall Rating of the Child's Temperament* (ATP devised measure)
2. *Rating of Mother-Baby Pair Relationship* (ATP devised measure)
3. *Birth and Developmental History* (ATP devised measure)

2. 1984: 1–2 YEARS (two-thirds of sample)

Parent (N = 1279)
1. *Toddler Temperament Questionnaire*
Fullard, W., McDevitt, S. C. & Carey, W. B. (1984). Assessing temperament in one to three-year old children. *Journal of Pediatric Psychology*, *9*, 205–216.
Sewell, J., Oberklaid, F., Prior, M., Sanson, A., & Kyrios, M. (1988). Temperament in Australian toddlers. *Australian Paediatric Journal*, *24*, 343–345.
2. *MOR* (as above)(ATP devised measure)
3. *Behaviour Problems Checklist (BPC)* (ATP devised measure)
4. *Family Demographic Details* (as above)

3. 1985: 2–3 YEARS (two-thirds of sample)

Parent (N = 1360)
1. *Toddler Temperament Questionnaire*
Fullard, W., McDevitt, S. C. & Carey, W. B. (1984). Assessing temperament in one to three-year old children. *Journal of Pediatric Psychology*, *9*, 205–216.
Sewell, J., Oberklaid, F., Prior, M., Sanson, A., & Kyrios, M. (1988). Temperament in Australian toddlers. *Australian Paediatric Journal*, *24*, 343–345.
2. *MOR* (as above) (ATP devised measure)
3. *Behaviour Problems Checklist (BPC)* (ATP devised measure)
4. *Behaviour Checklist*

Richman, N., Stevenson, J., & Graham, P. J. (1982). *From pre-school to school: A behavioural study.* London, UK: Academic Press.

5. *Aggression Questionnaire*

Arnold, G. (1984). Aggression Questionnaire (unpublished scale in Master of Psychology Thesis, LaTrobe University.)

6. *Family Demographic Details* (as above)

4.   1986: 3–4 YEARS

Parent (N = 1716)

1. *Childhood Temperament Questionnaire*

Thomas, A., & Chess, S. (1977). *Temperament and development.* New York: Brunner/Mazel.
Sanson, A., Smart, D., Prior, M., Oberklaid, F., & Pedlow, R. (1994). The structure of temperament from three to seven years: Age, sex and sociodemographic differences. *Merrill-Palmer Quarterly*, *40*, 233–252.

2. *Behar Pre-school Behaviour Questionnaire*

Behar, L., & Stringfield, S. (1974). A behavioral rating scale for the pre-school child. *Developmental Psychology*, *10*, 601–610.

3. *Aggression Questionnaire*

Arnold, G. (1984). Aggression Questionnaire (as above)

4. *Ratings of Physical and Language Development and Problems* (ATP devised measure)

5. *Family Demographic Details* (as above)

5.   1988: 5–6 YEARS

Parent (N = 1581)

1. *Childhood Temperament Questionnaire*

Thomas, A., & Chess, S. (1977). *Temperament and development.* New York: Brunner/Mazel.
Sanson, A., Smart, D., Prior, M., Oberklaid, F., & Pedlow, R. (1994). The structure of temperament from three to seven years: Age, sex and sociodemographic differences. *Merrill-Palmer Quarterly*, *40*, 233–252.

2. *MOR* (as above) (ATP devised measure)

3. *Rutter Problem Behaviour Questionnaire*

Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.

4. *Child Health Questionnaire*

Eisen, M., Donald, C. A., Ware, J. E., Brook, R. H. (1980) *Conceptualization and measurement of health for children in the health insurance study*. Santa Monica, California: The Rand Corporation. R–2313–HEW.

5. *Family Demographic Details* (as above)

Teacher (N = 1428)

1. *Teacher Temperament Questionnaire*

Keogh, B., Pullis, M. E. & Cadwell, J. (1982). A short form of the Teacher
Temperament Questionnaire. *Journal of Educational Measurement, 19*, 323–329.

2. *Teacher's Overall Rating (TOR)* (ATP devised measure)

3. *Rutter Problem Behaviour Questionnaire*

Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.

4. *School Readiness Questionnaire* (ATP devised measure)

6. 1990: 7–8 YEARS

Parent (N = 1727)
1. *Childhood Temperament Questionnaire*
Thomas, A., & Chess, S. (1977). *Temperament and development.* New York: Brunner/Mazel.
Sanson, A., Smart, D., Prior, M., Oberklaid, F., & Pedlow, R. (1994). The structure of temperament from three to seven years: Age, sex and sociodemographic differences. *Merrill-Palmer Quarterly, 40,* 233–252.
2. *MOR* (as above) (ATP devised measure)
3. *Rutter Problem Behaviour Questionnaire*
Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.
4. *Child Health Questionnaire*
Eisen, M., Donald, C. A., Ware, J. E., Brook, R. H. (1980) *Conceptualization and measurement of health for children in the health insurance study.* Santa Monica, California: The Rand Corporation. R–2313–HEW.
5. *Life Events Scale*
Smith, J., & Prior, M. (1995). Temperament and stress resilience in school-age children: A within families study. *Journal of the American Academy of Child and Adolescent Psychiatry, 34,* 168–179.
6. *Family Demographic Details*

Teacher (N = 1264)
1. *Teacher Temperament Questionnaire*
Keogh, B., Pullis, M. E. & Cadwell, J. (1982). A short form of the Teacher Temperament Questionnaire. *Journal of Educational Measurement, 19,* 323–329.
2. *TOR* (as above) (ATP devised measure)
3. *Rutter Problem Behaviour Questionnaire* (as above)
Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.
4. *Interpersonal Competence Scale*
Cairns, R. B. & Cairns, B. D. (1984). Predicting aggressive patterns in girls and boys: A developmental study. *Aggressive Behaviour, 11,* 227–242.
5. *School Functions Questionnaire* (ATP devised measure)
6. *ACER Word Knowledge Test*
Australian Council for Educational Research (1969). *Primary Reading Survey, Word Knowledge Test. Level BB.* Melbourne, Australia: ACER.

7. 1992: 9–10 YEARS

(N = 1536)
1. *EAS Temperament Questionnaire*
Buss, A., & Plomin, R. (1984). *Temperament: Early developing personality traits.* Hillsdale, NJ: Erlbaum.
2. *MOR* (as above) (ATP devised measure)
3. *Rutter Problem Behaviour Questionnaire*
Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.
4. *Social Behaviour Questionnaire*
Over, R. (1992). Social Behaviour Questionnaire (unpublished scale)
5. *Mentor Relationship* (ATP devised measure)
6. *Family Demographic Details* (as above)

8. 1994: 11–12 YEARS

Parent (N = 1469)
1. *School-Age Temperament Questionnaire*
McClowry, S. G. (1995). The development of the School-Age Temperament
Inventory. *Merrill-Palmer Quarterly*, *41*, 271–285.
2. *MOR* (as above) (ATP devised measure)
3. *Rutter Problem Behaviour Questionnaire*
Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London:
Longmans.
4. *Social Skills Rating System*
Gresham F.M., & Elliott, S.N. (1990). *Manual for the Social Skills Rating System.* Circle Pines
MN: American Guidance Service.
5. *Peer Relationships*
Short Form of Peers scale from Walker, H. M., & McConnell, S. R. (1988). *Walker-
McConnell Scale of Social Competence and School Adjustment.* Austin TX: Pro-Ed.
6. *Deviant Peer Associations*
Adapted from Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Anti-social Boys.*
Eugene, OR: Castalia.
7. *Child Health Questionnaire* (as above)
Eisen, M., Donald, C. A., Ware, J. E., Brook, R. H. (1980) *Conceptualization and measurement
of health for children in the health insurance study*. Santa Monica, California: The Rand
Corporation. R–2313–HEW.
8. *Mentor Relationship* (ATP devised measure)
9. *Parental Monitoring* (ATP devised measure)
10. *Family Demographic Details* (as above)

Teacher (N = 1232)
1. *Teacher Temperament*
Keogh, B., Pullis, M. E. & Cadwell, J. (1982). A short form of the Teacher Temperament
Questionnaire. *Journal of Educational Measurement*, *19*, 323–329.
2. *Rutter Problem Behaviour Questionnaire*
Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London:
Longmans.
4. *Social Skills Rating System*
Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle
Pines MN: American Guidance Service.
5. *Peer Relationships*
Short Form of Peers scale from Walker, H. M., & McConnell, S. R. (1988). *Walker-
McConnell Scale of Social Competence and School Adjustment.* Austin TX: Pro-Ed.
6. *ACER Word Knowledge Test*
Australian Council for Educational Research (1972). *Primary Reading Survey, Word
Knowledge Test. Level D Form R.* Melbourne, Australia: ACER.

Child (N = 1453)
1. *Self-Concept*
Marsh, H. W., Barnes, J., Cairns, L., & Tidman, M. (1984). Self-Description Questionnaire:
Age and sex effects in the structure and level of self-concept for pre-adolescent children.
Journal of Educational Psychology, *76*, 940–956.
2. *Berndt Friendship Questionnaire*
Berndt, T. J., & Perry, R. B. (1986). Children's perceptions of friendships as supportive
relationships. *Developmental Psychology*, *22*, 640–648.
3. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

4. *ATP adaptation of Rutter Problem Behaviour Questionnaire*

Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.

9.   1995: 12–13 YEARS

Parent (N = 1274)

1. *School-Age Temperament Questionnaire*

McClowry, S. G. (1995). The development of the School-Age Temperament Inventory. *Merrill-Palmer Quarterly*, *41*, 271–285.

2. *MOR* (as above) (ATP devised measure)

3. *Rutter Problem Behaviour Questionnaire*

Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour*. London: Longmans.

4. *Academic & Social Progress at School* (ATP devised measure)

5. *Eating Behaviours Inventory* (Short Form)

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, 2, 15–34.

6. *Parent-Child Communication* (ATP devised measure)

7. *Parental Monitoring* (ATP devised measure)

8. *Family Demographic Details* (as above)

Child (N = 1228)

1. *Self-Concept* (re physical appearance)

Marsh, H. W., Barnes, J., Cairns, L., & Tidman, M. (1984). Self-Description Questionnaire: Age and sex effects in the structure and level of self-concept for pre-adolescent children. *Journal of Educational Psychology*, *76*, 940–956.

2. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

3. *Rutter Problem Behaviour Questionnaire*

Rutter, M., Tizard, J., & Whitmore, K. (1970). *Education, Health and Behaviour.* London: Longmans.

4. *Academic and Social Progress at School* (ATP devised measure)

5. *Eating Behaviours Inventory* (Short Form)

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*, 15–34.

6. *Child Communication Patterns* (ATP devised measure)

10.   1996: 13–14 YEARS

Parent (N = 1391)

1. *School-Age Temperament Questionnaire*

McClowry, S. G. (1995). The development of the School-Age Temperament Inventory. *Merrill-Palmer Quarterly*, *41*, 271–285.

2. *MOR* (as above) (ATP devised measure)

3. *Revised Behaviour Problem Checklist*

Quay, H. C. & Peterson, D. R. (1987). *Manual for the Revised Behavior Problem Checklist.*

Odessa, FL: PAR Inc.

4. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

5. *Peer Relationships* (ATP devised measure)

6. *Deviant Peer Associations*

Adapted from Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Anti-social Boys*. Eugene, OR: Castalia

7. *Academic and Social Progress at School* (ATP devised measure)

8. *Parenting Practices Questionnaire* (ATP devised measure)

9. *Pubertal Development* (ATP devised measure)

10. *Family Demographic Details* (as above)

11. *Parental Smoking and Drinking Habits* (ATP devised measure)

Child (N = 1358)

1. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

3. *Revised Behaviour Problem Checklist*

ATP adaptation, Quay, H. C. & Peterson, D. R. (1987). *Manual for the Revised Behavior Problem Checklist*. Odessa, FL: PAR Inc.

4. *Short Mood and Feelings Questionnaire*

Angold, A., Costello, E. J., & Messer, E. C. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, *5*, 237–249.

5. *Academic and Social Progress at School* (ATP devised measure)

6. *Inventory of Peer Attachment* (Short Form)

Armsden, G. C. & Greenberg, M. T. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological wellbeing in adolescence. *Journal of Youth and Adolescence*, *16*, 427–454.

7. *Deviant Peers* (ATP devised measure)

8. *Friendship Quality* (ATP devised measure)

9. *Inventory of Family Attachment* (Short Form)

Armsden, G. C. & Greenberg, M. T. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological wellbeing in adolescence. *Journal of Youth and Adolescence*, 16, 427–454.

10. *Delinquency Short Form*

Moffitt, T. E., & Silva, P. A. (1988). Self-reported delinquency: Results from an instrument for New Zealand. *Australian & NZ Jnl Criminology*, *21*, 227–240.

11. *Smoking, Drinking and Other Drug Use* (ATP devised measure)

12. *Curiosity Scale*

Ainley, M. D. (1987). The factor structure of curiosity measures: Breadth and depth of interest curiosity styles. *Australian Journal of Psychology*, *39*, 53–59.

13. *Emotional Control* (ATP devised measure)

11.   1998: 15–16 YEARS

Parent

1. *School-Age Temperament Questionnaire*

McClowry, S. G. (1995). The development of the School-Age Temperament Inventory. *Merrill-Palmer Quarterly*, 41, 271–285.

2. *Five Factor Personality Questionnaire*

Lanthier, R. P., & Bates, J. E. (1995). *Infancy era predictors of the big five personality dimensions in adolescence.* Paper presented at the 1995 Meeting of the Midwestern Psychological Association, Chicago, IL.

3. *MOR* (as above) (ATP devised measure)

4. *Revised Behaviour Problem Checklist*

Quay, H. C. & Peterson, D. R. (1987). *Manual for the Revised Behavior Problem Checklist.* Odessa, FL: PAR Inc.

5. *Teenager Substance Use*

Adapted from Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Anti-social Boys.* Eugene, OR: Castalia.

6 *Peer Relationships* (ATP devised measure)

7. *Deviant Peer Associations*

Adapted from Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Anti-social Boys.* Eugene, OR: Castalia.

8. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

9. *Social Responsibility and Citizenship* (ATP devised measure)

10. *Academic and Social Progress at School* (ATP devised measure)

11. *Parenting Practices Questionnaire* (ATP devised measure)

12. *Mentor Relationships* (ATP devised measure)

13. *Teenager Eating Behaviours and Body Size* (Short Form)

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*, 15–34.

14. *Family Demographic Details*

Teenager

1. *Five Factor Personality Questionnaire*

Lanthier, R. P., & Bates, J. E. (1995). *Infancy era predictors of the big five personality dimensions in adolescence.* Paper presented at the 1995 Meeting of the Midwestern Psychological Association, Chicago, IL.

2. *Social Skills Rating System*

Gresham F. M., & Elliott, S. N. (1990). *Manual for the Social Skills Rating System.* Circle Pines MN: American Guidance Service.

3. *Social responsibility and Citizenship* (ATP devised measure)

4. *Revised Behaviour Problem Checklist* (ATP adaptation of Quay & Peterson)

5. *Short form of Revised Manifest Anxiety Scale*

Reynolds, C. R. & Richmond, B. O. (1997) What I think and feel: A revised measure of Children's manifest anxiety. *Journal of Abnormal Child Psychology*, 23, 15–20.

6. *Short Mood and Feelings Questionnaire*

Angold, A., Costello, E. J., & Messer, E. C. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, *5*, 237–249.

7. *Life at School* (Short Form)

ACER School Life Questionnaire 1984. Reported in Ainley, J., Reed, R., & Miller, H. (1986). *School organisation and the quality of schooling: A study of Victorian Government secondary schools.* ACER Research Monograph Number 29.

8. *Deviant Peer Associations* (ATP devised measure)

9. *Friendship Quality* (ATP devised measure)

10. *Delinquency* (Short Form)

Moffitt, T. E., & Silva, P. A. (1988). Self-reported delinquency: Results from an instrument for New Zealand. *Australian & NZ Jnl Criminology*, *21*, 227–240.

11. *Smoking, Drinking and Other Drug Use* (ATP devised measure)

12. *Sensation Seeking*

Zuckerman, M. (1994). *Behavioral Expressions and Biosocial Bases of Sensation Seeking.* Cambridge, UK: Cambridge University Press.

13. *Emotional Control* (ATP devised measure)

14. *Eating Behaviours and Body Image* (Short Form)

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders, 2*, 15–34.