aspirations, expectations and implementation

A report prepared for
The Smith Family

Adrian Beavis
Martin Murphy
Jennifer Bryce
Matthew Corrigan

ACER

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The Smith Family
Level 8
35 Pitt Street
Sydney NSW 2000

GPO Box 10500
Sydney NSW 2001
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Post-School plans:

aspirations, expectations and implementation

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by

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Preface

The Smith Family's major research report for 2004, *Post-School Plans: aspirations, expectations and implementation*, was prepared for The Smith Family by the Australian Council for Educational Research (ACER). Adrian Beavis and his colleagues at ACER Martin Murphy, Jennifer Bryce and Matthew Corrigan, have progressed research into critical questions that have been part of The Smith Family's commitment to becoming broadly evidence based in implementing our strategic focus on education/lifelong learning. This year's Report is a further step in helping us to contribute to our vision of a more caring and cohesive Australian community. It will also assist us in working with caring Australians to unlock opportunities for disadvantaged families to participate more fully in society by identifying more effective ways to gain the knowledge, skills and confidence to exercise realistic life choices.

The focus in the Report on the importance of post-school plans was initially flagged in last year's major report, *Barriers to Participation: Financial, Educational, and Technological*, a report into the barriers to societal participation among low-income Australians: "The post-school plans of students provide an indication of the level of success in school and their subsequent attitudes towards school and learning" (Barriers, c. 2, p. 56). In this year's Report the relation between plans, aspirations, expectations and implementation – and the importance of adequate material resources for the latter to be realised – are consistent themes throughout.

The major sources of data for the Report – *the Longitudinal Study of Australian Youth* (LSAY) and the Organisation for Economic Co-operation and Development's (OECD) *Program for International Student Assessment* (PISA) – provided an understanding of the significance of post-school plans as a consolidating focus for a number of advantaging factors. To that end ACER has responded to our original and more general concern to identify advantaging factors in families, schools and communities for successful educational outcomes.

In addition to offering a sound, empirically based set of findings, the Report also progresses from theory formulation to identification and definition of key concepts, on to the description of indicators matched to these concepts. A significant section of the Report considers theoretical and conceptual issues to establish the legitimacy of the indicators. For the most part, these matters are located in the Appendices to the Report for the interest of those who wish to understand how the indicators were derived. I strongly recommend them to the reader for a significantly enhanced understanding of the analyses in the preceding chapters.

A number of other features of the Report commend it to the reader. The overview on lifelong learning, the characteristics of lifelong learners and association between types of post-school plans and pre-dispositions towards lifelong learning add further depth to the study. The proposals for future directions in research suggested by the report will be of interest to all Australians who are committed to ensuring that our children and young people have the best possible opportunities to engage in learning that equips them and enhances Australia's capacity for robust participation in the knowledge economy of the 21st century. Finally, the section on policy implications makes a preliminary case for considering a shift in Australia's predominant policy focus on education, training and work during the 20th century to a broader 21st century focus on education, work, community and family.

Dr Rob Simons
National Manager Strategic Research and Social Policy
The Smith Family

Notes on the Authors

Adrian Beavis is a Principal Research Fellow at ACER. He has been at ACER for over 10 years during which time he has worked on a wide range of educational evaluation and policy related studies for State and Australian governments, as well as on the OECD PISA project. He is currently working in the *Teaching and Learning Division* at ACER and has particular interest in Teacher Education. He is also interested in, and has worked on, numerous projects concerned with school to work transition.

Martin Murphy is a Research Fellow at ACER. He has worked on a number of projects, including an evaluation of the *Cooperative Scholarship Testing Program* and research into language factors in large-scale assessments in Mathematics. In 1999 and 2000 he was project director of the *Queensland Statewide Literacy and Numeracy Testing Project*, involving full cohort testing at Years 5 and 7, as well as a sample of students at Year 3. He has recently begun work on management activities related to the OECD PISA project. He also maintains the ACER Sampling Frame and works with project directors across the organisation in the selection of samples for trials and main studies.

Jennifer Bryce is a Research Fellow at ACER. She has also been at ACER for over 10 years during which time she has worked on a large range of educational measurement, evaluation and policy related studies for State and Commonwealth governments and also an ACER core-funded project on Lifelong Learning. Jennifer's particular interests are in defining and assessing learning characteristics and generic skills.

Matthew Corrigan is a Research Officer at ACER in the *Transitions and Economics of Education* research program. His particular research interests are improving the educational outcomes of disadvantaged and Indigenous students. He has produced a number of papers in the area of Indigenous education and has worked as a volunteer in Indigenous communities in South America.

Acknowledgments

We wish to acknowledge the contribution of Rob Simons and Maree Murray of *The Smith Family*, for their help in defining the scope and orientation of the study, for their detailed review of various drafts, and for their continued support of the work. We wish to acknowledge the artistic contribution of Evan Shapiro, also of *The Smith Family*, in preparing camera-ready copy of the report.

The report was copy edited by Jarrod Bates. We wish to thank him for his close attention to it.

Executive Summary

This study investigates the relations between post-school plans, family background and having a lifelong learning orientation.

The major research questions addressed in the report are:

1. What are the post-school plans of young people?
2. What factors are associated with the development of these post-school plans?
3. What is the association between types of post-school plans and pre-dispositions towards lifelong learning?

Data for this study were taken from two sources – the *Longitudinal Study of Australian Youth* (LSAY) and the *Organisation for Economic Co-operation and Development's* (OECD) *Program for International Student Assessment* (PISA) data for Australia. Our study did not collect new data.

For this study lifelong learning was understood as an orientation that encourages engagement with learning, and the development of characteristics that will make learning an integral part of the learner's life. Post-school plans were understood as the (more or less clear-cut) set of aspirations and expectations that an individual has about what activities, related to (a) education; post-compulsory school destinations, including TAFE, VET, university and other learning options (b) work or (c) family, they will undertake after leaving secondary school.

The Smith Family was particularly interested in focussing the analyses on young people from families in the lowest quintile of socio-economic status. Accordingly, many of the findings relate to differences between these quintiles.

THE MAIN FINDINGS

1. *What are the post-school plans of young people?* Most Year 9 students in 1995 planned further study in their first year after leaving school. Around 40% of boys and 20% of girls planned no post-school study. A fifth of students did not know what they would do in the first year after leaving school.

2. *What factors are associated with the development of these post-school plans?*

   a. Girls are more likely to plan to study than boys.

   b. Students who had parents with a degree or diploma were more likely to plan to study full-time after school.

   c. Socio-economic status of the family had a weak effect on the post-school plans of students. Students from higher socio-economic status families were somewhat more likely to plan to study at a university.

   d. Vocational orientation influenced post-school plans. Students with an interest in working with their hands – mostly boys – were much less likely to plan post-school study. They were also much less likely to plan to go to a university even if they planned post-school study. These students were more likely to plan to go to a TAFE or become an apprentice than students with other vocational orientations.

   e. Family structure had no effect on post-school plans to not study or to study part-time in any quintile of family socio-economic status.

   f. Family socio-economic status influenced the extent to which young people were able to successfully implement their post-school plans, especially when those plans were for attending a university. This effect was strong.

3. *What is the association between types of post-school plans and pre-dispositions towards lifelong learning?*

   a. The LSAY data suggested that having an orientation to lifelong learning has a weak effect on post-school plans and expectations. Ability, gender, and vocational orientation are strong influences on post-school plans.

   b. The Australian PISA data showed a weak to moderate relationship between an orientation to lifelong learning and family wealth, depending upon the indicators used. A stronger relation was found for two indicators of lifelong

learning – home educational resources, and comfort and ability with computers – suggesting that where material resources are required, family wealth has an impact on the development of an orientation to lifelong learning.

c. The PISA data showed that, for students from the lowest quintile of family wealth, having an instrumental motivation towards learning was associated with an increased expectation of an occupation with high socio-economic status.

OTHER FINDINGS

A range of other findings were also made that did not directly relate to the main research questions, but which nevertheless appear important. These included:

1. Of students from families in the lowest quintile of socio-economic status who planned to go to university when they were in Year 9, a little over 60% were attending university in 1999. This compares with 80% of students from the highest quintile. In other words, young people at Year 9, from lower socio-economic status families, find it harder to realize their post-school plans for study at a university.
2. Socio-economic status does not appear to be associated with difficulty in realizing post-school plans as described at Year 9 when these plans do not involve study at a university.
3. If young people state in Year 9 that they plan no post-school study, those from lower socio-economic status families are more likely not to be studying than those from higher socio-economic status families.
4. There is an increase in average levels of family educational support across the quintiles of family wealth.
5. There is no association between the wealth of the family and levels of effort and perseverance reported by 15-year-old students.

FUTURE DIRECTIONS

The Report's Conclusion also notes directions for future research reflecting how post-school plans provide indications of young people's understandings of their destinations into the world of work. Post-school plans appear to reflect understandings of: (a) the self – including abilities, interests, and gender; (b) the world of work – including socio-economic status of occupations, types of work and the distribution of the sexes within occupations; (c) the nexus between education or training and the world of work, and: (d) the location in that world to which they perceive themselves as best suited.

The directions for future research suggested by each of the levels of understanding reflected in post school plans include investigations into:

1. The accuracy of the perceptions of the world of work by 'at risk' young people;
2. The clarity and congruence of interests of young people in relation to vocational goals;
3. The criteria other than the socio-economic status of an occupation, such as happiness, quality of life, and job satisfaction, that influence how students formulate post-school plans;
4. How young people from low socio-economic status families view the world of work, and how their perceived interests, ability, and gender together shape their post-school plans in ways that might differ from young people of higher socio-economic families.

Policy Implications

In addition, the Report has implications for policy development in a number of areas that are related to the importance of education and lifelong learning for young people who will have to face the workplace challenges of living in a 21st century knowledge economy. On the basis of this research it suggests four guiding principles for policy development:

1. That a national youth mentoring strategy be implemented that enhances and complements the support that can be provided by families, communities and schools either for compulsory school retention and completion rates, or for the identification of alternate pathways suited to interests and abilities;

2. That family and community support systems be developed to provide seamless and interrelated support for post-compulsory school transitions and the development of positive attitudes toward life long learning;
3. That funding mixes be devised to support and reward schools that develop more diverse, flexible and interrelated pathways into work and post compulsory education and also improve post-school destination outcomes for all students - including those from the lower SES deciles;
4. That large, medium and small businesses be provided incentives to engage with schools and tertiary institutions in providing mentoring and career counselling that involves more than career information and stresses the importance of formulating post-school plans in making realistic connections between students' interests and abilities and the world of work.

GENERAL CONCLUSION

The study suggests that the most important factors for predicting post-school plans are gender, ability and the vocational orientation of the student. Students appear to have a good understanding of all these factors and plan their post-school destinations accordingly. An orientation to lifelong learning also has an effect on these destinations, but it appears on the LSAY data to be small. This suggests that policies designed to enhance student outcomes, by encouraging the development of a positive lifelong learning orientation, may need to consider the interests and abilities of young people. The contents and methods of delivery for programs need to be situated in an environment that is congruent with their interests and set at a level appropriate to their ability.

Chapter One

Introduction

BACKGROUND

This study investigates the factors associated with having an orientation to lifelong learning on the educational or occupational outcomes of young people in Australia during the late 1990s. More specifically, it considers the relations between post-school plans, family background and having a lifelong learning orientation.

The Australian Council for Educational Research conducted the study for *The Smith Family*.

RESEARCH QUESTIONS

The major research questions addressed in the report are:

1. What are the post-school plans of young people?
2. What factors are associated with the development of these post-school plans?
3. What is the association between types of post-school plans and pre-dispositions towards lifelong learning?

Related issues are also addressed as part of a broad exploration of these questions.

APPROACH

This study aims to provide a sound, empirically-based set of findings. It progresses from theory formulation to identification and definition of key concepts, and on to the description of indicators matched to these concepts.

Indicators are used to measure key concepts, and act as variables in the statistical models and analyses. The use of indicators requires that concepts are clearly explained and that the key facets of these concepts are described. This ensures that the indicators are viewed as appropriate and cover the domain described by the concepts (de Vaus, 1995). To achieve this, a significant section of the report is spent considering theoretical and conceptual issues, and establishing the legitimacy of the indicators. This process was complicated by the fact that the study only used existing data. New data were not collected to address the research questions. There was, therefore, a need to assess the adequacy of those indicators available in the data.

SOURCES OF DATA

Data for this study were taken from two sources. The first source was the *Longitudinal Study of Australian Youth* (LSAY), and the second was the *Organisation for Economic Co-operation and Development's* (OECD) *Program for International Student Assessment* (PISA).

LSAY[i] examines the progress of several groups of young Australians as they move from school into post-secondary education or employment. Information from the surveys is used to describe what young Australians are doing and how this changes as they age. The use of LSAY data enabled detailed investigation of the links between social characteristics, education and training, and employment.

The PISA project collects data on a three-year cycle. Its first data collection was in 2000. While it collected data from around 30 countries, only the data from Australia were used in this study. PISA collects data from a large, nationally representative sample of 15-year-olds. It uses tests to measure student reading, mathematical and scientific literacy, and a questionnaire to provide a range of data about family background, and educational and post-school plans.

The OECD regards the orientation of the PISA study as:

> ... forward-looking, focussing on young peoples' ability to use their knowledge and skills to meet real-life challenges, rather than on the extent to which they have mastered a specific school curriculum (OECD, 2001).

The approach taken by PISA complements that taken in this study, with its focus on the nexus between education and the world of work, and on skills and types of knowledge that are not curriculum bound.

STRUCTURE OF THE REPORT

The substantive part of this report begins with Chapter 2 – a literature review. This review is pivotal to the study. It helps:

1. define the concept of 'lifelong learning';
2. describe the key facets of the concept;
3. rank the importance of each facet;

4. describe and evaluate the empirical evidence gleaned from various studies of lifelong learning, and;
5. establish a list of sound indicators.

Chapters 3 and 4 of the Report describe the findings drawn from the LSAY and PISA data sets. The concluding chapter integrates the findings from LSAY and PISA to provide answers to the major research questions of this study and offers suggestions for further relevant research.

Chapter Two

Literature Review

Concern with learning over a lifetime has existed for a long time. Cramer, for example, wrote the following nearly 70 years ago:

> *I would rather develop in my child a desire to continue throughout his life his self education through wide reading, than to be able to teach him everything he will ever need to know before he leaves school.*
> (Cramer, 1936, p. 44)

The term 'lifelong learning' was not used in Cramer's time, but the importance of learning throughout life has been acknowledged for centuries. Particular interest in 'lifelong education', sometimes with an instrumental purpose (such as gaining qualifications to enhance earning power), sometimes with a purpose of life enrichment, becomes evident in literature from the 1970s onwards (Candy, Crebert, & O'Leary, 1994).

In the early 1990s, the governments of many Western nations focused on economic potential, particularly, of secondary school education. Sets of generic key competencies were developed, most of which were very similar and aimed to equip secondary school leavers for the workplace (Department of Employment, 1995; The Mayer Committee, 1992; US Department of Labor Employment and Training Administration, 1991). By the end of the decade, these generic skills, while still focusing on employment, took on a less instrumental flavour. There was greater emphasis on meta-cognitive skills and with this development the term 'lifelong learning' was to become ubiquitous (Aspin, 1997; Australian Chamber of Commerce and Industry and Business Council of Australia, 2002). Not surprisingly, lifelong learning has been taken up in international settings (Delors, 1996; European Commission Working Group on Quality Indicators, 2002; European Union, 1995; OECD, 2002).

Accompanying these developments, a vast literature about lifelong learning has been created. This posed the challenge of how to most effectively approach the literature for this review.

APPROACH TAKEN BY THE REVIEW

This review is a key element of the research reported here. Its aim is to identify the concepts salient to understanding an orientation to lifelong learning. It seeks to identify those characteristics of people that serve as effective indicators of these key concepts. These indicators can then be utilized to guide the selection of variables for use with empirical analyses.

The approach to this review is driven by this need to identify indicators of lifelong learning. It is therefore focused on literature that is either strongly empirical in orientation or provides a sound basis for understanding key concepts.

The review starts by establishing a definition of 'lifelong learning'. It is important to understand what is meant by this term and what the term connotes when used. The review then explores this definition so that significant indicators for lifelong learning can be listed.

A DEFINITION OF LIFELONG LEARNING

For much of the twentieth century, lifelong learning was commonly associated with adult education. Only recently has the idea of orienting children to lifelong learning gained prominence. This change may be due to the now often expressed view that the world of work has radically changed and is likely to be highly unstable in the future. According to this view, young people will need to be adaptable, flexible and resilient throughout their work lives (Bryce, Frigo, McKenzie, & Withers, 2000). To have the attributes needed for success in this new world of work, they will need to be lifelong learners. The *Enterprise and Career Education Foundation* (2002, p. 5), for example, hold this view:

> *We have replaced lifelong employment with lifelong learning where we continually acquire, upgrade and market our skills so that we are equipped to respond to the diverse needs of employers and our society generally.*

This view of the importance of lifelong learning appears to depend upon its perceived economic importance. This may help explain why the notion of 'lifelong learning' is now commonly seen to be so important. However, this linkage to the world of work is not necessary for the definition of lifelong learning. Indeed, its definition is made easier by

excluding the linkage, as it avoids having to establish the truth (or otherwise) about these purported changes in the world of work.

For this study, the notion of lifelong learning refers to an orientation that encourages engagement with learning, and the development of characteristics that will make learning an integral part of the learner's life (Bryce & Withers, 2003). 'Learning' should be construed here in the broadest possible terms. It includes learning undertaken in both formal and informal education settings. It may also incorporate moral or personal aspects. These include: a commitment to learning; respect for one's own learning and the learning of others, and; respect for the truth (Smith & Spurling, 1999).

It is in this spirit that the review of national policy for education in Norway by the OECD regarded the notion of lifelong learning:

> *Lifelong Learning is more a kind of perspective than a new educational system.... The individual is seen as the focal point. Lifelong Learning involves learning and training from cradle to grave. Initial education and training needs to provide a sound foundation for further learning.... Lifelong Learning presupposes that motivation to learn is instilled early in childhood in order to generate a capacity for self-directed learning.* (OECD, 2002, p.13)

Given the above, for the study reported here, an orientation to lifelong learning: (a) may be expressed in any formal or informal educational setting; (b) can apply to any sphere of life; (c) involves the learner directing their learning, and; (d) engages the learner with their learning. Of these four elements, engagement and self-direction are especially important. Without them, it is unlikely that learning will be an integral and valued part of peoples' lives.

Engagement and self-direction are characteristics of individuals. These characteristics have psychological correlates, and the identification and measurement of these correlates provide opportunities for assessing the extent to which an individual has an orientation towards lifelong learning.

THE CHARACTERISTICS OF LIFELONG LEARNERS

This section describes studies that have investigated the characteristics of lifelong learners. It aims to elaborate on the definition given above and to provide a list of possible indicators that could be used to measure orientation towards lifelong learning.

Candy, Crebert and O'Leary: personal agency and learning skills

Candy, Crebert and O'Leary's (1994) study of the lifelong learning characteristics of Australian university students identified two particular 'needs' of lifelong learners: the need to have 'a sense of personal agency' and the need for 'a repertoire of learning skills'.

The Australian Higher Education Council commissioned the study. The main focus was to identify the ways in which undergraduate education can assist graduates to enhance their skills in, and attitudes towards, lifelong learning. The study included an extensive review of the literature, analysis of course documentation and institutional publications and interviews with 160 staff, students and graduates of programs spread across different disciplines and different parts of Australia.

For Candy et al. the need for a sense of personal agency sees the learner as confident and in control of their learning. The need for a repertoire of learning skills refers to a meta-cognitive orientation that sees the learner reflecting on how they learn, and how they might improve their learning.

Based on this research, an individual who is confident about their capacity to learn, who has an internal locus of control, and who demonstrates evidence of thinking about their learning, would likely have an orientation predisposed towards lifelong learning. The Candy et al. study focused on tertiary education, but their findings are similar to those reported by Bryce and Withers (2003), who studied the development of lifelong learning characteristics in secondary schools.

The Bryce and Withers study of lifelong learning in schools

Bryce and Withers (2003) examined factors that contributed to Australian secondary schools providing and supporting a lifelong learning environment. The research was based

on a series of case studies undertaken in Australian secondary schools. They reported a number of findings, including the importance of helping students to develop: (a) meta-cognitive skills; (b) information literacy; (c) planning and organising; (d) curiosity, and; (e) working with others.

Meta-cognitive skills

Bryce and Withers (2003) noted that for students to have an orientation towards lifelong learning, they need to be taught explicitly how to learn. This includes learning about their own styles of learning, how to think and reflect as well as learning how to set realistic personal targets.

Information literacy

Students need to be 'information literate' to be lifelong learners. This means they must have skills to explore information independently, know how to evaluate a source of information, how to collect, analyse and organise information from multiple sources and how to interrogate information.

Planning and organising

To be lifelong learners, students need to be able to plan their study and work out what they need to know, which in turn helps them to be in control of their learning. The importance of planning and organising is associated with a sense of personal agency (mentioned in the discussion of Candy et al.'s study, above).

Curiosity

Curiosity is a disposition that encourages questioning and a 'problem solving' approach to learning. It is thus associated with an orientation towards lifelong learning.

Working with others

Bryce and Withers (2003) point out that as well as being able to work with others it is important to be able to work alone, when it is easier to reflect on one's learning and plan according to one's own needs. But an ability to work with others implies an openness, a willingness to share one's knowledge and an ability to see others as sources of knowledge. 'Working with others' is a competency that is found repeatedly in sets of employability skills – and appears to be highly valued by employers. (See, for example Australian Chamber of Commerce and Industry and Business Council of Australia, 2002; The Mayer Committee, 1992.)

Some of these findings are the same as those reported by Russell (2000), who investigated lack of achievement in middle-school years, recommending the explicit teaching of thinking skills and self-regulation.

In these studies, an orientation towards lifelong learning requires a combination of confidence in one's self as a learner, curiosity, a systematic approach to learning, resilience, creativity, sociability and strategic awareness. It is not clear from these studies, however, if all of these characteristics are necessary. Nor is it clear what their relative importance is in acquiring a lifelong learning orientation. But it is clear that a self-regulated learner is more likely to have an orientation towards lifelong learning.

Stages in self-regulated learning

According to Zimmerman (2002, pp.65-69), a self-regulated approach to learning involves three phases:

1. The *Forethought* phase, which includes task analysis, goal setting and planning, and self-motivation.
2. The *Performance* phase, which involves self-control, deployment of the strategies planned in the forethought phase, and self-monitoring.
3. The *Self-reflection* phase, which includes self-evaluation, including causal attribution to errors or successes.

Zimmerman (2002) maintains that the skills required to implement each of these phases can be learned. However, self-regulation has been shown to be related to one's confidence and sense of agency as a learner (Bryce & Withers, 2003; Candy et al., 1994). The extent to which this sense can be enhanced appears to depend on views held by the individual about the nature of ability (Pomerantz & Saxon, 2001). For example, if failure is blamed on a lack of ability and the notion of ability is seen as 'fixed', students are likely to accept failure passively, viewing it as outside of their control (Pomerantz & Saxon, 2001, p. 154).

For the purposes of this study, therefore, any evidence that points to the use of any of the three phases of self-regulated learning, or which points to a sense of agency, or which indicates a fatalistic view of ability as fixed, is usable as an indicator of an orientation towards (or away from) lifelong learning.

Lifelong learning: the importance of literacy and numeracy

Basic literacy and numeracy skills are necessary for the development of an orientation to lifelong learning in Western culture. This view was endorsed by the *Working Group of the European Commission*, which investigated indicators for lifelong learning. Furthermore, it quantified the necessary levels. The Working Group made use of data from PISA to set minimum standards required before an individual would have the necessary skills to be a lifelong learner. The Working Group identified Proficiency Level 1 (OECD, 2001) as a minimal requirement for reading literacy and a score of 380 on the PISA Mathematical Literacy measure as a minimal requirement for numeracy (European Commission Working Group on Quality Indicators, 2002). These levels are not especially high. For example, at Reading Literacy Level 1, an individual can: "Take account of a single criterion to locate one or more independent pieces of explicitly stated information" (OECD, 2001, Figure 2.1, p. 36).

It follows, from the argument made by the Working Group, that any study of factors associated with the development of an orientation towards lifelong learning will need to include measures of literacy and numeracy.

Other factors linked to lifelong learning

The *Working Group of the European Commission* also proposed other indicators for lifelong learning. The list is wide-ranging and includes: (a) basic competencies in mathematics, science and technology; (b) foreign language skills; (c) information and communications technology skills and use of technology; (d) learning-to-learn skills; (e) entrepreneurship; (f) an appreciation of the general culture, and; (g) a high level of 'active citizenship', as measured by the IEA study, *Citizenship and Education in Twenty-Eight Countries: Civic Knowledge and Engagement at Age Fourteen* (Torney-Purta, Lehmann, Oswald, & Schulz, 2001).

This review of the literature found no information about gender and indicators of lifelong learning.

Summary of indicators of lifelong learning

The characteristics of lifelong learners described in the literature above include:

- the sense of 'personal agency' or confidence in oneself as a learner;
- the possession of a range of 'learning' skills;
- the ability to link new knowledge to what is already known;
- to be curious;
- to value learning;
- to be self-regulated as a learner, and;
- to have basic literacy and numeracy skills.

Other factors were: foreign language skills, entrepreneurship, an appreciation of the general culture and being an active citizen.

Chapter Three

Results from LSAY data

This chapter describes the post-school plans for a cohort of Australian youth. It also investigates the extent to which post-school plans vary for sub-groups of young people. Finally, it considers what factors – including an orientation to lifelong learning – are associated with different post-school plans.

Post-school plans may be understood as the (more or less clear-cut) set of aspirations and expectations that an individual has about what activities, related to (a) education, (b) work or (c) family, they will undertake after leaving secondary school.[1]

An aspiration describes what an individual would like to do. This can be contrasted with an expectation, which is what an individual expects to do.

According to Gottfredson (1981, p. 548), an occupational aspiration is the one occupational title named as preferred at any given time. When so defined, not all young people will be able to specify an aspiration. Many will not know what they would like to do after leaving school. However, they typically will know what they do not want to do, and these views can also represent post-school plans. They can be thought of as 'negative' aspirations or expectations.

The focus on education, work and family reflects a need to address the research questions in such a way as to take account of policy issues and debates. Youth policy in Australia at present is strongly focused upon education, training and work (for example, see Finn, 1991; The Mayer Committee, 1992; Zappalà & Parker, 2000). The section considering policy in the conclusion of this report provides a basis for the inclusion of family as an important future policy focus.

DATA

The following analyses are based upon data from the *Longitudinal Studies of Australian Youth* (LSAY) program. The respondents first provided data in 1995 when they were in Year 9. The data used here were collected in the 1999 survey when the respondents were around 18 years of age and most had completed their secondary schooling.

A representative sample of 13,613 Year 9 students, from all States/Territories and school sectors, participated in the first administration of the survey in 1995. By the time of the 1999 survey, 8,783 students remained in the study. The analyses below have been weighted, to correct for both the original sample design and attrition. The original sample was designed so that some small groups with high policy salience (for example, Aboriginal or Torres Strait Islanders) were over-sampled to ensure there were enough respondents for detailed studies of these groups. The contribution of these groups to the data, as a whole, then has to be weighted back so that it does not bias population estimates.

MEASUREMENT OF SOCIO-ECONOMIC STATUS

In 1995, respondents reported the occupations of their father (or male guardian) and mother (or female guardian). This information was coded according to the Australian Standard Classification of Occupations (ASCO) and from this code assigned a socio-economic status score. This score was derived from a scale named the 'ANU3 scale of socio-economic status' (Jones, 1989). (This was the third version of a socio-economic status scale produced at the Australian National University.)

A *parental socio-economic status* scale was constructed, reflecting the socio-economic status background of the survey respondents. The parental socio-economic status scale used the father's socio-economic status unless it was missing. If it was missing, the socio-economic status of the mother was used. This procedure maximized the variance available for the analysis. Using an average of father's and mother's socio-economic status, or the higher of the two, reduces the amount of variance available and may give misleading results.

Reflecting the concerns of The Smith Family, many of the analyses reported below focus upon the group of young people whose parents made up the lowest quintile of socio-economic status.

1. See Appendix 1 for a theory for understanding post-school plans of young people based on a theory of the development of occupational aspirations described by Gottfredson (1981, 1996, 2002).

POST-SCHOOL PLANS

When first surveyed in 1995, students were typically in Year 9. They were asked about their plans for work and study in the year after leaving school. They were also asked what they thought their parents wanted them to do in relation to work and study in the year after leaving school.

Figure 1 shows the post-school study plans of students when they were in Year 9 in 1995. It can be seen that girls are more likely to plan post-school study – either full-time or part-time – and that nearly twice as many boys as girls have no plans for any study. Around 20% of Year 9 girls and boys do not know what they would do after leaving school.

Figure 2 shows that for students from the highest quintile of parental socio-economic status, the probability of planning to study full-time was higher than for students from the lowest quintile. A little over 10% more of the highest quintile plan full-time study compared with the lowest quintile. Students from the highest quintile are less likely to plan no further study compared with the lowest quintile. Again this difference is around 10%.

In Figure 2 all quintiles have about the same proportion of young people who are undecided about their post-school plans (around 20%).

Figure 3 shows the proportion of students reporting what their parents were planning that they, the students, should do in the year after leaving school. Irrespective of socio-economic status, around 40% of students did not know what their parents had planned for them after leaving school. That is, the same high proportion of students from all quintiles appear ignorant of their parents' plans for them post-school.

Similarities between student and parental post-school plans for the year after leaving school were also examined. The proportion of respondents whose post-school plans were the same as their parents' plans was around 70% and showed little variation across socio-economic status quintiles.

Results revealed an association between socio-economic status of the family and the probability of a student planning to study full-time in the year after leaving school. The higher the socio-economic status, the higher the probability of plans for full-time study, and

Figure 1 Proportion (%) of students planning no study, to study full-time or part-time who did not know their post-school study plans in the year after leaving school by gender (Source: LSAY 1995)

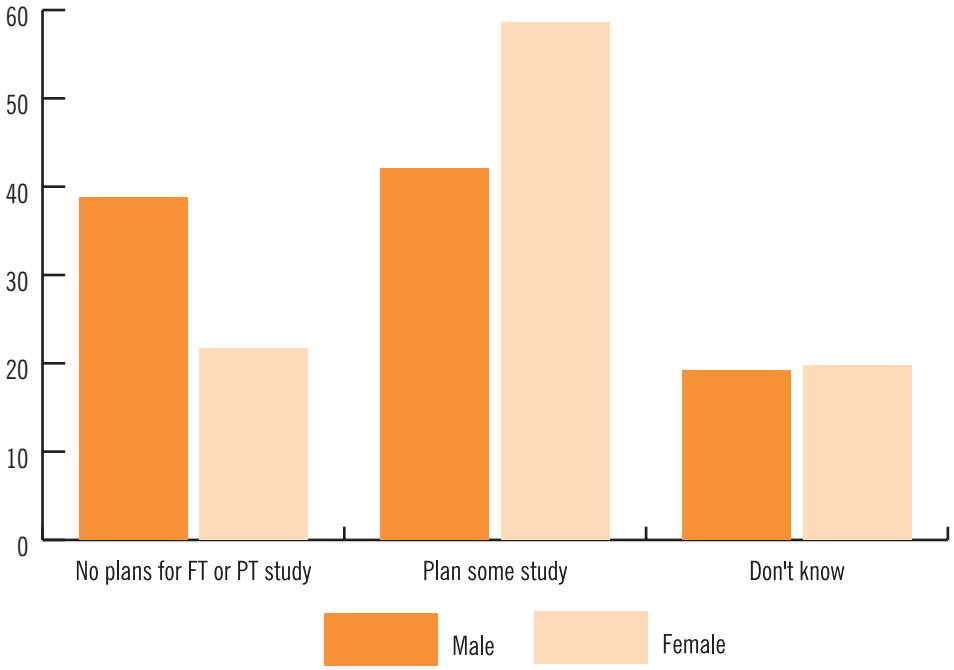


Figure 2 **Proportion (%) of students planning no study, to study full-time and who did not know their post-school study plans in the year after leaving school, separated into socio-economic status quintile (Source: LSAY 1995)**

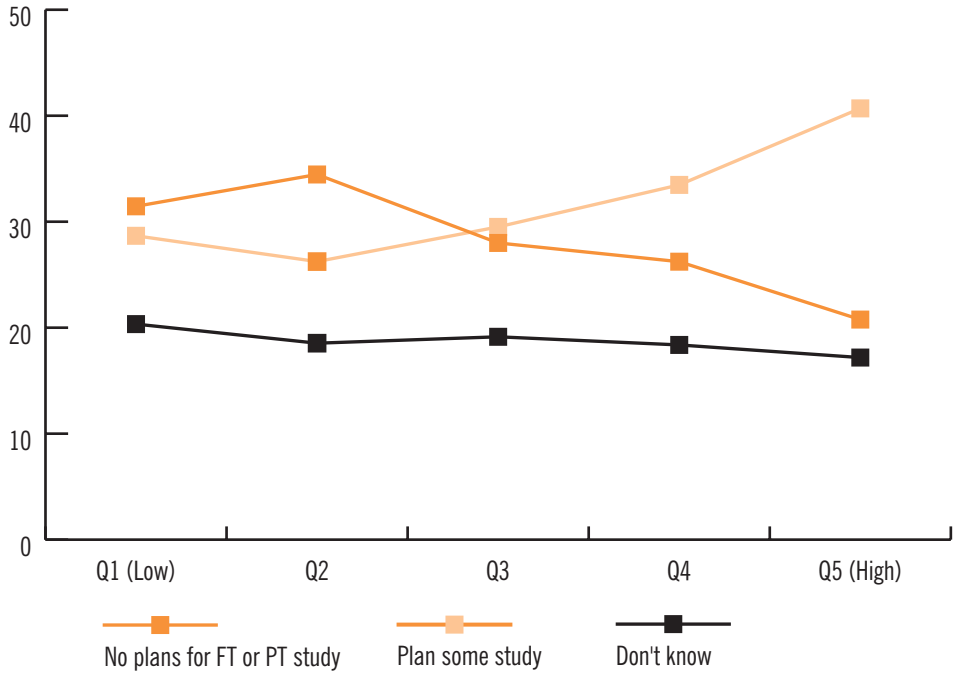
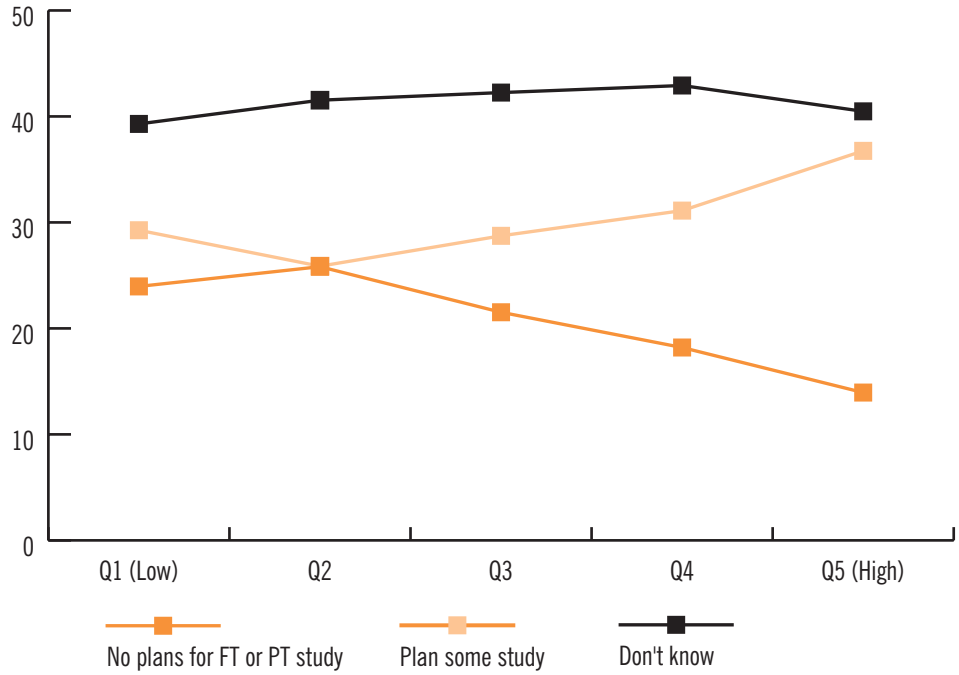


Figure 3 **Proportion (%) of students reporting parental post-school study plans for the students in the year after leaving school, separated into socio-economic quintile of the family (Source: LSAY 1995)**



conversely, the lower the probability of having no plans to study. However, the association is weak (Pearson's r = 0.11), accounting for around 1% of the variance in plans to continue study full-time in the year after leaving school.

Parental education levels and their relation to post-school plans in the year after leaving school were also investigated. Figure 4 shows that the educational level of the parents is associated with post-school plans of students. As education levels of parents rise students are increasingly likely to report plans to continue study full-time after leaving school. They are also less likely to report plans for no further study. On these figures, students with parents who have a university degree or a diploma are about three times more likely to plan post-school study than those who have parents with no secondary school education.

Figure 5 shows the proportion of students, with parents who have a degree or diploma, planning full-time study or no study post-school, for each quintile of family socio-economic status. It shows that even when parents have a degree or diploma, students from the highest quintile have a higher probability of planning full-time study post-school than those students in the lower quintiles. The difference between the highest and lowest quintiles is around 10%: around 40% of students from the lowest quintile plan full-time study post-school, compared with over 50% of students from the highest quintile. Figure 5 also shows that when both parents have a degree, students from the lower quintiles of family socio-economic status are more likely to have no plans for full-or part-time study in the year after school.

FAMILY STRUCTURE AND POST-SCHOOL PLANS

In 1997, when most of the LSAY students were in Year 11, the students were asked a number of questions about their living arrangements, including how many people usually live in the student's household and the relationship of those people to the student.

This section of the report compares the post-school plans of students and their parents (as reported when the students were in Year 9), who indicated in 1997 that both a father (or step-father) and a mother (or step-mother)

Figure 4 Post-school plans in Year 9 by highest level of parental education (Source: LSAY 1995)

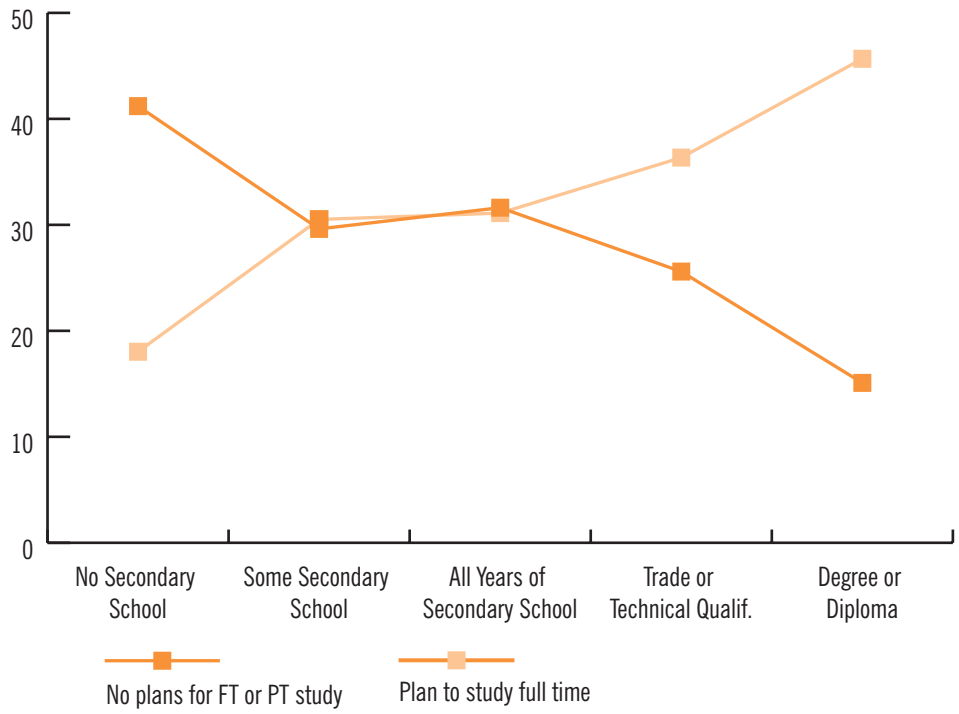


Figure 5 **Proportion (%) of students, with parents who have a degree or diploma, planning full-time study or no study in the year after school, separated into quintiles of family socio-economic status (Source: LSAY 1995)**

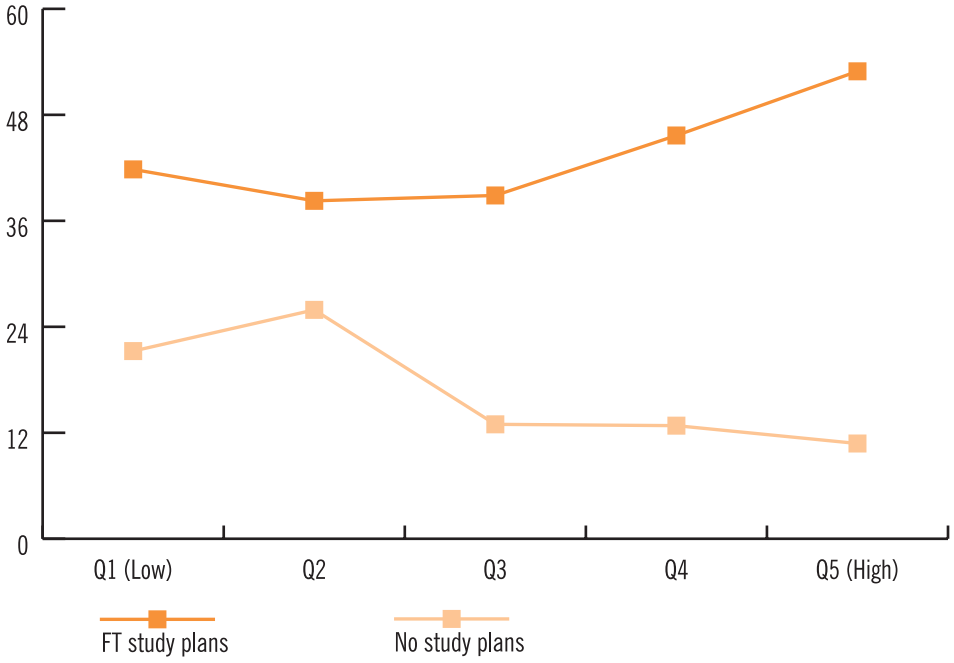
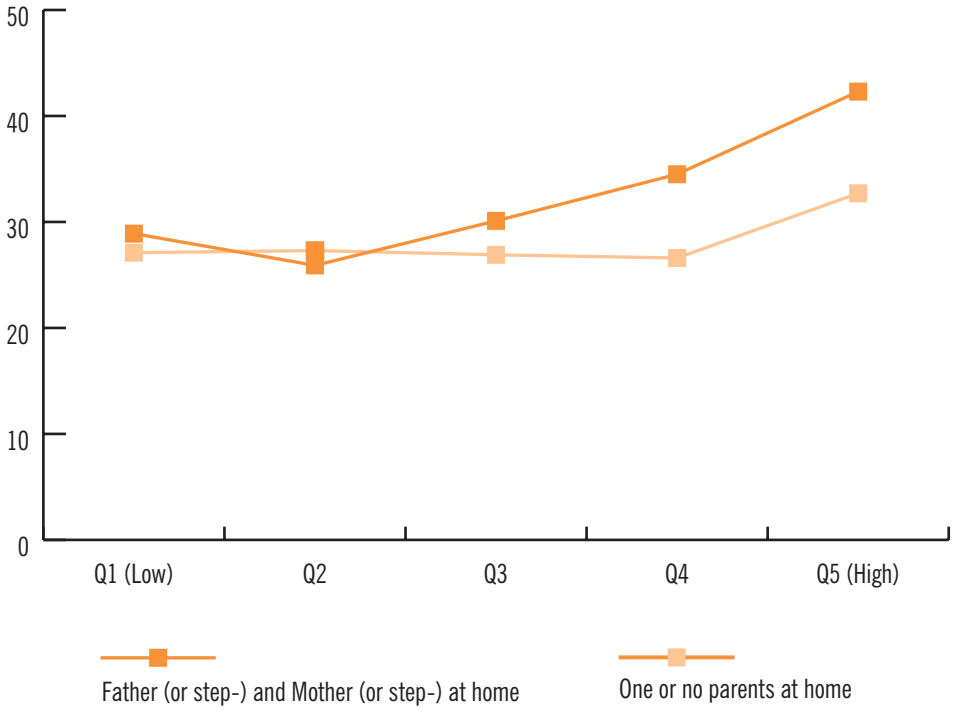


Figure 6 **Proportion (%) of students planning to study full-time following school, by family structure and socio-economic quintile of the family (Source: LSAY 1995 and 1997)**



usually live with them, with those of students who indicated that no more than one parent (one or no parent) usually lives with them. Thus family structure was defined dichotomously in terms of the number of parents with whom the respondent was living: two versus less than two parents.[2]

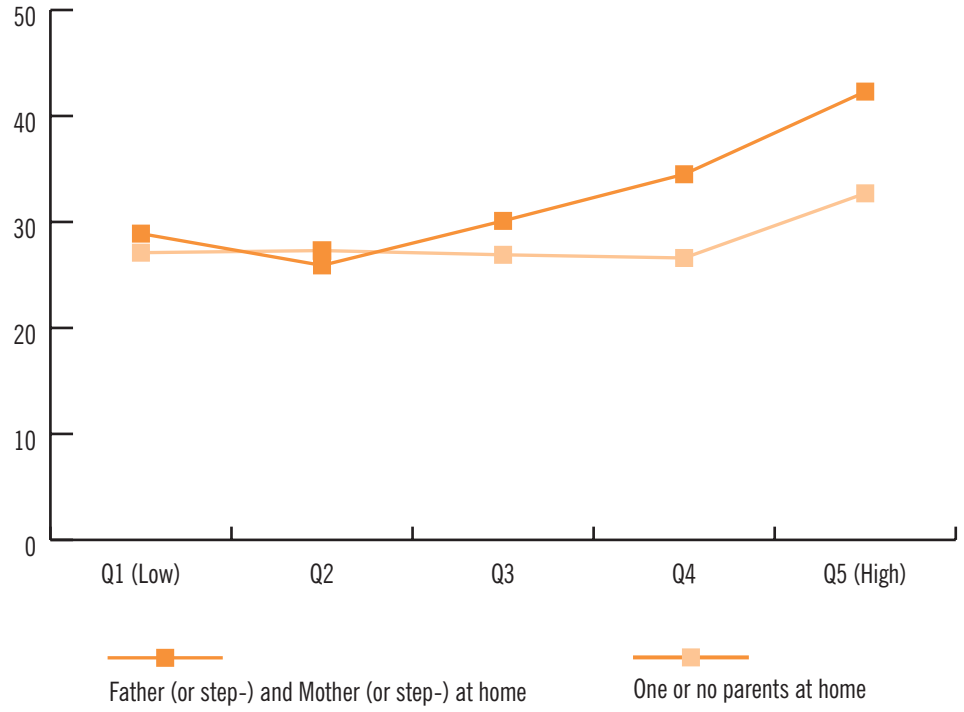
Figure 6 shows that for students from lower socio-economic backgrounds, there is little difference in post-school plans for full-time study among students with two parents at home compared to those with one or no parent. Among students from higher socio-economic backgrounds, a larger proportion of those from two-parent families plan to study full-time after school. At the two highest quintiles there is almost a 10% difference between students from the two types of family structure. The proportion of students with one or no parent who plan to study full-time following school stays about the same across the lower four quintiles, at around 27%. Only among the highest quintile of socio-economic background does this proportion increase to around 32% for students from a single or no-parent family.

Figure 7 shows the proportion of students reporting that their parents planned full-time study for them following school, according to the type of family structure for each quintile of socio-economic status. There were only small differences between the two types of family structure across the quintiles of socio-economic background.

Figure 8 shows that for both types of family structure, the proportion of students with no plans for study after school tends to decline as the socio-economic background increases. The differences between the two groups is generally small across the quintiles, although a larger proportion of students in the fourth quintile with one or no parent at home reported no plans for post-school study. It is unclear why this group is likely to have such a high probability of having no post-school study plans.

The proportion of students who believed their parents planned for them to not pursue further study followed a similar pattern across family structure and socio-economic background as was observed among the students' own plans.

Figure 7 Proportion (%) of students reporting parental plans of full-time study following school, by family structure and socio-economic background (Source: LSAY 1995 and 1997)



2.The family structure variable was taken from the LSAY 1997 data collection and matched to the 1995 data

POST-SCHOOL PLANS AND THEIR RELATION TO EDUCATIONAL AND OCCUPATIONAL OUTCOMES

LSAY data offer the opportunity to investigate change over time. In this section, the data were used to examine post-school plans of Year 9 students and their relation to educational and occupational outcomes four years later.

Figure 9 shows the proportion of the cohort who in 1995 had plans for different types of post-school study, and the proportion who four years later were able to successfully realise these plans. For example, of all students from families in the lowest quintile of socio-economic status who planned to go to university when they were in Year 9, a little over 60% were attending university in 1999. This compares with 80% of students from the highest quintile.

Figure 9 also shows there is a consistently low realisation of plans for apprenticeships and TAFE courses across nearly all quintiles of socio-economic status.

These data suggest that Year 9 students from lower socio-economic status families find it harder to realise their plans for a university education than those from higher socio-economic status families. For other educational destinations, socio-economic status appears to have little impact.

Figure 10 shows the proportion of students who were studying at various levels or not studying in 1999, who in 1995 reported that they did not plan any post-school study. To simplify the display, only data for the highest and lowest quintiles of family socio-economic status are shown. It shows that just on half of the respondents from the highest quintile, who said they would not be studying, were studying or training. In other words, half appear to have changed their post-school plans, or have engaged in training activities which they planned but did not conceive of as 'study' (e.g. a traineeship). Of this group of young people, the modal activity was study at TAFE. For the lowest quintile of socio-economic status, about two thirds were sticking with their Year 9 plans and were not studying post-school. Of those who were in study, TAFE, apprenticeships and traineeships were equally likely post-school outcomes. They are much less likely to be enrolled in a university than young people from the highest quintile. On these data, young people from the lowest quintile of socio-economic status are less likely to change their post-school plans when they involve no further study. If they do,

Figure 8 Proportion (%) of students with no plans for study following school, separated by family structure and socio-economic background (Source: LSAY 1995 and 1997)

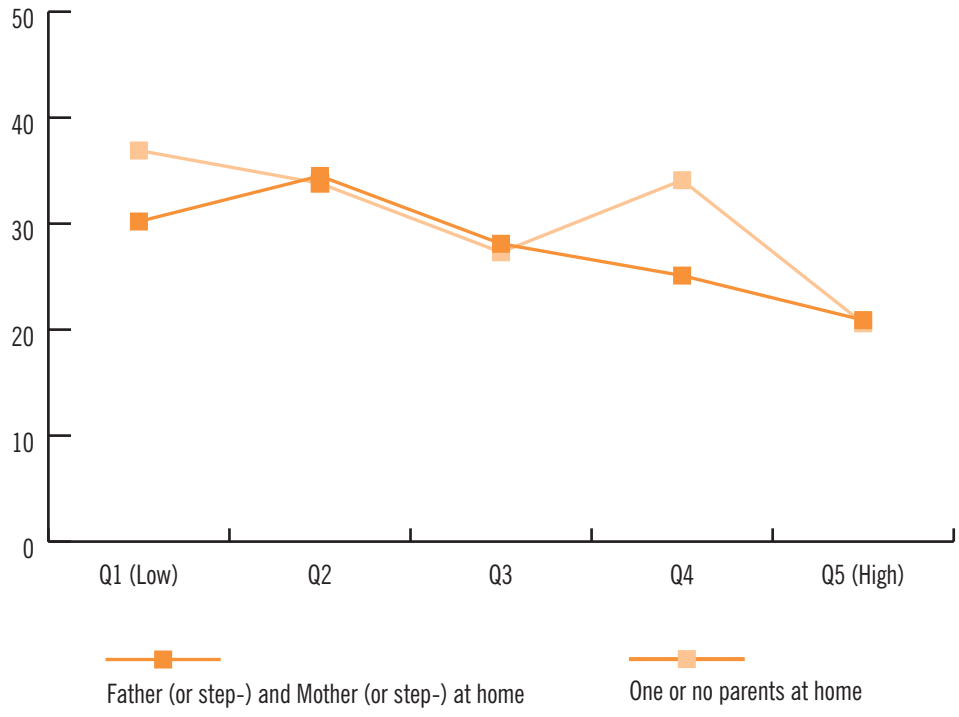


Figure 9 Proportion (%) of students who in 1999 had implemented their 1995 post-school educational plans to study at university, TAFE or undertake an apprenticeship after leaving school, for each quintile of socio-economic status (Source: LSAY 1999)

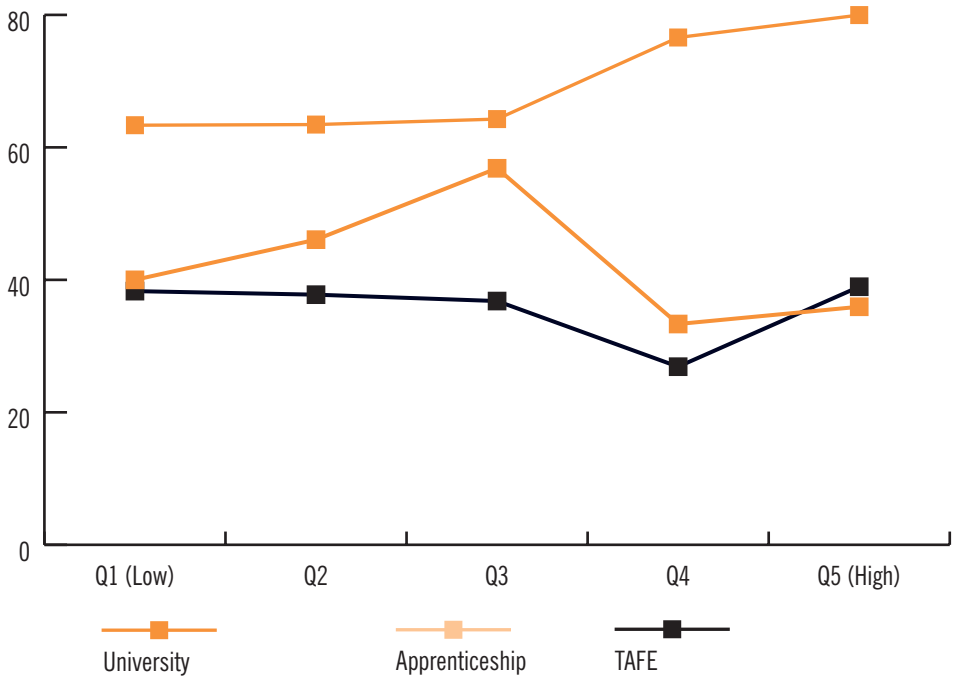
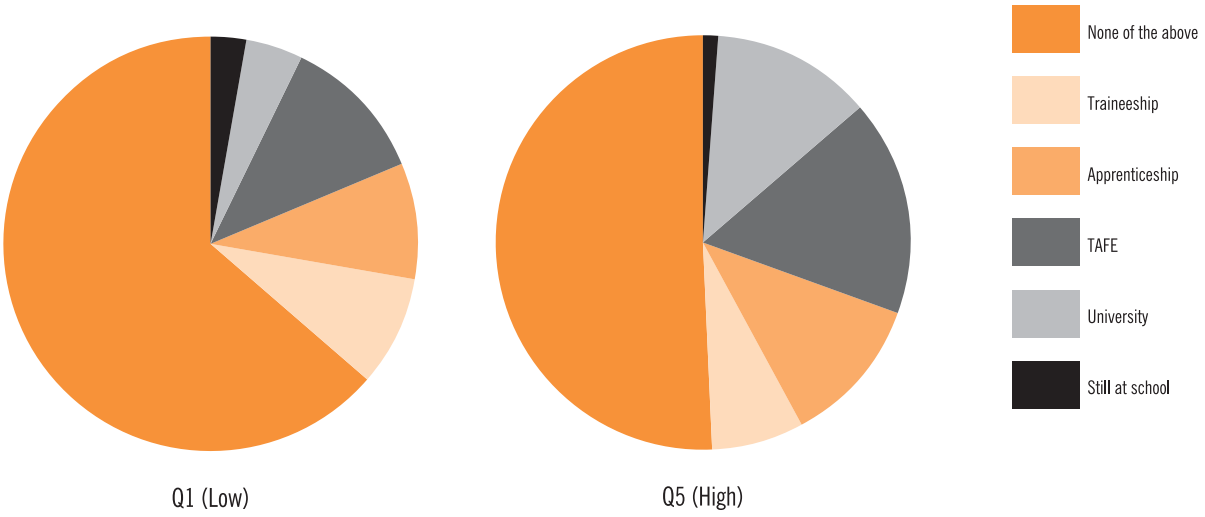


Figure 10 Proportion of students who in 1995 reported plans for no study after leaving school, by type of actual study in 1999. Lowest versus highest quintiles of family socio-economic status (Source: LSAY 1999)



they are less likely to end up studying at a university compared with young people from the highest quintile of socio-economic status.

Figure 11 provides a more detailed picture of the extent to which students who planned no post-school study ended up in study four years later. The probability of attending university increases as the socio-economic status of the family increases. TAFE and apprenticeships are more likely educational or training destinations of young people with no plans for post-school study compared to university or traineeships.

INDICATORS OF LIFELONG LEARNING IN THE LSAY DATA

The LSAY data do not provide variables which were constructed explicitly to tap an orientation to lifelong learning. However there are a number of variables which are candidates for indicators of lifelong learning. These include:

- Literacy and numeracy achievement levels;
- Satisfaction with school, and;
- Interest in learning beyond school.

As was indicated in the literature review, both literacy and numeracy skills are needed for development of an orientation to lifelong learning. The extent to which young people have acquired these skills indicates the level to which they are able to develop a lifelong learning orientation.

It might be expected that high levels of satisfaction with school would be associated with an enjoyment of learning, which may in turn be linked to an orientation to lifelong learning. Having an interest in learning beyond school is a strong indicator of an orientation to lifelong learning, because it points to the presence of self-regulated learning, and some level of engagement and self-direction.

Achievement

Literacy and numeracy achievement scores were calculated for each student, based on a set of literacy and numeracy items administered in 1995 when the respondents were in Year 9. The items were scaled using the Rasch IRT model (Rasch, 1960). Individual scaled scores were derived in both Literacy and Numeracy, with a mean of 50 and a standard deviation of 10. Mean achievement levels were computed. Confidence intervals around the mean were also calculated. These were set to the conventional 95% level.

As Figure 12 shows, a small but statistically significant difference was observed between the mean mathematics achievement scores of each of the quintiles. A similar pattern can be seen in Figure 13 for literacy achievement.

There is an association between family socio-economic status and student achievement evident in Figure 12 and in Figure 13. Pearson's r gives a measure of the strength of this correlation. For mathematics, its value is 0.22, and for literacy it is 0.20. On these data, only 4 – 5% of the variation in student achievement is associated with family socio-economic status.

These findings suggest that students with parents of higher socio-economic status have a slightly sounder skill basis for developing an orientation to lifelong learning.

Satisfaction with school

The 1995 LSAY survey contained a series of items related to student satisfaction with school. Most of these items were drawn from the *Quality of School Life* questionnaire that was used in earlier ACER studies to assess students' views of school life.

The items, and the scales that they contribute to, are described below. Each item is preceded with 'My school is a place where…' Response categories were (1) Strongly Agree; (2) Agree; (3) Disagree; (4) Strongly Disagree.

The first scale provides a measure of the general well-being (or 'positive affect') of the student. Table 1 shows the items upon which this scale is based.

Figure 14 shows that students in the highest two quintiles were more likely to report feeling better about school than students from the three lowest quintiles of family socio-economic status. The differences are small with a 5% gap between the lowest and highest quintiles.

The second scale provides a measure of the intrinsic motivation of the student. Table 2 shows the items upon which this scale is based.

Figure 11 **Proportion (%) of students who in 1995 reported plans for no study after leaving school but were studying in 1999, for each quintile of family socio-economic status (Source: LSAY 1999)**

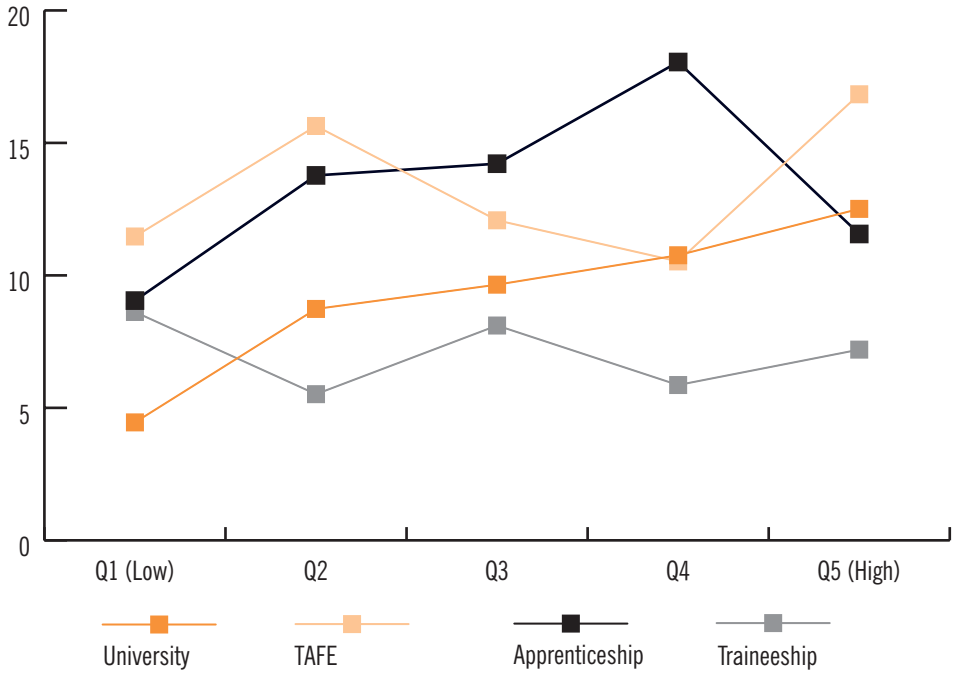


Figure 12 **Mean mathematics achievement levels, by socio-economic status quintile of family background, showing 95% confidence intervals (Source: LSAY 1995)**

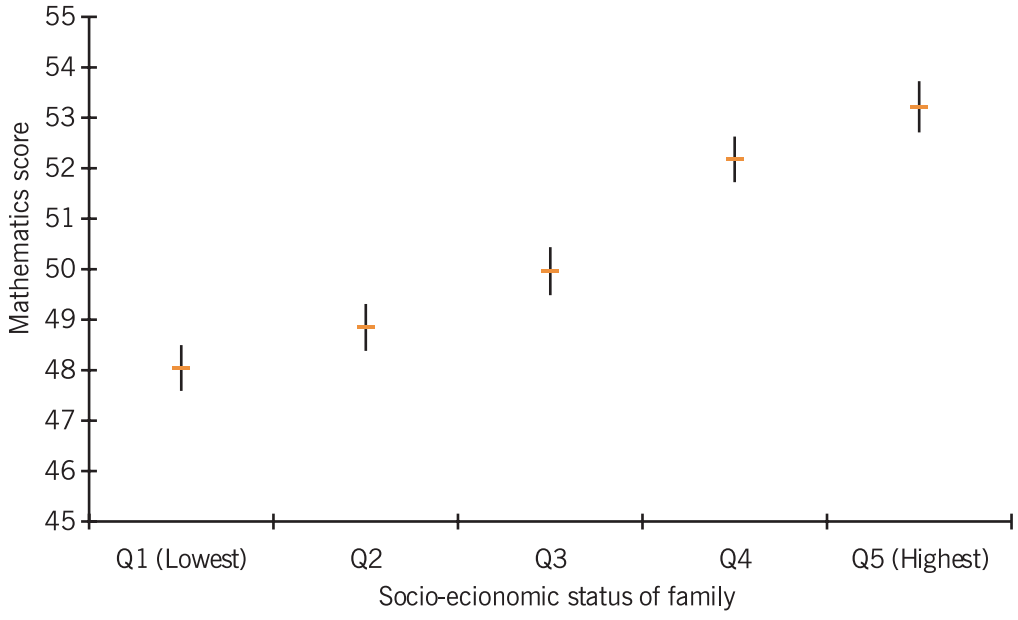


Figure 13 **Mean literacy achievement levels, by socio-economic status quintile of family background, showing 95% confidence intervals (Source: LSAY 1995)**

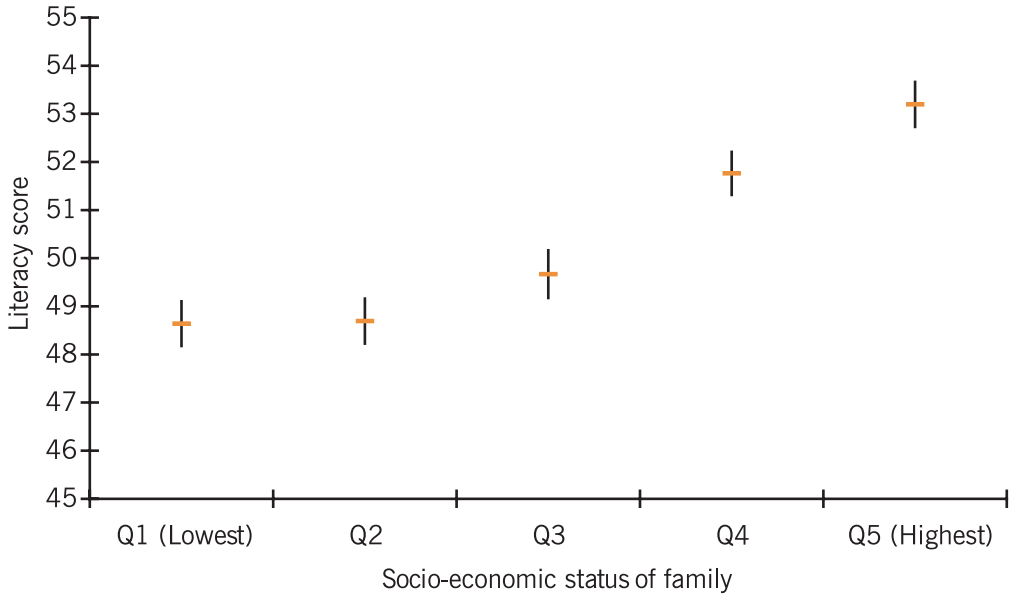


Figure 14 **Proportion (%) of students agreeing or strongly agreeing with positive statements about their general well-being at school (Source: LSAY 1995)**

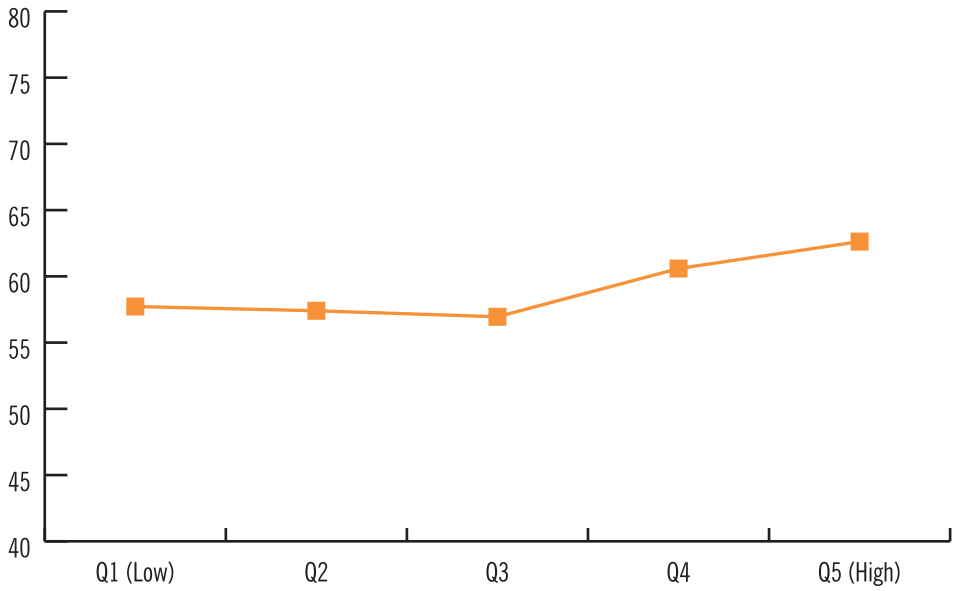


Figure 15 shows that the level of intrinsic motivation among students is similar across all quintiles of family socio-economic status. The difference between the lowest level (quintile 2) and the highest (quintile 5) is less than 5%.

The third scale provides a measure of student belief in the relevance of learning. Table 3 shows the items upon which this scale is based.

Figure 16 shows that levels of perceived relevance of learning at school among

Table 1 Content of the positive affect scale (Source: LSAY 1995)

My school is a place where …	I feel happy
	I like learning
	I enjoy being there
	I like to go
	learning is fun
	I feel safe and secure

Table 2 Content of the intrinsic motivation scale (Source: LSAY 1995)

My school is a place where …	the work we do is interesting
	I like to ask questions
	I enjoy what I do
	I like to do my best
	I get excited about the work we do
	I like to do extra work

Table 3 Content of the student's belief in the relevance of learning scale (Source: LSAY 1995)

My school is a place where …	we learn important things
	the work is good preparation for the future
	we learn useful skills
	we get a chance to do interesting work
	the things we learn will help in adult life
	the things I am taught are worthwhile learning

students are similar across all quintiles of family socio-economic status. The difference between the lowest level (quintile 2) and the highest (quintile 5) is 2%.

The fourth scale provides a measure of a student's sense of success in schoolwork. Table 4 shows the items upon which this scale is based.

Figure 17 shows that the sense of success in schoolwork is very similar across all quintiles of family socio-economic status. The difference between the lowest level (quintile 2) and the highest (quintile 5) is less than 2%.

The fifth scale provides a measure of student satisfaction with their teachers. Table 5 shows the items upon which this scale is based.

Figure 18 shows that the level of student satisfaction with their teachers is very similar across all quintiles of family socio-economic status. The difference between the lowest level (quintile 1) and the highest (quintile 5) is less than 5%.

Summary

The evidence from the LSAY data indicates there is little difference in the level of school satisfaction between students coming from different quintiles of family socio-economic status. Using this as an indicator of orientation to lifelong learning implies there will be little difference between students irrespective of their parental socio-economic status.

Table 4 Content of the sense of success in schoolwork scale (Source: LSAY 1995)

My school is a place where …	I have learnt to work hard
	I achieve a satisfactory standard in my work
	I always achieve a satisfactory standard in my work
	I know how to cope with work
	I know I can be successful
	I am a success as a student

Table 5 Content of student satisfaction with their teachers scale (Source: LSAY 1995)

My school is a place where …	teachers are fair and just
	teachers listen to what I say
	teachers give me the marks I deserve
	teachers take a personal interest in helping with my school work
	teachers help me to do my best
	teachers treat me fairly in class

Figure 15 **Proportion (%) of students agreeing or strongly agreeing with positive statements that they are intrinsically motivated at school (Source: LSAY 1995)**

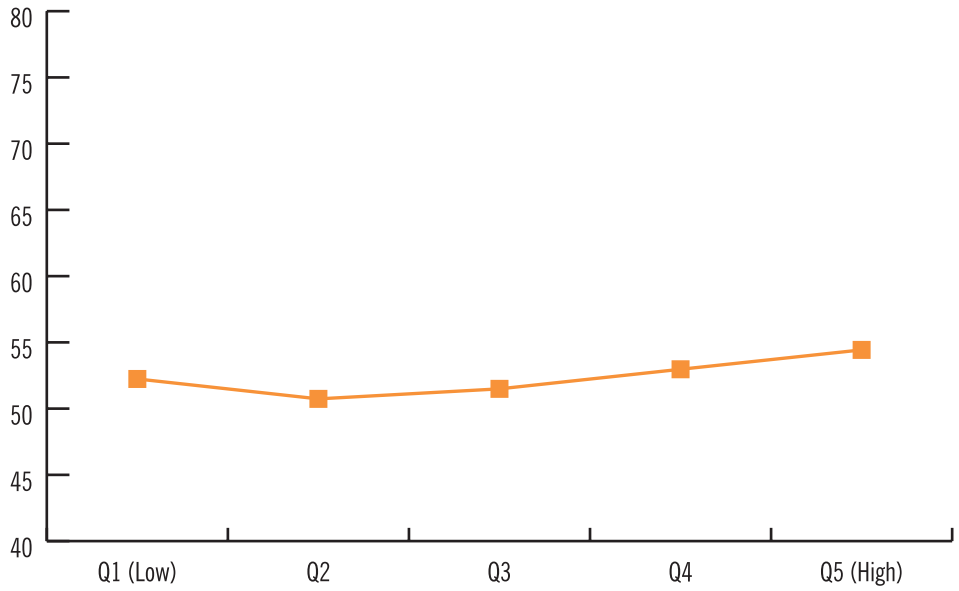


Figure 16 **Proportion (%) of students agreeing or strongly agreeing with positive statements that their learning at school is relevant to them (Source: LSAY 1995)**

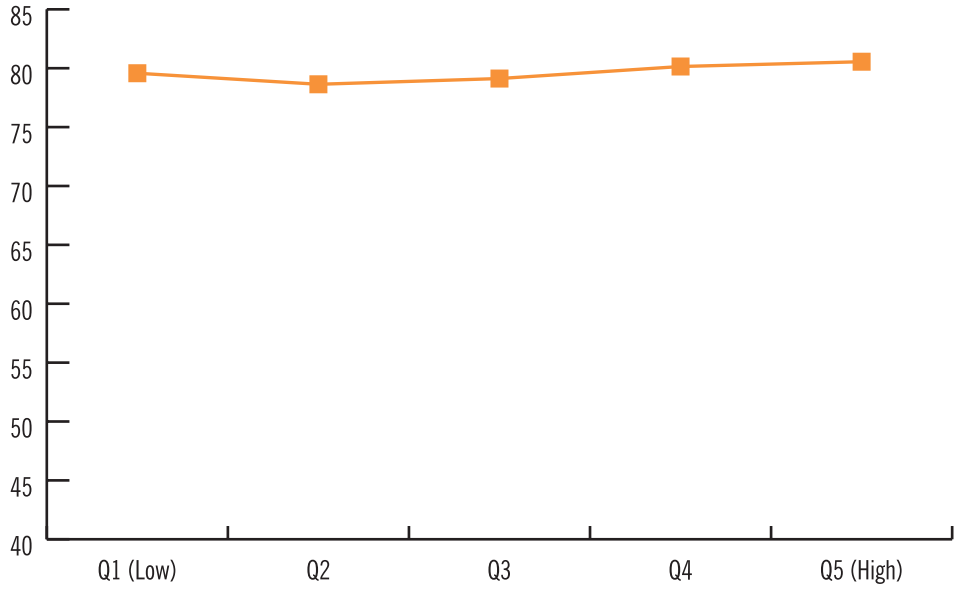


Figure 17 Proportion (%) of students agreeing or strongly agreeing with positive statements that they have a sense of success at school (Source: LSAY 1995)

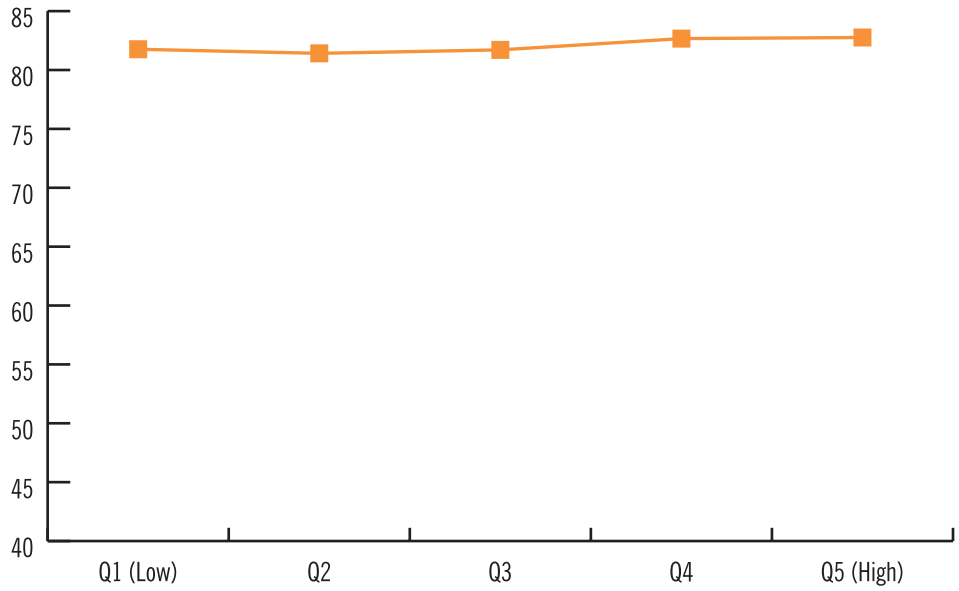
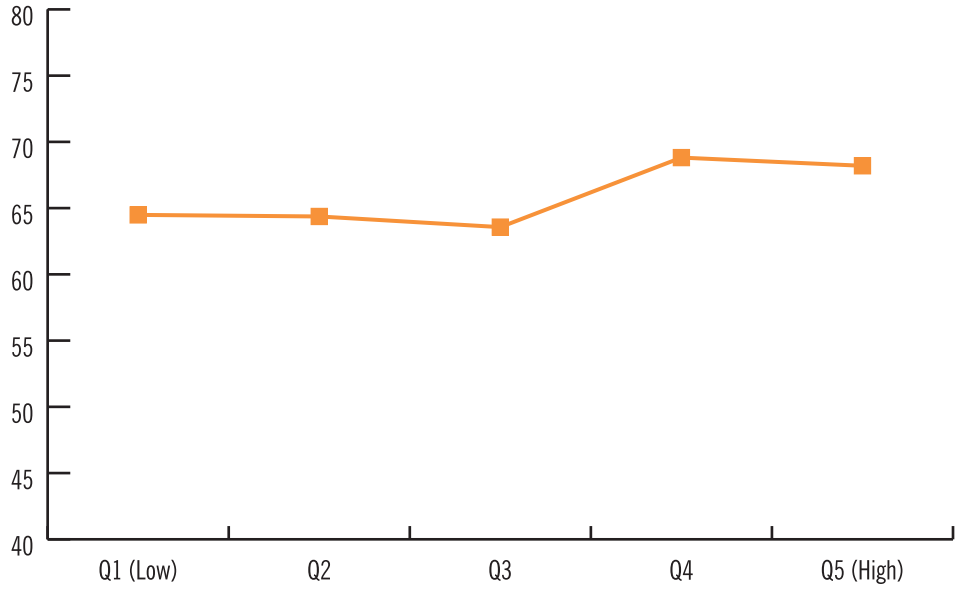


Figure 18 Proportion (%) of students agreeing or strongly agreeing with positive statements that they are satisfied with their teachers (Source: LSAY 1995)



INTEREST IN LEARNING (BEYOND SCHOOL)

In the 1999 LSAY survey, respondents were asked to respond to the following statements related to their interest in learning. These items give an indication of respondents' interest in learning activities beyond school. They are listed in Table 6. The responses available for each statement were: none; a little; some; a lot; a great deal.

A comparison of the proportion of respondents who answered 'A lot' or 'A great deal' to each of these items against parental occupation is shown in Table 7. It demonstrates there were only small differences between students across the quintiles of parental socio-economic status. For example, 78.3% of respondents from Quintile 1 reported 'A lot' or 'A great deal' of interest in the prospect of learning new things compared with 83.4% from Quintile 5.

The largest difference seen in Table 7 is the question asking 'why the world is in the state it is'. Around 7.9% more students from the highest quintile of family socio-economic status reported that they had 'A lot' or 'A great deal' of interest in this question compared with students from the lowest quintile.

It is interesting to note that in Table 7 the three questions asking about the world of work are the three for which the lowest socio-economic quintile has a greater level of interest than the highest quintile. However, these differences are small.

Summary

The set of indicators for an orientation to lifelong learning available from the LSAY data show only small variation across the five quintiles of parental socio-economic status. On this evidence socio-economic status of the family does not appear to be associated with an orientation towards lifelong learning.

VOCATIONAL ORIENTATION AND INTEREST IN LEARNING

The interests of individuals – their vocational orientation – are important in shaping their post-school plans (Holland, 1985, 1997). This section examines this proposition.

Students still at school in 1996 (mostly in Year 10) were asked what job they planned to work in when they had finished studying (after leaving school or after finishing further study). Responses to this item were classified according to vocational interest type, using Holland's (1985; 1997) RIASEC (pronounced ree-a-sec) typology. See Appendix 1 for an outline of Holland's work and its importance. The RIASEC typology proposed by Holland categorizes vocational orientation into six groups: (1) Realistic for those with an interest in working with their hands; (2) Investigative

Table 6 Content of interest in learning beyond school scale

How much interest do you have in the prospect of learning new things?
How much interest do you have in thinking about why the world's in the state it is?
How much interest do you have in finding out why something happened the way it did?
How much interest do you have in finding out more about things you don't understand?
How much interest do you have in finding out more about a new idea?
How much interest do you have in finding out how something works?
How much interest do you have in improving your skills after you have started work?
How much interest do you have in learning new skills after you have started work?

These items based on Ainley (1987).

Table 7 Proportion (%) of respondents reporting 'A lot' or 'a great deal' of interest in learning activities beyond school, separated by quintile of family socio-economic status (Source: LSAY 1999)

	Q1 Lowest	Q2	Q3	Q4	Q5 Highest
Prospect of learning new things	78.3	79.0	79.4	81.9	83.4
Why the world's in the state it is?	39.6	40.4	39.9	41.6	47.5
Why things happen the way they do?	57.3	60.1	57.4	60.5	64.3
Things that you don't understand?	72.4	73.5	74.3	75.3	75.2
Interest in new ideas?	58.6	59.3	59.1	60.3	62.7
In finding out how something works?	65.0	63.3	64.0	61.9	60.3
Improving skills after started work?	83.7	84.3	81.4	82.4	80.3
Learn new skills after started work?	85.5	84.4	81.9	82.6	81.6

for those with an interest in work involving abstract thinking especially of a scientific type; (3) Artistic; (4) Social for those with an interest in working with or for people, for example as nurses or teachers; (5) Enterprising for those who are interested in work involving the exercise of power, and; (6) Conventional for those who are interested in routine handling of data and information, such as clerical or other office work. The acronym RIASEC is often used in the literature when referring to these categories.

Appendix 2 briefly describes how the RIASEC codes were applied to the data for this study. The distribution of cases across each RIASEC category is also described in this appendix.

Achievement and vocational interests

Figure 19 shows the mean mathematics score of boys in Year 9, by the type of their vocational orientation. The mean performance of boys with an Investigative orientation was higher than those for other groups, except for those with a Conventional orientation. Those with a Realistic orientation had the lowest mean score.

Figure 20 shows the mean mathematics score of girls in Year 9, by the type of their vocational orientation. The pattern of scores across the RIASEC types is similar to that observed for boys. It is interesting to note that for girls with a Conventional orientation, their score is about the same as the overall mean, but for boys it is well above the mean.

Figure 21 shows the mean literacy score of boys in Year 9, by the type of their vocational orientation. Again, those with a Realistic orientation had the lowest mean score. However, the other types have roughly the same average literacy score. This suggests that strength in mathematics is a characteristic of those having an orientation towards an Investigative occupation. For girls, the pattern is more complex. Figure 22 shows the mean literacy score of girls in Year 9, by the type of their vocational orientation. Girls with an Investigative orientation have higher scores than other types, and those with Realistic, Social and Conventional orientations all low literacy scores. This indicates that low achieving boys tend to focus on one type of occupation, whereas low achieving girls may have more types available to them.

Figure 19 **Mean mathematics achievement of boys by vocational orientation, showing overall mean and 95% confidence intervals (Source: LSAY 1995)**

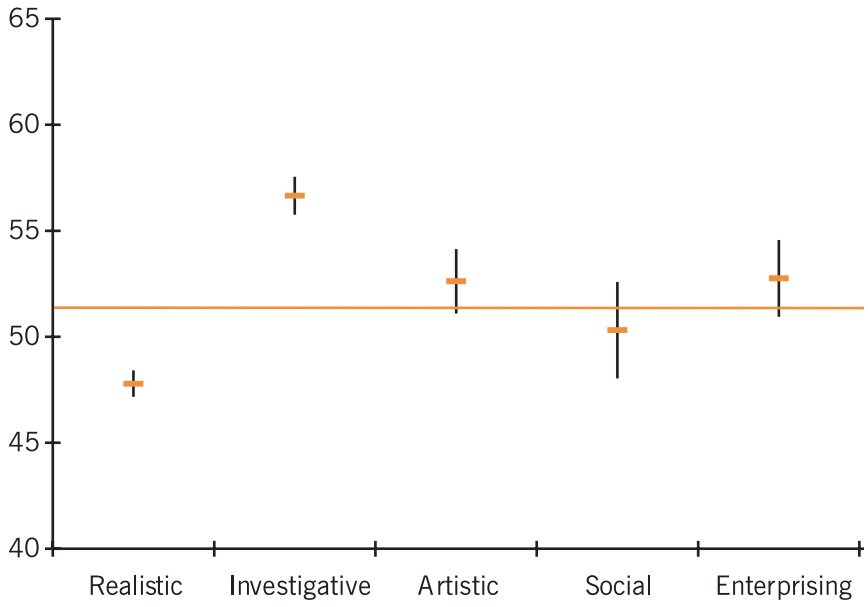
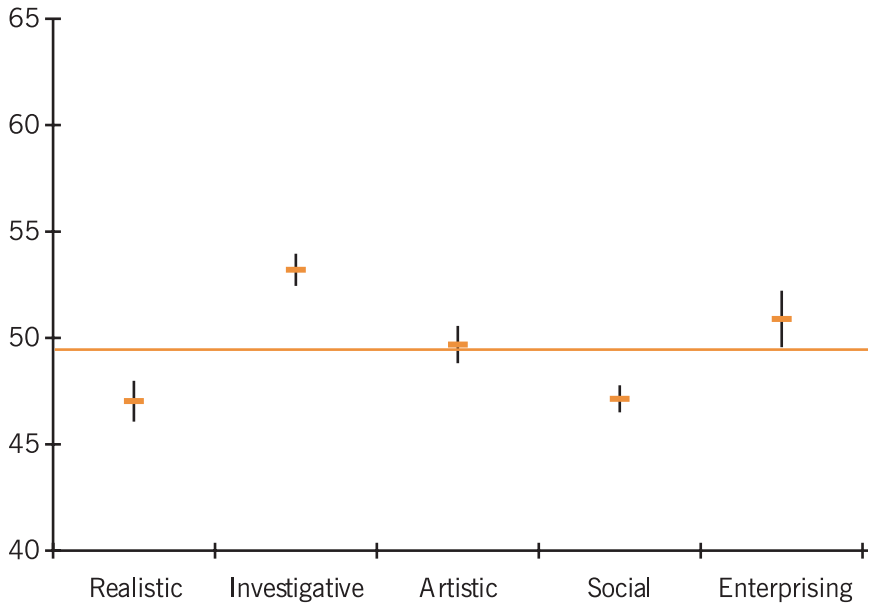


Figure 20 **Mean mathematics achievement of girls by vocational orientation, showing overall mean and 95% confidence intervals (Source: LSAY 1995)**



Overall, these results suggest that ability is associated with preference for only some types of work, and that this tends to vary by gender. This points to the importance of gender and vocational interests in shaping career orientation. It may also suggest that an orientation towards lifelong learning varies by vocational orientation.

Post-school plans and vocational orientation

Students' plans for the year following school were compared across each type of vocational orientation. The results are presented in Figure 23.

There is an association between post-school plans of students and their vocational orientation. A high proportion of students with a Realistic orientation have no plans for post-school study in contrast to other groups of students. One interpretation of this high proportion is that they plan to do an apprenticeship and do not see this as further study, but rather as an aspect of work. In contrast, nearly all respondents with an Investigative orientation planned to study full-time in the year after leaving school.

The effect of student gender and their vocational orientation was also investigated. Figure 24 shows that except for those with a Conventional orientation, girls were more likely than boys to plan full-time study post-school for each of the types. The largest difference between the sexes is for those with an Artistic, Enterprising or Conventional vocational orientation.

The planned educational destination of students also varies between the types of vocational orientation. Those with a Realistic orientation are less likely than others to plan entry to university. Nearly all with an Investigative orientation plan to enter university after leaving school. This can be seen in Figure 25.

It is interesting to note that when Harvey-Beavis and Elsworth (1998) classified university courses using the RIASEC typology, none were identified as Realistic (see Table 14, above). This may suggest young people have an accurate understanding of the salience of offerings made by universities and congruence with their interests.

Plans to attend TAFE are strongest among those with a Realistic or Social orientation. Girls with these orientations had the lowest average literacy and numeracy scores. Boys

Figure 21 Mean literacy achievement of boys by vocational orientation, showing overall mean and 95% confidence intervals (Source: LSAY 1995)

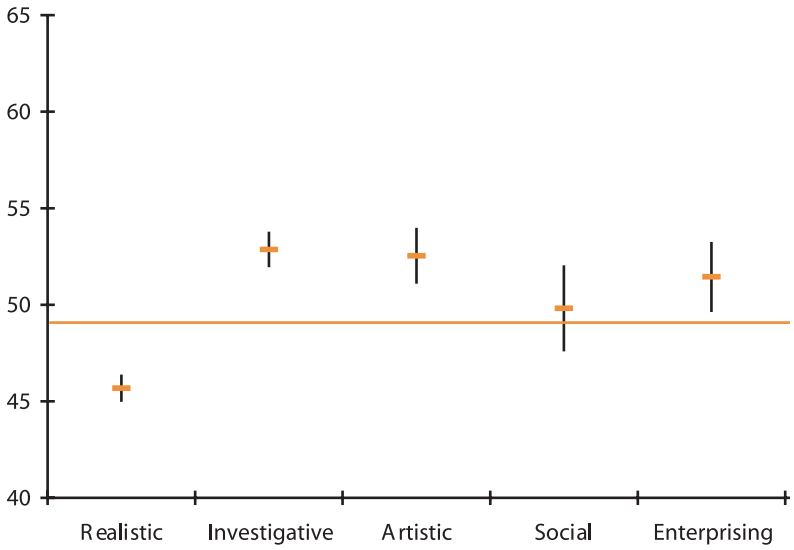


Figure 22 **Mean literacy achievement of girls by vocational orientation, showing overall mean and 95% confidence intervals (Source: LSAY 1995)**

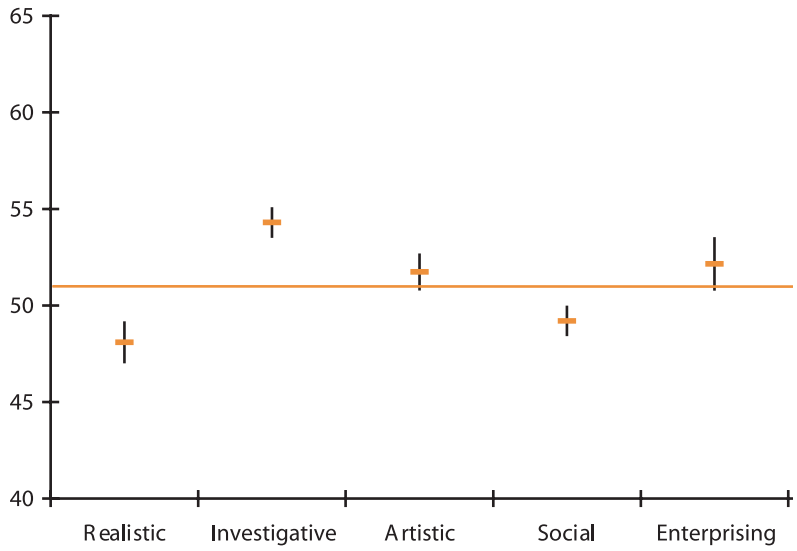
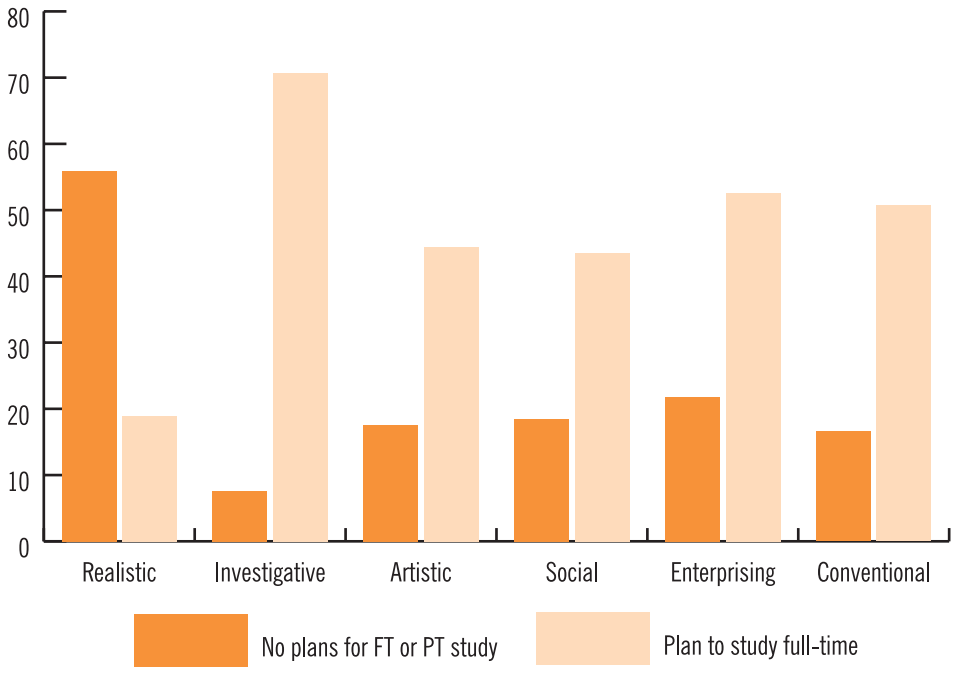


Figure 23 **Post-school plans compared with vocational orientation (Source: LSAY 1995)**



with a Realistic orientation had the lowest literacy and numeracy scores (see Figure 19 to Figure 22). Conversely, those with an Investigative orientation had the highest average numeracy and literacy scores and a high proportion planning university after leaving school. This suggests that ability may influence student plans at Year 9. It also suggests that students have an accurate idea of their literacy and numeracy achievement levels and use this knowledge in their planning. The use of this knowledge is consistent with Gottfredson's theory of the development of vocational aspirations. Students take account of their ability in identifying occupations for which to aspire.

Satisfaction with school and vocational orientation

Figure 26 shows the average level of agreement on the Quality of School Life scales across different types of vocational orientation. Students with an Investigative orientation consistently expressed higher levels of satisfaction across the five *Quality of School Life* scales compared to those with other orientations. Similarly, those with a Realistic orientation expressed lower levels of satisfaction.

The difference in satisfaction levels between the Investigative and Realistic groups is quite large across the scales, ranging from approximately 6.5% on the 'Relevance of Learning' scale, to around 15% on the 'Positive Affect' scale.

These results indicate a relationship between vocational orientation of students and their satisfaction with school life. The relationship may indicate that schools are less well equipped to assist students oriented towards more practical career choices, and that they are better at satisfying the needs of students with an academic or other orientation. A second possible interpretation is that students with a Realistic vocational orientation find themselves in an environment defined by teachers in a way that it is incongruent with their interests. Teachers typically have Social interests (Holland, 2001b) and this may be contributing to low scores on the *Quality of School Life* scales shown by students with a Realistic vocational orientation.[ii] There is some evidence for this view in Figure 26 where students with a Social orientation, who also tend to have low achievement levels, have higher levels of satisfaction with school than students with a Realistic orientation.

Vocational orientation and interest in learning beyond school

Responses to the items concerning interest in learning beyond school were compared for students classified according to their vocational interests. The eight items explored earlier in this report (Table 7) were separated into two groups. The first five items refer to a more general interest in learning, and the remaining three items are more oriented to learning within the world of work.

Figure 27 shows the level of interest expressed on these items was similar across the Realistic, Social and Conventional orientations. These were generally lower than the level of interest expressed by the Investigative, Artistic and Enterprising orientations. Those with an Investigative orientation expressed the highest level of interest in the prospect of learning new things or things not yet understood, and in why things happen the way they do. Those with an Artistic orientation expressed the highest level of interest in new ideas and why the world is in the state it is. This finding is consistent with theoretical expectations based upon Holland's description of these types (Holland, 1985, 1997) – an interest in ideas and complex problems. This variation between types of vocational orientation suggests there is an association between these types and an orientation to different aspects of lifelong learning.

Figure 28 shows similar interest levels across the more work-oriented learning items for each of the vocational orientations, with the exception of the 'how something works' category. On this item, those with a 'Realistic' career orientation express considerably more interest than other groups.

Figure 27 and Figure 28 show that there is a high level of interest expressed by most students in learning new things, and in acquiring and improving skills within a work context, regardless of their vocational orientation. A vocational orientation dimension

Figure 24 **Proportion (%) of Year 9 boys and girls with plans for full-time study beyond school, by type of vocational orientation (Source: LSAY 1995)**

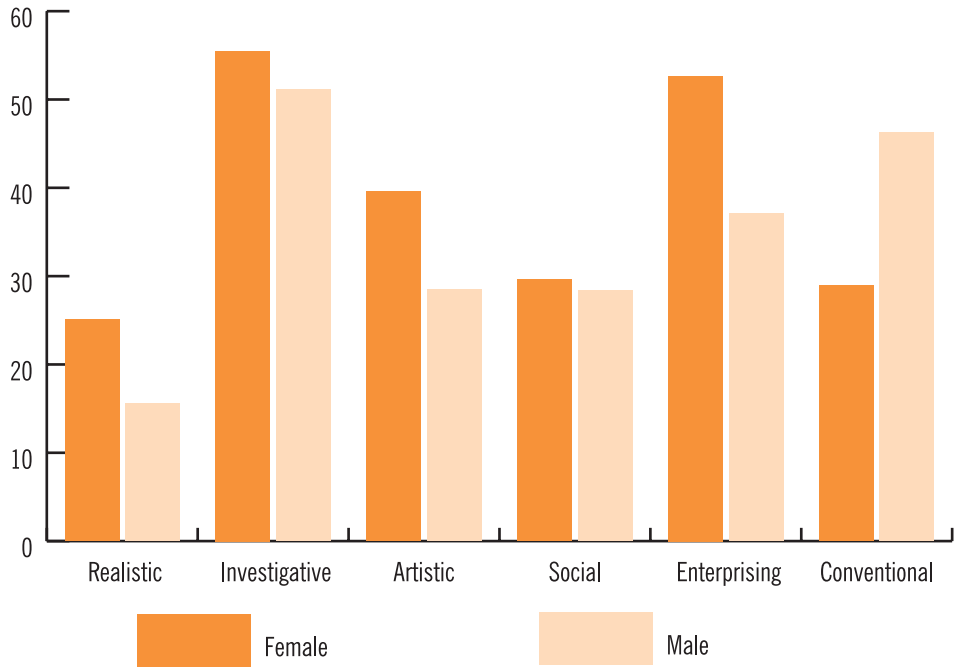


Figure 25 **Type of post-school study planned by type of vocational orientation (Source: LSAY 1995)**

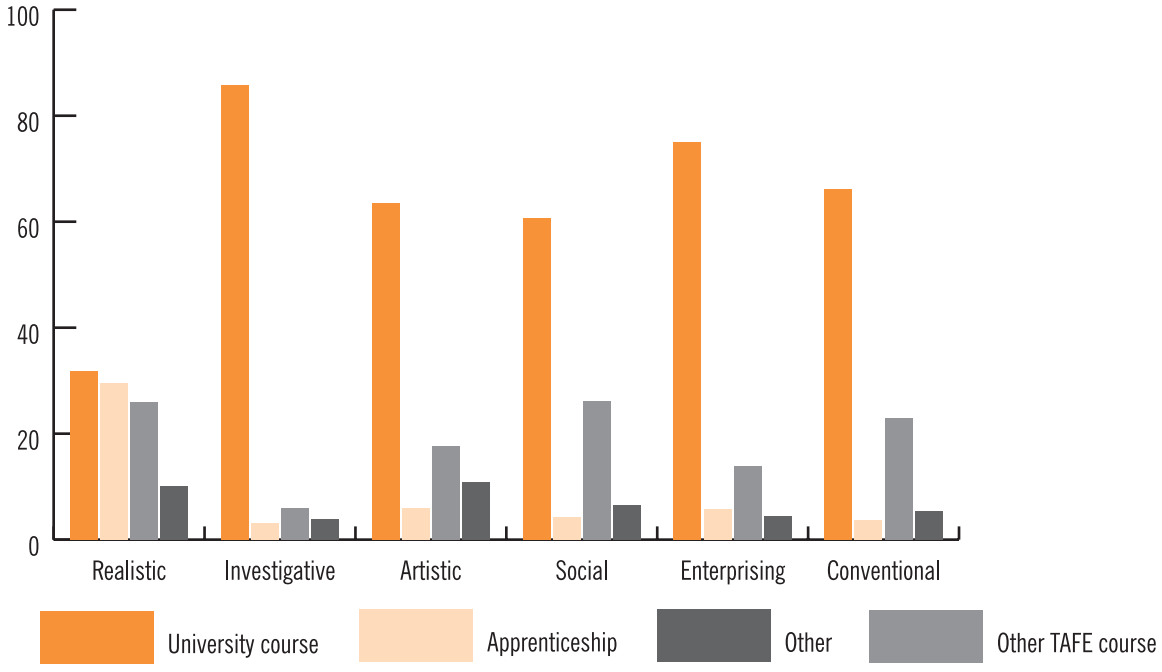


Figure 26 **Average proportion (%) of agreement (agree or strongly agree) on the *Quality of School Life* scales, by vocational orientation (Source: LSAY 1995)**

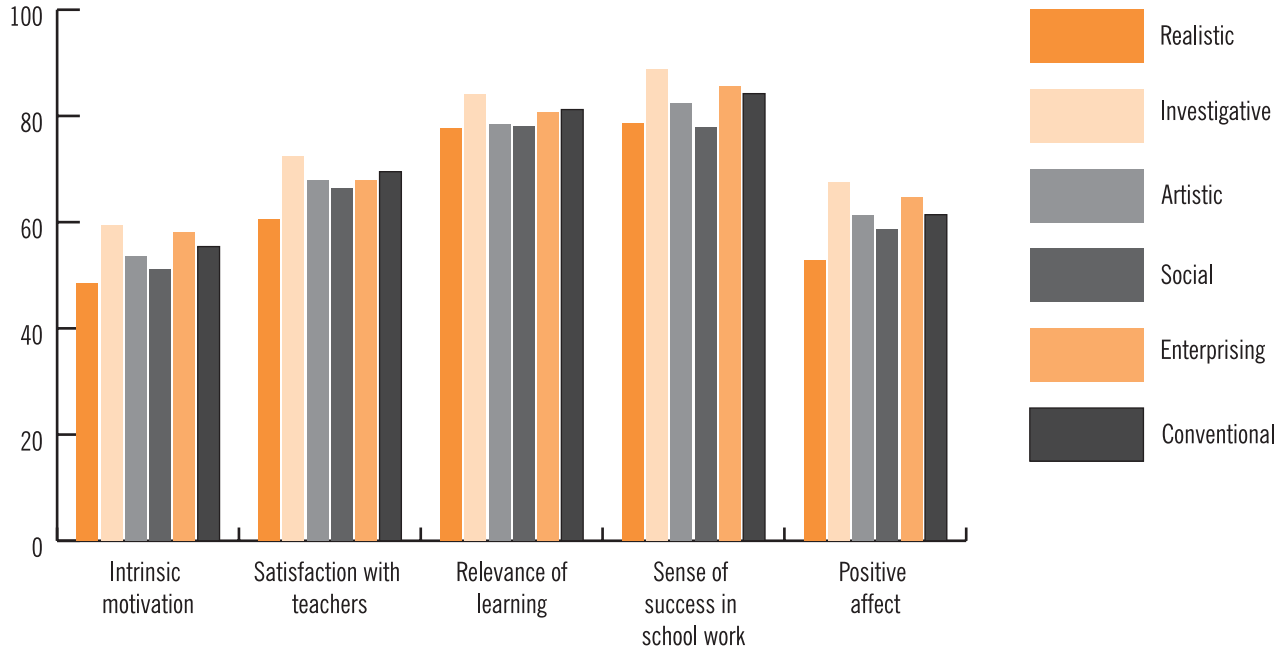
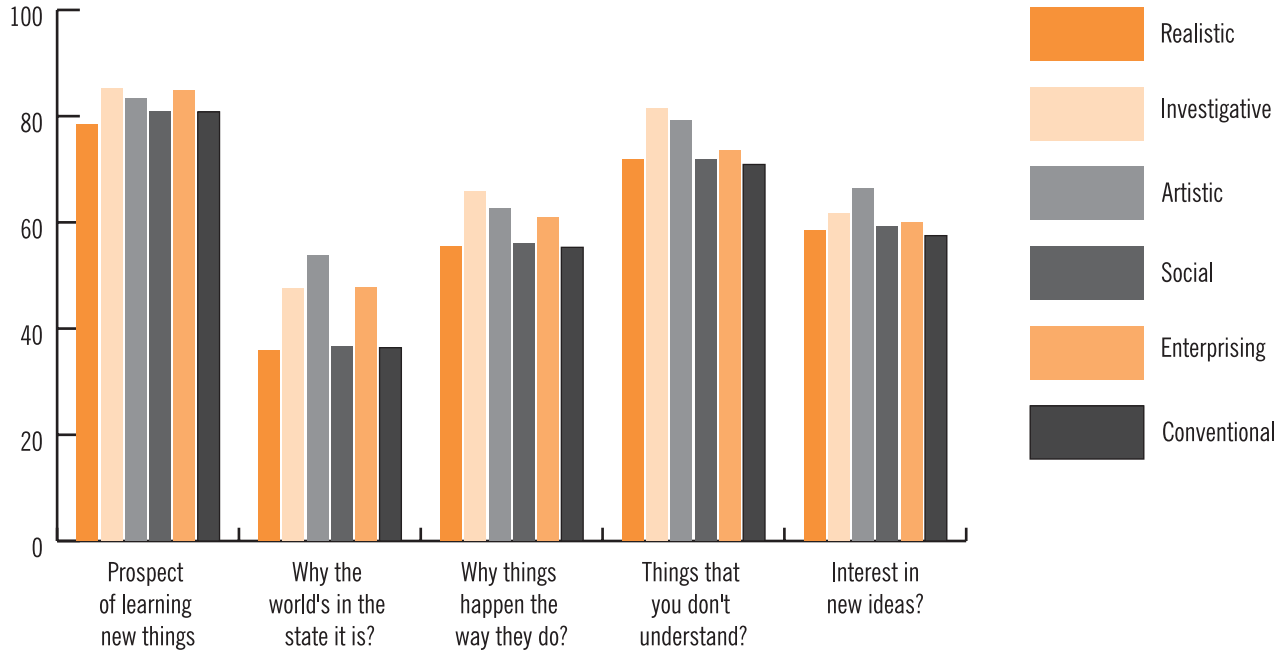


Figure 27 **Proportion (%) of respondents reporting 'A lot' or 'A great deal' of interest in learning (generally) beyond school, separated by vocational orientation (Source: LSAY 1999)**



does emerge however, when the type of learning – more practical ('how something works'), or more abstract ('the state of the world') – is articulated.

ESTIMATING THE RELATIVE IMPORTANCE OF FACTORS PREDICTING THE SOCIO-ECONOMIC STATUS OF PLANNED OCCUPATIONS

This section of the report seeks to establish the relative importance of each of the factors considered in predicting the socio-economic status of the most preferred job and of post-school plans. To establish the relative importance of these factors the statistical procedure named 'regression analysis' is used.[iii]

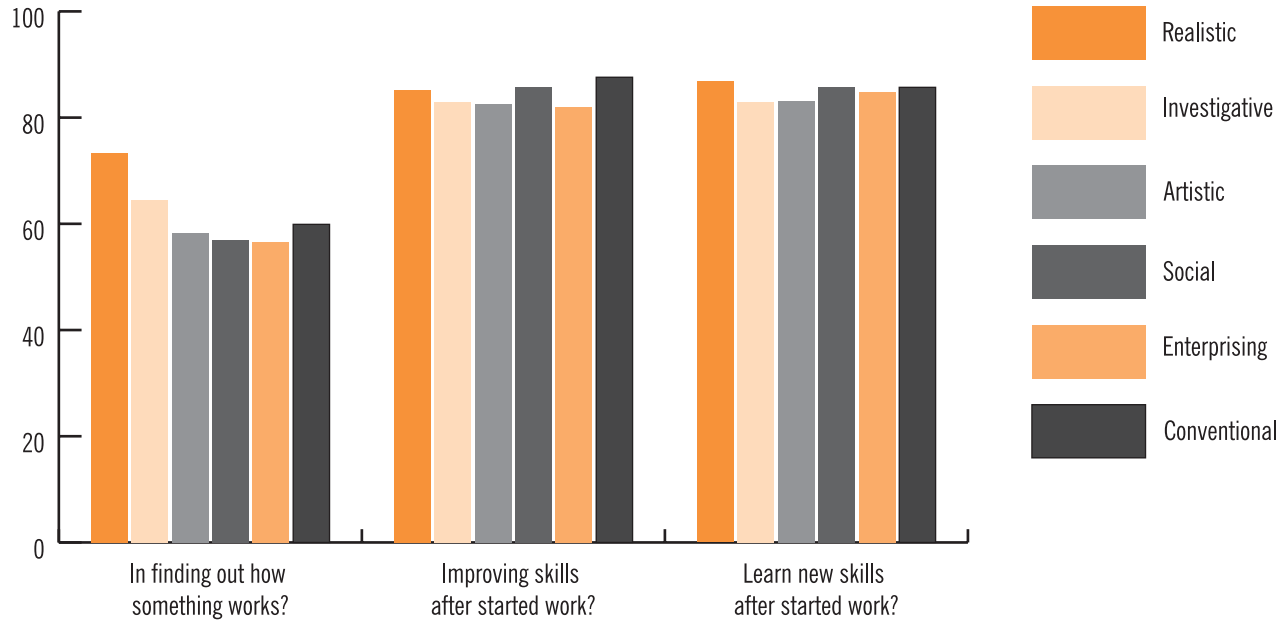
Independent variables

The following variables were used in the regression analysis:

1. Gender: this variable was included because it has policy interest and because there is some evidence that girls do better than boys at school and hence may have more post-school options. Including this variable helps to establish if it is ability or gender which contributes to post-school outcomes.
2. Vocational orientation: for the analysis reported here, a 'dummy' variable was constructed which had the value of 1 if the respondent had an orientation towards an Investigative occupation, and 0 if they had an orientation towards any other type of occupation. The use of the Investigative orientation as the reference point for this was based upon the known importance for students with this orientation to take up university courses.

   The use of this variable is controversial because it is not independent of the dependent or outcome variable. Both variables are derived from the occupational title provided by the student. It can be expected, therefore, that use of orientation will inflate the proportion of variance accounted for by the set of independent variables. For the analysis where socio-economic status of this occupation was the dependent variable, two sets of analyses were undertaken. One provided the unique contribution of vocational orientation so that its importance could be assessed. For this analysis the proportion of variance explained was ignored. For the other

Figure 28 Proportion (%) of respondents reporting 'a lot' or 'a great deal' of interest in learning (work-oriented) beyond school, separated by vocational orientation (Source: LSAY 1999)



analysis, the proportion of variance explained was examined to assess the adequacy of the set of independent variables for explaining the socio-economic status of the planned occupation.

3. Numeracy achievement score: this score, as with the literacy score, was included as a measure of ability. It is important to disentangle the effect of ability from the effect of an orientation to lifelong learning. If this is not done, it will remain unknown how much post-school outcomes are due to ability and how much uniquely due to an orientation towards lifelong learning.
4. Literacy achievement score.
5. A set of variables combined to measure the intrinsic motivation of the student. This variable is the central focus of the analysis. It is an indicator of an orientation to lifelong learning.
6. The socio-economic status of the family: this variable is included as it is known to be (weakly) associated with student achievement and post-school outcomes (see above). It is also an important variable from a policy perspective (see for example Zappalà & Parker, 2000).
7. Post-school plans to study full-time: This variable is used as an independent variable for predicting socio-economic status of the planned for occupation, and as an independent variable for the logistic regression. It is treated as a dichotomous variable with the value of 1 if a student planned to study full-time after leaving school and 0 if they planned any other outcome (including 'Don't know').

The family structure variable was not included in the analysis as preliminary investigations showed it had little impact on either dependent variable.

Results

Table 8 shows the results of the regression analysis conducted to identify which variables contribute most to predicting socio-economic status of the job the student plans to obtain.

Table 9 shows the results of the regression analysis conducted to identify which variables contribute most to predicting socio-economic status of the job the student plans to obtain. Included with this analysis was the vocational orientation of the respondent.

Table 10 shows the results of the logistic regression analysis conducted to identify which variables contribute most to predicting whether an individual will study full-time after school. The independent variables were standardised before the analysis so that results enable a rough comparison of the importance of each dependent variable.

Discussion

The socio-economic status of the planned for occupation was chosen as the dependent variable because this provides an opportunity to assess how many of society's rewards – social and economic – are expected to be made available to respondents. Thus socio-economic status is an indicator of the extent to which students expect to succeed.

Table 8 shows that having an intrinsic motivation to learn – an indicator of an orientation to lifelong learning – is statistically significant in its contribution to predicting socio-economic status of the occupation planned for after leaving school. However, its effects are not especially strong once the effect of gender, ability and plans to study after school are taken into account. Indeed, the effect of an intrinsic motivation to learn is almost at the same level as socio-economic status of the family, and this was the weakest predictor in the model.

The model only accounts for around a quarter of the variance in the socio-economic status of the planned for occupation. This suggests there are other important variables omitted from the model. Based on arguments by Naylor (1993; 1997) and Gottfredson (1981; 1996; 2002), vocational interests might be expected to make a strong contribution to this prediction. Unfortunately, there is no measure of these interests available in the LSAY data for the cohort used in this report. However, a vocational orientation can be inferred from the type of occupation that students expect after leaving school.

Table 9 shows that when the vocational orientation variable is included in the model it becomes the most important variable (as

Table 8 Standardised coefficients and significance levels for a set of independent variables predicting socio-economic status of the occupation planned for after leaving school

	Standardised coefficients	Significance
Sex	.103	.000
Mathematics score	.223	.000
Literacy score	.098	.000
Parental socio-economic status	.076	.000
Plans to study full-time after school	.271	.000
Lifelong learning orientation (intrinsic motivation)	.079	.000
Adjusted R Squared	0.23	

Table 9 Standardised coefficients and significance levels for a set of independent variables, including vocational orientation, predicting socio-economic status of the occupation planned for after leaving school

	Standardised coefficients	Significance
Sex	.118	.000
Mathematics score	.131	.000
Literacy score	.067	.000
Parental socio-economic status	.047	.000
Vocational orientation (Investigative versus the rest)	.546	.000
Plans to study full-time after school	.193	.000
Lifelong learning orientation (intrinsic motivation)	.042	.000

Table 10 Unstandardised coefficients and significance levels for a set of independent variables predicting whether a student planned full-time study after leaving school

	Unstandardised coefficients	Significance
Sex	.462	.000
Mathematics score	.252	.000
Literacy score	.264	.000
Parental socio-economic status	.094	.000
Vocational orientation (Investigative versus the rest)	.811	.000
Lifelong learning orientation (intrinsic motivation)	.145	.000

indicated by the strength of its standardised coefficient of .546). It is around 30 times more powerful than having an intrinsic motivation to learn. However, caution is required here. Vocational orientation of the individual is not independent of the dependent variable in this model. This result should be treated as only indicative of the importance of vocational interests. Some plausibility for its importance is that it is congruent with the theoretical work of Naylor (1993; 1997) and Gottfredson (1981; 1996; 2002).

To consider the importance of vocational interests, a further analysis was conducted with a dichotomous independent variable – plans to study full-time after leaving school. The results of this analysis, conducted using logistic regression, can be seen in Table 10. Having an Investigative vocational orientation appears to be the most important predictor of an intention to study full-time after leaving school. It also shows that an intrinsic motivation to learn appears to have an effect, but that it is among the weakest of the variables in the model. Family socio-economic status is even weaker.

This set of analyses suggests, therefore, that while an orientation to lifelong learning may contribute to post-school plans and expectations, its effect is weak compared with the effect of ability and gender, and probably, vocational interests. It appears more important though than the socio-economic status of the family in its effect.

OVERVIEW OF THE FINDINGS FROM THE LSAY DATA

The LSAY data showed the following:

Family socio-economic status and post-school plans

1. Year 9 students from lower socio-economic quintiles were less likely to plan full-time study post-school than those from higher socio-economic quintiles.
2. Year 9 students from lower socio-economic quintiles were more likely to plan no study post-school than those from higher socio-economic quintiles.
3. Around 20% of Year 9 students, irrespective of the socio-economic status of their family, did not know what they planned to do after leaving school.
4. Around 40% of Year 9 students, irrespective of their socio-economic status, did not know what their parents planned for them to do after leaving school.
5. Around 1% of the variance in plans to study post-school was accounted for by family socio-economic status. (This is a very small proportion of the variance, suggesting it is not especially important in predicting post-school study.)

Parental educational levels

6. Year 9 students from lower socio-economic quintiles, who had parents with a degree or diploma, were less likely to plan full-time study post-school than those from higher socio-economic quintiles whose parents also had a degree or diploma.

Family structure

7. Family structure did not influence post-school plans of Year 9 students.

Post-school plans

8. Young people at Year 9, from lower socio-economic status families, find it harder to realize their post-school plans for study at a university.
9. Socio-economic status does not appear to be associated with difficulty in realizing their post-school plans as described at Year 9 when these plans do not involve study at a university.
10. If young people state in Year 9 that they plan no post-school study, those from lower socio-economic status families are more likely not to be studying than those from higher socio-economic status families.

Indicators of lifelong learning

11. Socio-economic status accounts for around 5% of the variance in student achievement.
12. Satisfaction with school does not appear to be associated with socio-economic status.
13. Interest in learning beyond school does not appear to be associated with socio-economic status. Although it is interesting that young people from low socio-economic status families are a little more

interested in learning about the world of work.

Vocational orientation

14. Vocational orientation is associated with achievement and post-school plans, satisfaction with school, and interest in learning beyond school. Typically, these effects are strongest for Realistic and Investigative types.

The relative importance of factors predicting post-school plans

15. Having an orientation to lifelong learning as indexed by intrinsic motivation appears to contribute to post-school plans and expectations, but its effect is weak compared with the effect of ability and gender, and probably, vocational interests. It is, however, more important than socio-economic status of the family in its effect on these plans and expectations.

The LSAY data suggest that the most important factors for predicting post-school plans are the gender of the student, their ability and their vocational orientation. Students appear to have a good understanding of both, and plan their post-school destinations accordingly. An orientation to lifelong learning also has an effect on these destinations, but it appears on the LSAY data to be small. This suggests that policies designed to enhance student outcomes, by encouraging the development of a positive lifelong learning orientation, may need to consider the interests and abilities of young people. The contents and methods of delivery for a program need to be situated in an environment that is congruent with their interests and set at a level appropriate to their ability.

Chapter Four

Results from PISA data

In 2001 the *Organisation for Economic Co-operation and Development* (OECD) collected the first set of data in an international study designed to measure the reading, mathematics and science literacy levels of 15 year-old students in member countries. The study was called the Program for International Student Assessment, but is best known by its acronym PISA. A total of 34 countries participated in the study in 2001. A detailed account of the study is provided in the initial report from the project – *Knowledge and Skills for Life: first results from PISA 2000* (OECD, 2001). Australia participated in PISA.

PISA collected nationally representative data. These data consisted of test scores and responses from a student and school questionnaire. The questionnaires were designed to provide a set of variables that could be used to help understand within- and between-country test scores. These included: (a) family socio-economic status; (b) family wealth; (c) 'classical' cultural possessions and activities in the family; (d) patterns of communication within the family; (e) parental education; (f) family structure; (g) language spoken at home, and; (h) attitudes to school and reading. There was also a set of questions designed to tap the extent to which students demonstrated 'cross curricular competencies'. It was these questions that were judged to be especially relevant to the present study.

Pre-empting this study, the OECD released another PISA report late in November 2003, which had those items concerning the 'cross curricular competencies' as its focus (Artelt, Baumert, Julius-McElvany, & Peschar, 2003). The report – *Learners for Life: Student Approaches to Learning* – focused upon lifelong learning, a policy priority area for the OECD. In particular it focuses on students' motivation, self-beliefs and use of various learning strategies. The report finds an association between student approaches to learning and learning outcomes.

As this report is salient to the current study, the first section of this chapter provides a summary of its main findings. Next the analyses that were conducted for this study are reported and discussed.

LEARNERS FOR LIFE: STUDENT APPROACHES TO LEARNING

In *Learners for Life: Student Approaches to Learning*, Artelt et al. (2003) argue, correctly, that student approaches to learning can be viewed both as mediating variables to help explain student achievement, and as learning outcomes in their own right. While the authors provide results for both approaches, it is clear that they are more concerned to understand how students come to be 'competent autonomous learners', that is to say, 'Lifelong learners'. For these authors, such a learner: (a) regulates their own learning; (b) selects strategies and techniques that are appropriate; (c) shields themselves from 'competing intentions', and; (d) stays motivated (Artelt et al., 2003, p. 20 and 70).

Artelt et al. report that there is a strong association between having the skills of a lifelong learner and student achievement as measured by the PISA tests (Artelt et al., 2003, p. 70). They also show that the lifelong learning characteristics of students vary by socio-economic status background, with those from higher status tending to have higher measures. The authors describe the effect of socio-economic status as "accounting for a large amount of the variance in performance associated with student background" (Artelt et al., 2003, p. 71). This claim needs to be carefully understood. The authors are not arguing that socio-economic background has a strong effect on student achievement, but that of the effect of socio-economic status, a large proportion is attributable to differences in levels of competent autonomous learning. In other words, Artelt et al. are providing an account of the mechanism by which socio-economic status differences may be translated into differences in student achievement levels. It needs to be remembered that differences in student achievement due to socio-economic status are not large – typically accounting for around 10% of the variance in student achievement in Australia

Other findings reported by Artelt et al. include:

a. There were few differences between schools in measures of lifelong learning in any of the countries participating in PISA;

b. Low scores on one attribute of lifelong learning tend to be associated with low scores on other attributes. The authors indicate that weakness tends to be multiple such that, for example, students low in motivation will tend also to be low on a measure of attitude towards learning;

c. Students are more likely to use control strategies in their learning if they are motivated by concrete incentives such as occupational aspirations or specific interests. Control strategies include: (a) working out exactly what is needed in order to learn; (b) checking to see if what has been learnt is remembered; (c) working out what concepts still need to be learnt; (d) ensuring the most important things are learnt, and; (e) looking for additional information if something is not understood. Controlling one's own learning in this way has the closest relationship with performance as measured by the PISA tests.

d. Elaboration strategies are also associated with performance and tend to be used more by males. Elaboration strategies seek to connect new material to prior learning. This was measured by asking students questions such as: *When I study I figure out how material fits in with what I have learned* (Artelt et al., 2003, p. 13).

e. Memorisation is associated with lower performance and with students having low socio-economic status. Memorisation involves 'verbatim representation of knowledge'. This was measured by asking students *When I study I memorise as much as possible* (Artelt et al., 2003, p. 13).

f. Interest in reading has a strong link to reading achievement, but only when the interest is very strong. In other words, the relationship between interest and achievement is not linear. It requires high levels of interest in reading before it has any significant impact on achievement.

g. Instrumental motivation learning is especially important. Instrumental motivation involves studying for an external reward, for example, a job (Artelt et al., 2003, p. 13). The authors note:

> *…even where it proves hard to create a strong love of learning for its own sake among students who have not had this message reinforced in their home and social environment, the evidence shows that students driven by factors such as job prospects are more likely to set and monitor learning goals and therefore give themselves a better chance of performing well.* (Artelt et al, 2003, p.73)

This implies that students who learn for instrumental reasons may still continue to learn. Further research might examine the extent to which these students become lifelong learners.

In summary, the analysis of the international PISA data indicate that having an orientation to lifelong learning appears to be associated with achievement. Furthermore this orientation appears to vary by socio-economic status background. These data also point to differences between boys and girls in how they go about learning.

The report now turns to the analyses conducted for the present study. An overview of the Australian PISA data is provided in Appendix 3.

Lifelong learning and family wealth

This section of the report considers a set of variables that can be construed as indicators of an orientation towards lifelong learning. Some come from the cross-curriculum competencies items that formed the focus of the *Learners for Life* report (Artelt et al., 2003), while others are drawn from other sections of the PISA student questionnaire.

Reading achievement

Literacy is a necessary pre-requisite for lifelong learning (OECD, 2002). PISA reading achievement scores were standardised with a mean of 500 and a standard deviation of 100. This means around two thirds of students scored between 400 and 600 (Lokan, Greenwood, & Cresswell, 2001, pp. 18-19).

Figure 29 shows the mean PISA reading scores for each quintile of family wealth. These increased with an increase in family wealth except for the highest quintile who were slightly below the fourth quintile.

However, the fifth quintile of wealth still out-performed the lowest three quintiles. The OECD minimum standard for literacy levels needed to be a lifelong learner (OECD, 2002) is, however, well below the mean scores for any of the quintiles of family wealth in Australia.

There is thus some evidence of a relationship between family wealth and reading achievement in the PISA data. This is consistent with findings from the LSAY data. It indicates that there may be some increased likelihood of a positive orientation towards lifelong learning with an increase in family wealth. However if the OECD standards are accepted as reasonable, then there is no strong evidence here of socio-economic status precluding access to lifelong learning because of low literacy levels.

Family educational support and family wealth

PISA collected data on how much educational support was provided by the family. The question used asked how often the respondent's mother, father and siblings helped them with their schoolwork. Response categories ranged from 'Never or hardly ever' to 'several times a week'. Responses were standardised with a mean of 0 and a standard deviation of 1.

The amount of family educational support may be related to developing an orientation to lifelong learning by encouraging a positive attitude to learning. Higher levels of family support can also be related to low performance at school – poor achieving students need more support. Family educational support may not, therefore, be a reliable indicator of an orientation to lifelong learning.

Figure 30 shows that there is a consistent increase in average levels of family educational support across the quintiles of family wealth. The gap between the lowest and highest quintile is around a third of a standard deviation, which might be seen as a moderate difference.

Home educational resources and family wealth

PISA collected data on home educational resources. The question used asked whether the respondent had in their home a dictionary, a quiet place to study, a desk to study at, a calculator or textbooks. Response categories were 'yes' or 'no'.

Figure 29 Mean PISA 2000 reading score by socio-economic status quintile (Source: OECD PISA data)

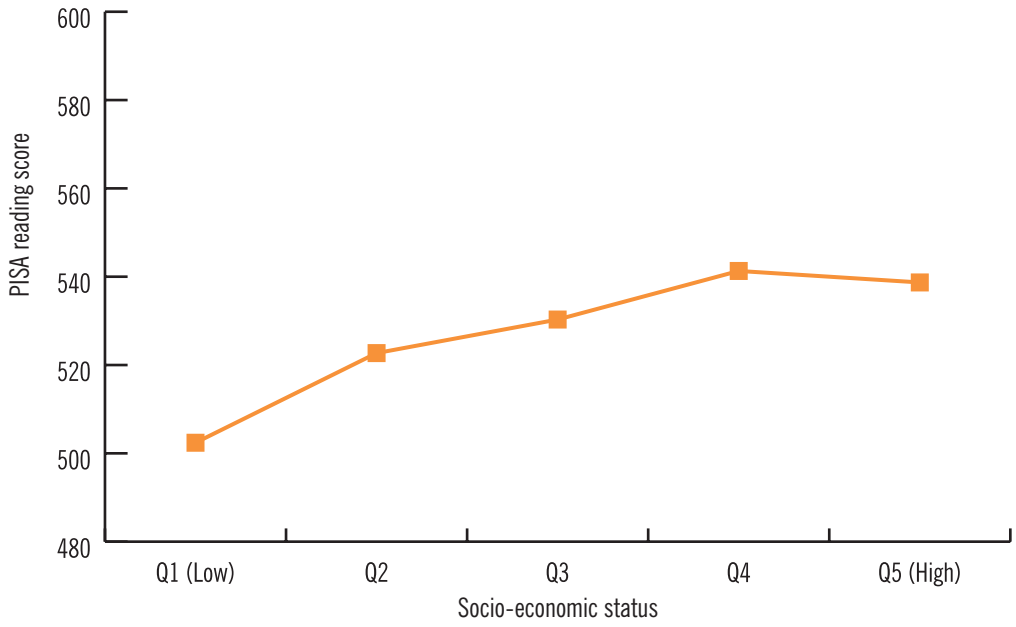
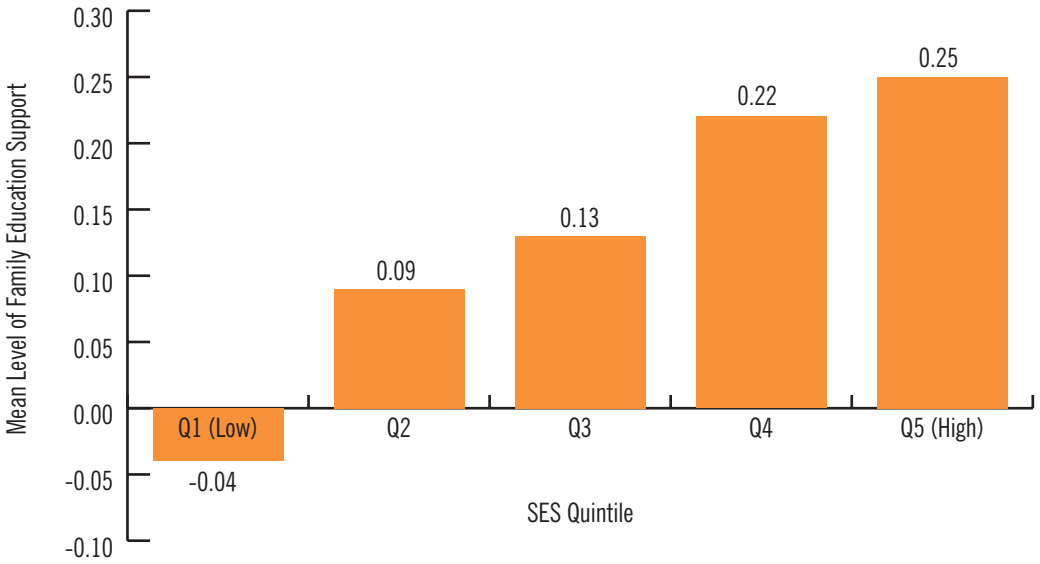


Figure 30 Mean level of family educational support for each quintile of family wealth (Source: OECD PISA 2000 data)



The level of home educational resources may be related to developing an orientation to lifelong learning in that their availability could facilitate the development of a range of learning strategies outside of a school setting. They may therefore increase 'information literacy', a required attribute of lifelong learning (Bryce et al., 2000). Providing educational resources at home may also signal learning is regarded as important in the family.

Figure 31 shows that there is a consistent increase in average levels of family educational support across the quintiles of family wealth. The difference between the mean for the lowest quintile and the highest quintile is close to one standard deviation (0.92). This is a large gap.

Cultural activities and family wealth

PISA collected data on the 'high' cultural activities of the student. The question used asked how often during the past year they had visited a museum or art gallery, attended an opera, ballet or classical symphony concert, or watched live theatre. Response categories ranged from 'Never or hardly ever' to 'More than four times a year'. Responses were standardised with a mean of 0 and a standard deviation of 1.

Involvement in 'high' cultural activities may indicate curiosity (Bryce et al., 2000) and an engagement with, and appreciation of, the general culture (European Commission Working Group on Quality Indicators, 2002). Both are seen as associated with an orientation to lifelong learning.

Figure 32 shows that there is a consistent increase in average levels of cultural activity across the quintiles of family wealth. The difference between the mean for the lowest quintile and the highest quintile is around one third of a standard deviation. This is a moderate gap.

Comfort and ability with computers and family wealth

PISA also collected data on ability and comfort with the use of computers. The ability question asked: If you compare yourself with other 15-year-olds, how would you rate your ability to use a computer? The comfort question asked how comfortable students were: (a) using a computer, (b) using a computer to write a paper, and (c) taking a test on a computer. The response categories were 'Very comfortable' through to 'Not at all comfortable'. Responses were standardised with a mean of 0 and a standard deviation of 1.

Figure 31 **Mean level of home educational resources for each socio-economic quintile (Source: OECD PISA 2000 data)**

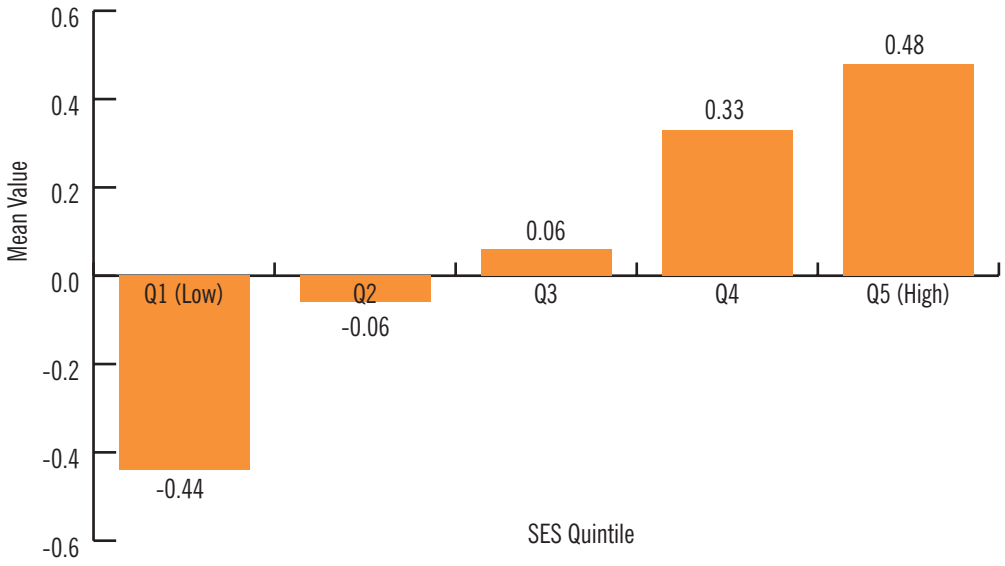
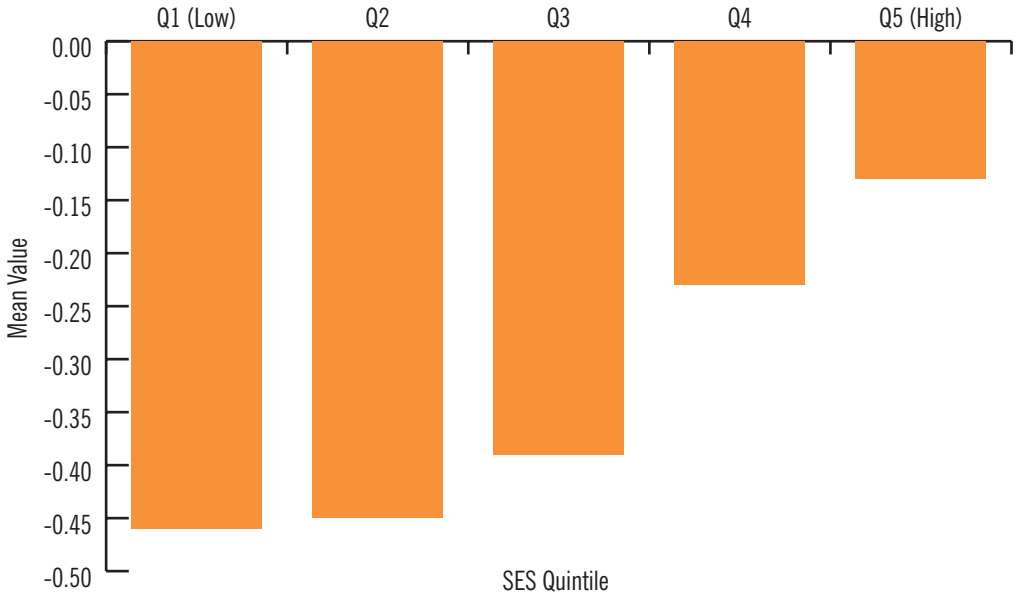


Figure 32 **Mean level of cultural activities for each socio-economic quintile (Source: OECD PISA 2000 data)**



Competency with information technology was regarded by the OECD (2002) as an indicator of lifelong learning.

Figure 33 shows that there is a consistent increase in average levels of comfort and ability with computers across the quintiles of family wealth. The difference between the mean for the lowest quintile and the highest quintile is around two-thirds of a standard deviation. This is a large gap.

Enjoyment of reading and family wealth

PISA collected data on the enjoyment of reading. The index was based upon nine questions which ask: (a) *I read only if I have to*; (b) *Reading is one of my favourite hobbies*; (c) *I like talking about books*; (d) *I find it hard to finish books*; (e) *I feel happy if I receive a book as a present*; (f) *Reading is a waste of time*; (g) *I enjoy going to a bookstore or a library*; (h) *I read only to get information*; (i) *I cannot sit still and read for more than a few minutes*. For this item, an increasingly negative score indicates an increasing level of enjoyment for reading relative to other students. Responses were standardised with a mean of 0 and a standard deviation of 1.

Enjoyment of reading may indicate a facility or positive orientation towards learning beyond the school setting, and hence indicate an orientation towards lifelong learning.

Figure 34 shows that there is a consistent but only slight increase in average levels of enjoyment of reading across the quintiles of family wealth. The difference between the mean for the lowest quintile and the highest quintile is small.

Level of effort and perseverance and family wealth

PISA collected data about the level of effort and perseverance that students brought to their learning. Effort and perseverance may indicate a facility or positive orientation towards learning beyond the school setting, and hence indicate an orientation towards lifelong learning. Responses were standardised with a mean of 0 and a standard deviation of 1. Figure 35 shows that there is no association between the wealth of the family and levels of effort and perseverance.

Figure 33 Mean level of comfort and ability with computers for each socio-economic quintile (Source: OECD PISA 2000 data)

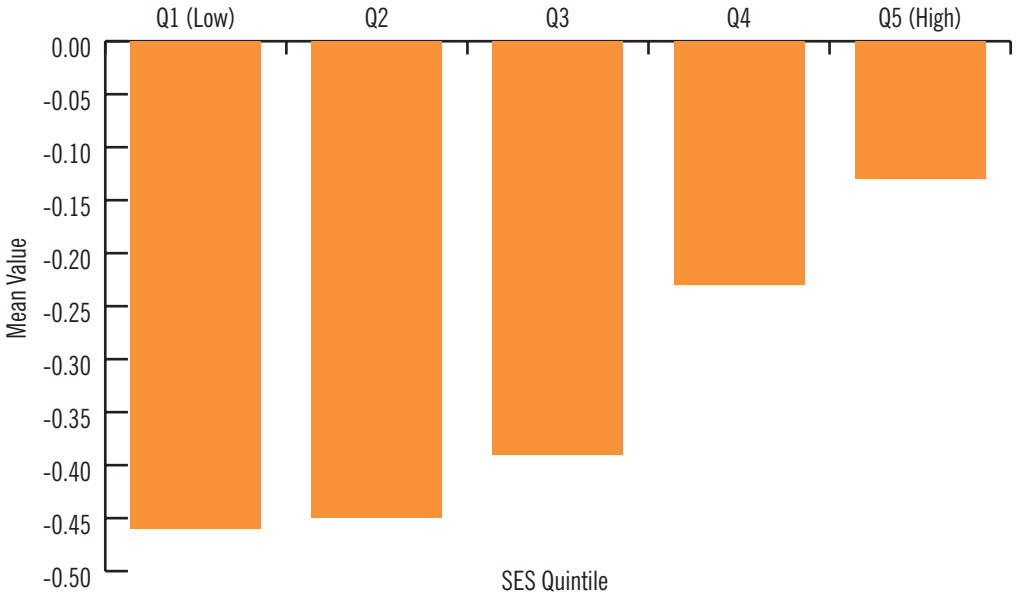


Figure 34 **Mean level of enjoyment of reading for each socio-economic quintile (Source: OECD PISA 2000 data)**

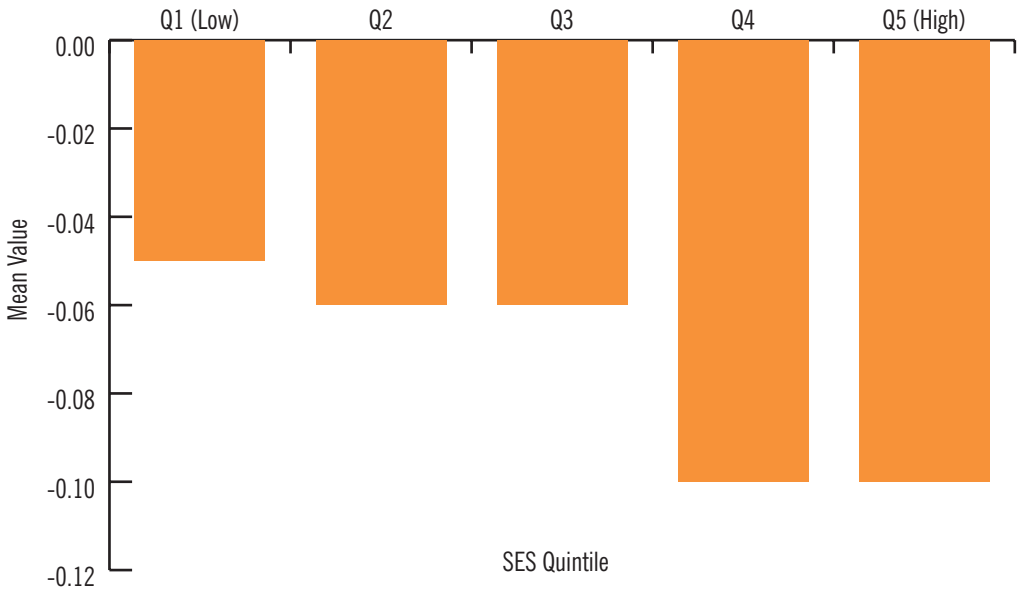
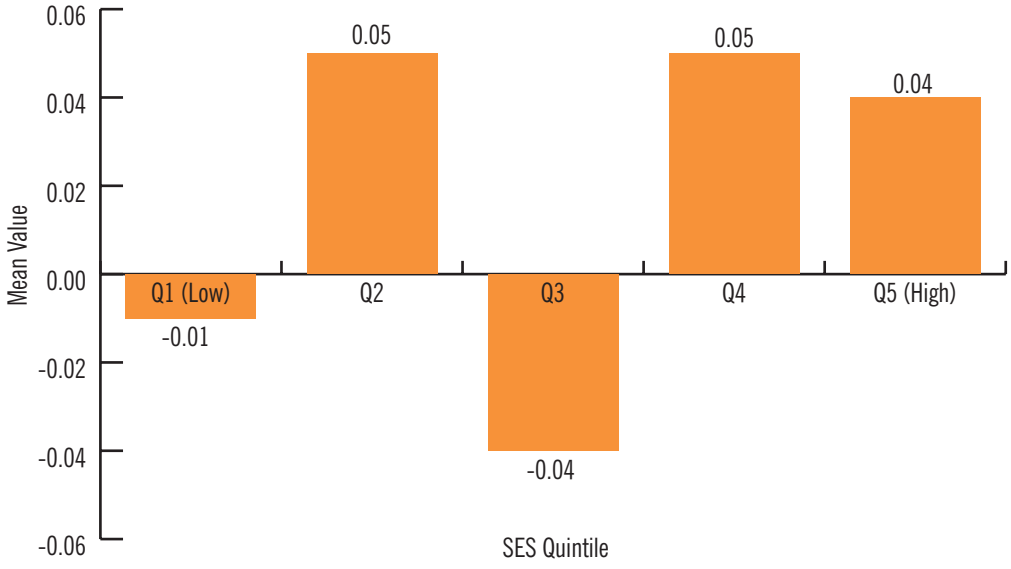


Figure 35 **Mean level of effort and perseverance for each socio-economic quintile (Source: OECD PISA 2000 data)**



Level of instrumental motivation and family wealth

PISA collected data about the level of instrumental motivation of students. Figure 36 shows that there appears to be no association between the wealth of the family and levels of instrumental motivation. The items on which this index is based are: (a) I study to increase job opportunities; (b) I study to ensure financial security; (c) I study to get a good job. Responses were standardised with a mean of 0 and a standard deviation of 1.

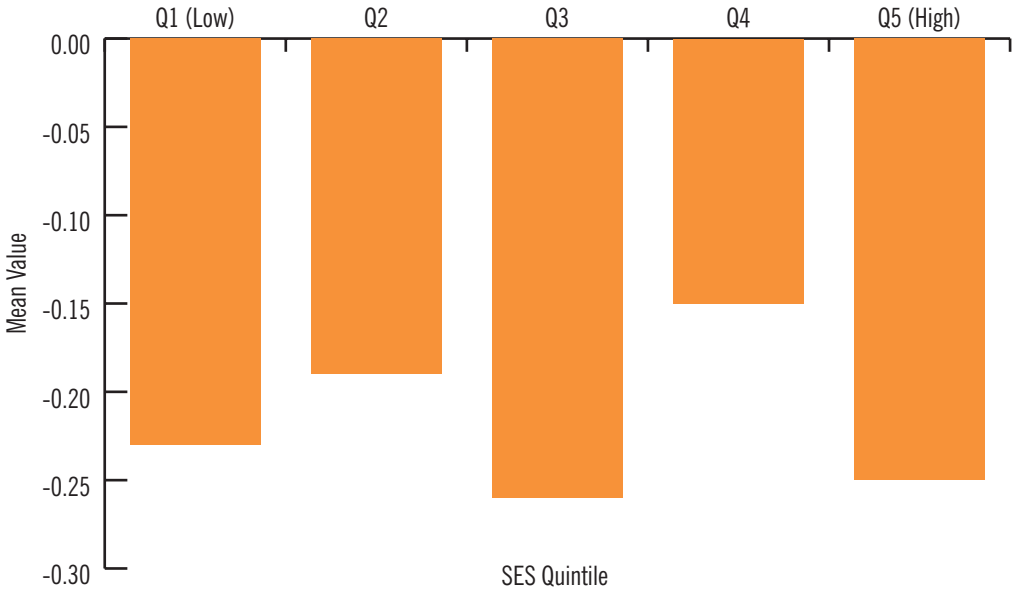
Level of mathematics self-concept and family wealth

PISA collected data about the mathematics self-concept of students. The scale was constructed from responses to the following items: (a) When I do mathematics, I sometimes get totally absorbed; (b) Because doing mathematics is fun, I wouldn't want to give it up; (c) I get good marks in mathematics; (d) Mathematics is one of my best subjects; (e) I have always done well in mathematics, and; (f) Mathematics is important to me personally. A four-point response category was available, ranging from 'Disagree' to 'Agree'. Responses were standardised with a mean of 0 and a standard deviation of 1.

A high level of mathematics self-concept may be taken as an indicator of an orientation towards lifelong learning in that those students with high levels may be more likely to have a sense of personal agency in their learning. This is an indicator of an orientation towards lifelong learning (Candy et al., 1994).

Figure 37 shows that there appears to be a weak association between the wealth of the family and levels of mathematics self-concept. Those in the lowest quintile of family wealth have the lowest levels of mathematics self-concept. Those in the highest quintile have the highest level. However, those in the fourth quintile have a lower average level than those in the second and third quintiles. The difference between the lowest and highest quintiles is not large – about an eighth of a standard deviation.

Figure 36 Mean level of instrumental motivation for each socio-economic quintile (Source: OECD PISA 2000 data)



Level of co-operative learning and family wealth

PISA collected data about the level of co-operative learning of students. The scale was constructed from responses to the following items: (a) *I like to work with other students*; (b) *I learn most when I work with other students*; (c) *I do my best work when I work with other students*; (d) *I like to help other people do well in a group*, and; (e) *It is helpful to put together everyone's ideas when working on a project.* A four-point response category was available, ranging from 'Disagree' to 'Agree'. Responses were standardised with a mean of 0 and a standard deviation of 1.

A high level of co-operative learning may be taken as an indicator of an orientation towards lifelong learning in that it implies a willingness to share knowledge and an ability to see others as sources of knowledge. As Bryce and Withers (2003) argue, these are important for lifelong learning.

Figure 38 shows that there appears to be no linear association between the wealth of the family and levels of co-operative learning.

Summary of findings concerning an orientation to lifelong learning

The Australian PISA data show that there is some evidence of a relationship between indicators of lifelong learning and family wealth. Some relations are moderately strong – reading achievement, family educational support, and participation in 'high' cultural activities. Other indicators of lifelong learning had either a weak, or no, relation with family wealth – enjoyment of reading, level of effort and perseverance, instrumental motivation, mathematics self-concept, and co-operative learning. Strong relations were found for home educational resources, and comfort and ability with computers. These strong relations may suggest that where material resources are needed to support an orientation to lifelong learning, family wealth has some impact, but that otherwise on most indicators it is not an important factor in developing an orientation to lifelong learning.

FAMILY WEALTH, VOCATIONAL ORIENTATION AND EXPECTED JOB AT AGE 30

Vocational orientation was shown with the LSAY data to be important for understanding

Figure 37 Mean level of mathematics self-concept for each socio-economic quintile (Source: OECD PISA 2000 data)

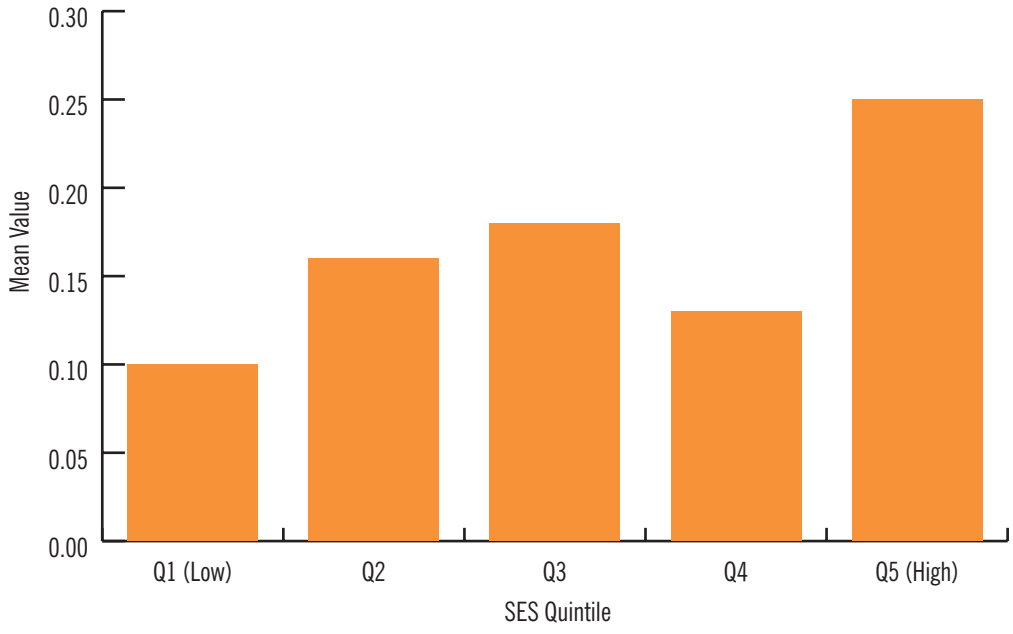


Figure 38 **Mean value of co-operative learning for each socio-economic quintile (Source: OECD PISA 2000 data)**

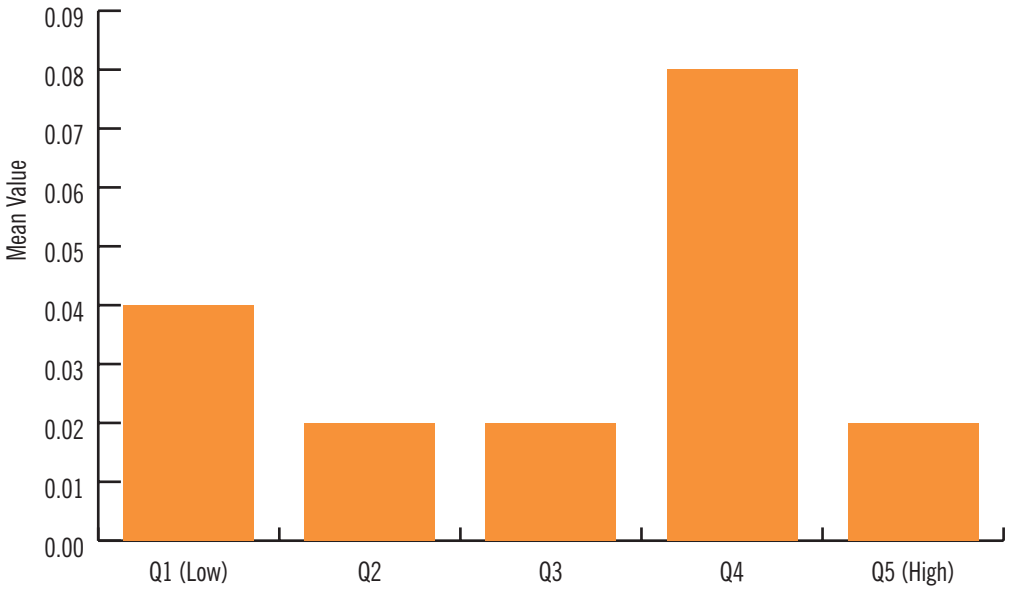
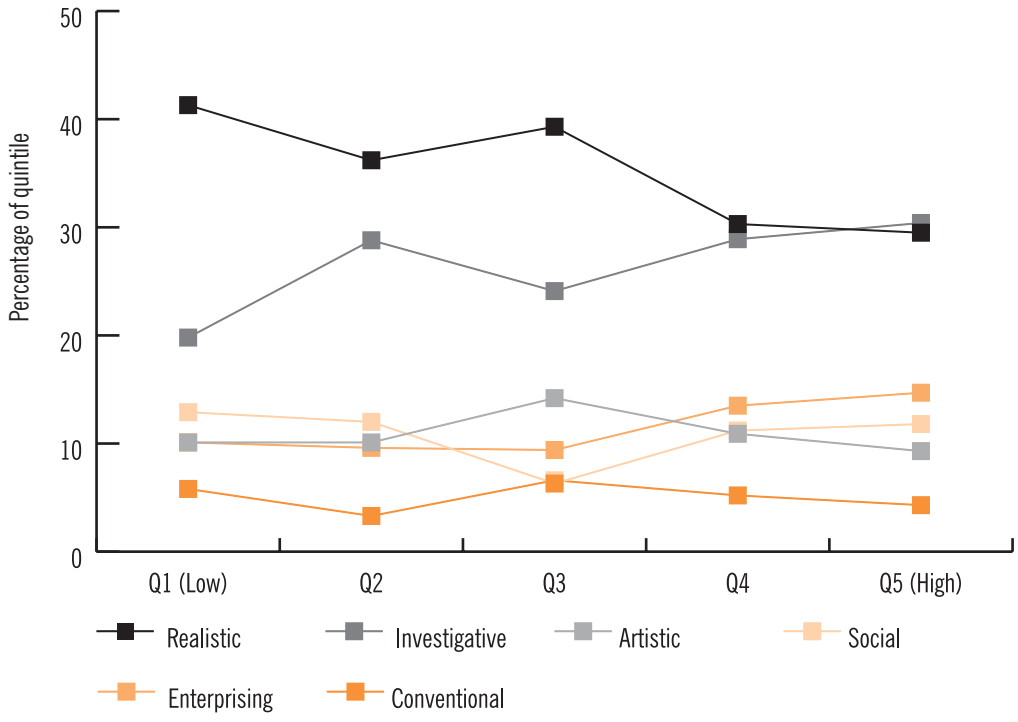


Figure 39 **Expected type of job at age 30 by quintile of family wealth (Source: OECD PISA 2000 data)**



the post-school plans of young people. In this section of the report, the relation between vocational orientation, post-school plans and a variety of indicators of lifelong learning is explored.

The PISA questionnaire asked students what occupation they expected to hold when they were aged 30. Their responses were coded into the International Standard Classification of Occupations (ISCO) at the four-digit level. ISCO is similar in structure and content to ASCO. Using a concordance provided by the *Australian Bureau of Statistics*, the ISCO codes were transformed into ASCO codes. Vocational orientation categories using the RIASEC typology (Holland, 1985, 1997) were then matched to the ASCO codes using information taken from the *Self Directed Search Occupations Finder, Australian Edition* (Holland, 2001b).

The first step in the analysis was to examine how family wealth affected occupational expectation at age 30. The sample was divided into quintiles based on the students' family wealth. Figure 39 shows that for all quintiles, both Realistic and Investigative jobs are more frequently expected than Enterprising, Artistic, Social and Conventional jobs.

Figure 40 simplifies the display shown in Figure 39 by showing only the highest and lowest quintiles of family wealth. Realistic jobs are more popular in the lowest quintile. While Realistic jobs are still commonly expected among those in the highest quintile, they are less common than in the lowest quintile. The reverse is true for Investigative jobs, which are more popular in the highest quintile.

Differences between the lowest and highest quintile proportions in the remaining types of vocational orientation are less dramatic. There are nevertheless differences between them. The frequency of Enterprising jobs is higher in the highest quintile than the lowest. The reverse is true for the remaining categories of Artistic, Social and Conventional occupations.

Figure 40 Expected type of job at 30 for the lowest and highest quintile of family wealth (Source: OECD PISA 2000 data)

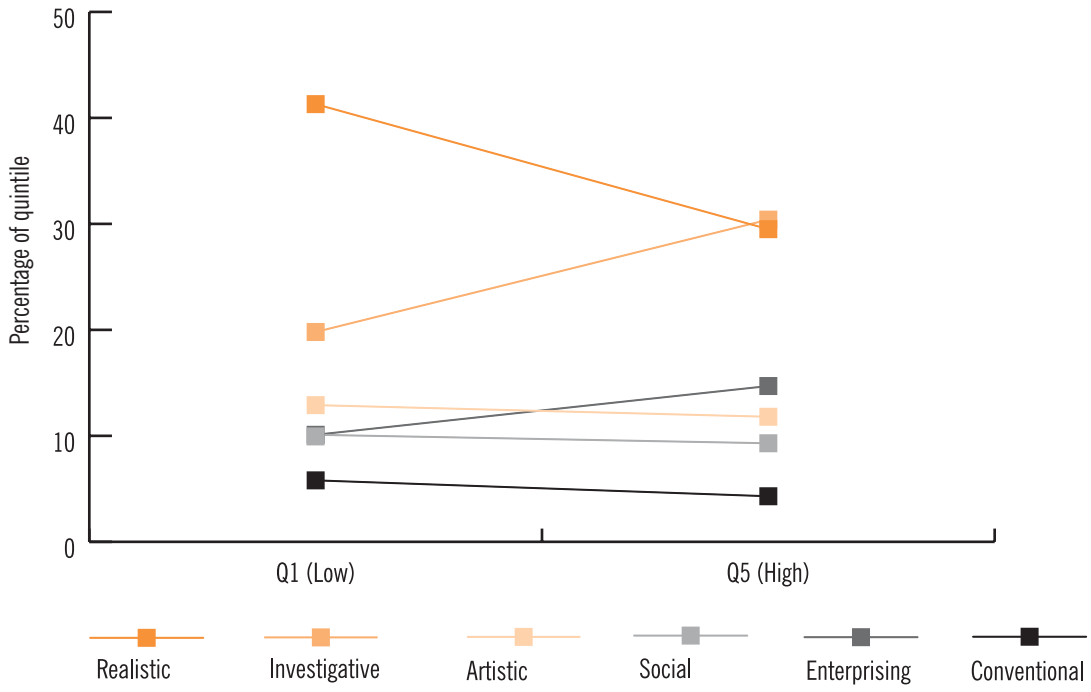


Table 11 Expected type of job at age 30 by gender.

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Female (%)	32	49	65	90	51	50
Male (%)	68	51	35	10	49	50
All respondents (%)	36	26	11	11	11	5

In addition to family wealth, gender was a significant predictor of the type of occupation expected at age 30. Table 11 shows the percentage of males and females expecting each type of occupation, and the percentage of all persons for each type.

Table 11 shows that males were more likely to expect a Realistic type of occupation and females were more likely to expect a Social or Artistic type of occupation. Males and females were equally likely to expect an Investigative or Enterprising occupation.

Predicting the expected occupational type

Two logistic regression analyses were performed to examine whether the selection of a particular occupational type can be predicted from a range of background measures and whether measures of an orientation to lifelong learning add to this prediction. Details of these analyses are found in Appendix 4. These analyses found that net of the effect of a range of family background factors and ability, lifelong learning variables improved prediction of Realistic type occupations, but did not improve prediction of Investigative type occupations.

Predicting expected socio-economic status at age 30 from background characteristics and an orientation to lifelong learning

The next step in the analysis was to examine whether an orientation to lifelong learning influenced students' expected socio-economic status at age 30. A hierarchical regression was performed with the background characteristics: ability, employment status of mother and father, tertiary qualification of mother and father, age, gender, family SES, family structure and NESB status as the first block of independent variables. The dependent variable was students' expected socio-economic status at age 30. The independent variables significantly predicted students' expected socio-economic status explaining 21% of the variance ($F(12,2502)=54636$, $p<0.0001$).

In the second block of independent variables were measures of lifelong learning. As there are more measures of lifelong learning in the PISA data set than can sensibly be included in an analysis, a range of measures were selected based on their theoretical similarity and inter-correlation with other independent variables. The variables included in the analysis were: co-operative learning, instrumental motivation, comfort and ability with computers, cultural activities of students, parental academic interest, enjoyment of reading, self-efficacy, elaboration strategies and effort and perseverance. The inclusion of these variables explained an additional 5% of the variance ($F(9,2493)=18.89$, $p<0.0001$). Significant individual predictors of expected socio-economic status were enjoyment of reading, comfort and ability with computers,

effort and perseverance, self-efficacy, instrumental motivation and co-operative learning.

The final step in the analysis was to examine whether an orientation to lifelong learning influenced students' expected socio-economic status at age 30 for the lowest socio-economic status quintile. A hierarchical regression was performed with the background characteristics: ability, employment status of mother and father, tertiary qualification of mother and father, age, gender, family socio-economic status, family structure and English language background as the first block of independent variables. The dependent variable was the students' expected socio-economic status at age 30. The independent variables significantly predicted students' expected socio-economic status explaining 24% of the variance ($N=403$, $F(11,390)=11.3$, $p<0.0001$).

In the second block of independent variables were measures of lifelong learning. The variables included in the analysis were: co-operative learning, instrumental motivation, comfort and ability with computers, cultural activities of students, parental academic interest, enjoyment of reading, self-efficacy, elaboration strategies and effort and perseverance. The inclusion of these variables explained an additional 8% of the variance bringing the total variance explained to 32% ($F(9,381)=8.8$, $p<0.0001$). Significant individual predictors of expected socio-economic status were enjoyment of reading and instrumental motivation. The use of elaboration strategies and co-operative learning styles were approaching significance. Instrumental motivation alone explained 4% of the variance in expected socio-economic status and is the best predictor once background characteristics have been taken into account.

This finding is consistent with recently completed work at the University of Melbourne. Care et al. (2003) examined the occupational interests and achievement goal orientations of Year 10 students. They found that students identified by their teacher as being 'at risk' of not successfully negotiating the transition from school to work or further study had different achievement goal orientations and vocational interests from those in their cohort. There were also differences between the interest and goal profiles of girls and boys. Girls at risk predominantly had lower scores than girls not at risk on measures of positive achievement and higher scores on performance avoidance. Boys at risk had a similar profile to boys not at risk, however they had slightly lower master goals. In relation to occupational interests 'at risk' boys had strong Realistic interests and weak interests in the other domains. In contrast girls 'at risk' had a flat profile with little interest in any of the domains.

Overview of the results from the Australian PISA data

The PISA data indicate that there is some association with family wealth and the vocational orientation of young people. Those from the lowest quintile are more likely to expect a Realistic occupation. The probability of expecting an Investigative or Enterprising occupation increased as the wealth of the family increased. There was also a strong association between gender and the type of occupation expected at age 30. Males strongly prefer Realistic occupations and females strongly prefer Social occupations. This finding is consistent with Gottfredson's (1981; 1996; 2002) theory of the development of vocational aspirations. Investigative, Enterprising and Conventional occupations were expected equally by both sexes. There was also some evidence that a lifelong learning orientation helped to predict - although only to a small extent – the probability of expecting a Realistic occupation. This finding was not reproduced for Investigative occupations.

The most important finding from the PISA data was that net of the effect of ability, family background variables and type of vocational orientation, having an orientation towards lifelong learning helped to predict the socio-economic status of the expected occupation at age 30. These indicators of lifelong learning included: (a) enjoyment of reading; (b) comfort and ability with computers; (c) effort and perseverance; (d) self-efficacy, (e) instrumental motivation, and; (f) co-operative learning. In other words, for young people with the same ability, family background and type of vocational orientation, those with an

orientation to lifelong learning will be more likely to aspire to an occupation with a higher socio-economic status.

When the same analysis was conducted for only the lowest quintile of family wealth, it was found that an instrumental motivation was the best predictor of socio-economic status at age 30, once background characteristics had been taken into account. It may not be surprising that those from the lowest quintile who expected to have a higher socio-economic status at age 30 had an instrumental motivation. Instrumental motivation is an external goal orientation – learning is seen as a means to an end. The 'end' here is a job with relatively high socio-economic status at age 30.

Chapter 5

Conclusion

The major research questions addressed in the report were:

1. What are the post-school plans of young people?
2. What factors are associated with the development of these post-school plans?
3. What is the association between types of post-school plans and pre-dispositions towards lifelong learning?

To address these questions, two data sets were used – LSAY and PISA. They helped to provide the following answers to each of the research questions.

WHAT ARE THE POST-SCHOOL PLANS OF YOUNG PEOPLE?

The study focused on the educational and occupational post-school plans of young people. These plans were most salient to the policy issues of concern to *The Smith Family.*

The LSAY data showed that in 1995, in Year 9, most young people planned further study in their first year after leaving school. However, around 40% of boys and 20% of girls planned no post-school study. A substantial minority of students – 20% of boys and girls – did not know what they would do in the first year after leaving school.

WHAT FACTORS ARE ASSOCIATED WITH THE DEVELOPMENT OF THESE POST-SCHOOL PLANS?

Post-school plans are fundamentally shaped by vocational aspirations. These aspirations arise from a process in which self assessments of one's ability and interests, as well as knowledge of various aspects of the world of work, combine to generate a view of oneself and one's location in the social world (Gottfredson, 1981; 1996; 2002). Key aspects of the world of work used by young people are: (a) the distribution of males and females within occupations; (b) the socio-economic status of occupations, and; (c) the types of persons in occupations.

The formation of aspirations is a dynamic one, linked to the cognitive development of the individual. Thus they will change over time. They will vary in their stability, clarity and the extent to which they are achievable. To explain this variation, Gottfredson uses the notions of 'circumscription' and 'compromise' to indicate how individuals develop and implement this changing view of themselves and the world of work. It was this theory which provided the key concepts used to address the question: *What factors are associated with the development of these post-school plans?* Additionally, *The Smith Family* was concerned with the importance of an orientation to lifelong learning in shaping or influencing post-school plans. In particular, young people from the lowest quintile of socio-economic status were of concern to *The Smith Family*, so many analyses focused upon the differences between this and the other quintiles.

The data suggested that a range of factors is associated with the development of post-school plans.

a. Gender had an important effect on post-school plans and on vocational orientation. Girls were more likely to plan to study than boys. The Social type of occupations strongly attracted girls, and the Realistic type of occupations strongly attracted boys.

b. Parental educational levels had a moderate effect on the post-school plans of students. Students who had parents with a degree or diploma were more likely to plan to study full-time after school.

c. Socio-economic status of the family had a weak effect on the post-school plans of students. Students from higher socio-economic status families were somewhat more likely to plan to study at a university.

d. Vocational orientation influenced post-school plans to the extent that students with a Realistic vocational orientation were much less likely to plan post-school study. They were also much less likely to plan to go to a university even if they planned post-school study. These students were also more likely to plan to go to a TAFE or become an apprentice than students with other vocational orientations.

e. Family structure made a difference to post-school plans to students from only the highest quintile of socio-economic status, with those from single or no parent families in the highest quintile being less likely to

plan to study full-time after leaving school. Family structure had no effect on post-school plans to not study or to study part-time in any other quintile of family socio-economic status.

f. While not directly related to post-school plans, it was also found that family socio-economic status did influence the extent to which young people were able to successfully implement their post-school plans, especially when those plans were for attending a university. This effect was strong.

WHAT IS THE ASSOCIATION BETWEEN TYPES OF POST-SCHOOL PLANS AND PRE-DISPOSITIONS TOWARDS LIFELONG LEARNING?

The LSAY data suggested that having an orientation to lifelong learning, as indexed by intrinsic motivation, appears to contribute to post-school plans and expectations, but its effect is weak. Ability, gender, and vocational orientation are stronger influences on post-school plans. Having an orientation towards lifelong learning appears to have around the same level of effect as the socio-economic status of the family.

The Australian PISA data showed a relationship between an orientation to lifelong learning and family wealth. This relation was typically weak to moderate depending upon the indicator used. A stronger relation was found for two indicators of lifelong learning – home educational resources, and comfort and ability with computers. This suggests that where material resources are required, family wealth has an impact.[iv]

The PISA data also showed that, for students from the lowest quintile of family wealth, having an instrumental motivation towards learning was associated with an expectation of an occupation with relatively high socio-economic status.

FUTURE DIRECTIONS

This study indicates that the post-school plans of young people are important for understanding their destinations into the world of work. These plans appear to reflect understandings of: (a) the self – including abilities, interests and gender; (b) the world of work – including socio-economic status of occupations, types of work and the distribution of the sexes within occupations; (c) the nexus between education or training and the world of work, and; (d) the location in that world to which they perceive themselves as best suited. A number of research questions and issues arise from this view of the importance of post-school plans.

1. Underpinning this view of the content of post-school plans are the theories of Gottfredson (1981; 1996; 2002) and of Holland (1985; 1997). These theories rely upon there being a general consensus among young people about the relations between occupations within the world of work. This consensus is expressed as a set of more or less accurate stereotypes about occupations. There is good evidence that people broadly share these stereotypes and that they are usually accurate (Holland, 1997, p. 10). However, for some sub-groups – for example, 'at risk' students – stereotypes may be inaccurate, incomplete and provide a misleading view of the world of work. If this is the case, post-school plans will not provide outcomes that the student is seeking.

   There is some recently available evidence that there is some variation in perceptions of the world of work. Turner and Lapan (2003, pp. 418-9) suggest that in the USA, middle-class suburban adolescents have a "better defined conceptualisation of career pathways" and construe the occupational world in different ways from inner city 'at risk' adolescents. Further, there is variation in how the world of work is construed associated with each (RIASEC) type of vocational orientation.

   Future research might usefully examine: (a) the extent to which young peoples' understandings of the relations between occupations within the world of work are accurate; (b) what is the nature and significance for post-school plans of inaccuracies, and; (c) whether the accuracy of stereotypes is evenly distributed across various sub-groups. Family background characteristics, ability levels, types of occupational orientations, or types of post-school plan could define these sub-groups.

2. The work of Care et al. (2003) indicated that there are differences between 'at risk' boys and girls in their vocational orientation. They showed that 'at risk' girls had low levels of interest in all RIASEC domains compared with 'at risk' boys who tended to have an elevated interest in manual (Realistic) type of work. Given the importance of occupational orientation in shaping post-school plans, a detailed examination of the vocational interests of young people focusing not only upon type, but also upon the degree of differentiation and consistency might extend this work. 'Differentiation' refers to the clarity of interests. 'Consistency' refers to the congruence of different types of interests – some types of interests are more like each other than other types (Holland, 1997, p.4).

   This research would investigate the extent to which:

   a. students with highly differentiated and consistent interests have clearer vocational goals and hence clearer post-school plans;
   b. 'at risk' students have poorly differentiated and inconsistent interests, and;
   c. investigating the Care et al. claim, levels of differentiation and consistency vary by sex for 'at risk' students.

3. Part of the present study used the socio-economic status of the expected occupation as an outcome of the post-school plans of young people. Other criteria might be used (Crook, 1997), including happiness, quality of life or job satisfaction. This approach implicitly focuses upon the goals of the individual as outcomes and may therefore provide a richer index of the success of post-school plans.

4. The focus of vocational psychology is upon the individual. The individual is seen to be more or less autonomous and so capable of making choices. As Holland notes of his own work:

   ...my thinking has been shaped by my work in counseling centers, in hospitals, and in my curbstone counseling of adolescents and adults. I have become addicted to seeing careers from an individual's perspective – how can a person's difficulties be resolved within the present personal and environmental resources? (Holland, 1997, p.vi)

   There is a contrasting tradition in the sociology of education (Bowles & Gintis, 1976; Taylor, 1983) that argues working class children are not given a 'choice', instead social relations drive their social destinations. This view, if correct, implies that young people from low socio-economic backgrounds have a different relationship to the world of work from others. These young people presumably do not see a linkage between their interests, ability, gender, post-school plans and the world of work, which allows them to exercise a choice about their post-school destinations.

   To investigate the extent to which this proposition is true, it will be necessary to move beyond obtaining measures of 'locus of control' – the young people may have a strong internal locus of control but not apply it to the world of work. The research should consider:

   a. how young people from low socio-economic families view their relationships to the world of work;
   b. how these views are related to their interests, abilities, and gender, and;
   c. how this set of views relate to post-school plans.

   Such a study could also consider how these young people plan to give expression to their abilities and interests if they do not direct them towards the world of work.

POLICY IMPLICATIONS

This research may have implications for policy development in a number of areas relating to the importance of education and lifelong learning for young people who will face the challenges of a 21st century knowledge economy, either for further education and training or work. If at the end of schooling students are making post-school plans which are known to have a relationship with outcomes, then it is in these plans that the effects of education are first being translated into action.

This suggests that there are two elements needed to support students in the formation of school plans that are linked to realistic outcomes. The first is to ensure that educational opportunities are available and support is provided to ensure those opportunities are taken; the second is to ensure that this education is turned to good purpose. Post-school plans in themselves are an indicator of the extent to which education and the advantages that accrue from it are being maximised. Whether post-school plans come to fruition may also be another indicator.

The identification of the content of post-school plans, an understanding of their psychological significance for the individual and an appreciation of the processes underlying their development and change may provide an opportunity for the extension of education support programs to include the elaboration and development of post-school plans. For example, in rural Australia, many towns are in decline with a loss of employment opportunities, in part due to the removal of public and private services (for example, bank branches). A young country person, who plans a university education, contends with not only a geographic dislocation, but also a social dislocation away from friends, family, as well as rural lifestyles and values. To plan to go to university involves the decision to move out of the district for typically there is limited opportunity for professional work in rural areas. The dislocation is likely to be permanent. In this context, a program of support might provide information to assist in establishing the effects of these plans, and the options that might be exercised to mitigate some effects.

However, the post-school plans of students involve issues that go beyond those of the individuals who make them. Post-school plans impact on the community from which the young people come. Young people leaving a town, for example, may undermine the long-term viability of their community. This suggests that there needs to be processes of community development that include considerations of post-school plans. As The Smith Family argues, initiatives for community development should focus on collaboration between government and non-government sectors and the communities involved. Given that post-school plans typically involve these sectors, this suggests that there should be scope for systematic development of a nexus between the individual making plans and the opportunities and limitations available with the community. This would help young people fulfil their expectations – both material well-being and personal fulfilment – while also contributing to community development.

CONCLUDING COMMENTS

Overall, post-school plans are influenced by the gender, ability and vocational orientation of the student. There was some evidence that students have a good understanding of these characteristics, and plan their post-school destinations accordingly. Having an orientation to lifelong learning also has an effect on post-school plans, but it appears on the LSAY data to be small. It was more powerful with the PISA data. This may suggest that PISA provides a better set of indicators of lifelong learning than LSAY.

These findings suggest that policies designed to enhance student outcomes, by encouraging the development of a positive lifelong learning orientation and encouraging students and their families to formulate post-school plans, may need to consider the gender, interests and abilities of young people. This may mean acknowledging that, typically, girls have different interests from boys, that most young people have a good idea of their abilities and what they expect that they can reasonably achieve. They will also typically have a general sense of what type of work they would like – and where they do not know this, it is very probable that they will know what kind of work they do not want to do. A program designed to be crafted on this understanding of how young people see themselves and the world of work will be more likely to succeed than one which seeks to engineer young people into destinations defined as 'good' using criteria that they do not judge relevant.

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Appendix 1: Post-school plans and Holland's RIASEC typology: a theoretical framework

This appendix provides a theory for understanding the post-school plans of young people. This theory begins with defining the concept of 'post-school plans'. It then explains the content and dynamics of the formation of post-school plans. This is achieved by arguing continuity between individual characteristics, education and the world of work.

This argument is based on a theory of the development of occupational aspirations described by Gottfredson (1981; 1996; 2002). Her theory proposes that preference for an occupation is driven by an individual's interests and his or her perception of themselves and of their location within society. Gottfredson's theory is elaborated using the ideas of Naylor (1993; 1997), suggesting that the same factors shaping occupational preference also shape educational preferences and choices.

Gottfredson's Theory

Gottfredson (1981; 1996; 2002) proposed a theory of the development of occupational aspirations, at the centre of which was the notion of the 'self-concept'. The self-concept is, as she writes, "one's view of who one is and who one is not". Such a view will "more or less consciously" include views about one's abilities, interests, personality and 'place in society' (Gottfredson, 1981, p. 547). For Gottfredson, people "act on their beliefs about themselves". To understand an individual's occupational preference or aspiration it is necessary to understand their beliefs about themselves and their location within the social world.

The development of the 'self-concept'

According to Gottfredson, the 'self-concept' develops in ways described by Van den Daele. For Van den Daele (cited in Gottfredson, 1981, pp. 554 and following), the development of the self-concept is driven by the cognitive development of the individual. Cognitive development occurs in stages. With each stage of cognitive development there is a new stage in the development of the self-concept. Gottfredson then argues that with each of the first four stages, there are four corresponding stages in the development of occupational aspirations.

Table 12 shows Gottfredson's summary of the four stages of children's cognitive development proposed by Van den Daele. It also shows the corresponding stages proposed by Gottfredson. It shows that children first understand that occupations are adult roles. This understanding typically develops between the ages of 3 and 5 years. In the second stage, children learn to discriminate gender. Children are able to distinguish between occupational images based on sex type. The second stage occurs between the ages of 6 and 8 years. In the third stage, children learn to discriminate between 'social class' levels. They can distinguish between occupational images based on social prestige level. At this stage children also recognise differences in intelligence. The third stage of cognitive development emerges between the ages of 9 and 13 years. In the fourth stage children learn to distinguish between such psychological characteristics as personality, interests, values and competencies. They can, for the first time, identify occupational types. This fourth stage occurs from the age of 14 years onwards.

Circumscription

Gottfredson argues that as each stage of cognitive development is entered, individuals are able to form more abstract views of their self-concept. Once this view is perceived, individuals make a fresh judgement about the compatibility of their self-concept with an occupational image. This judgement will lead individuals to perceive some occupations as no longer desirable, and this in turn will lead to a change in their career plans. Typically, they will no longer be interested in occupations that are incompatible with their self-concept.

Thus, at the second stage of cognitive development, those occupations perceived to be of the 'inappropriate' sex type will be identified and judged by individuals to be no longer desirable. At the third stage, occupations with an 'inappropriate' social prestige level will be identified. Finally, at the fourth stage of cognitive development,

Table 12 Summary of the four stages in the development of the self-concept and occupational preferences proposed by Gottfredson

	Stage 1:	Stage 2:	Stage 3:	Stage 4:
Stage of cognitive development	Orientation to size & power	Orientation to sex roles	Orientation to social valuation	Orientation to internal self
Age	3-5	6-8	9-13	14 and over
New elements in perception of self and others	Little v Big	Gender	Social class and intelligence	Personal values, competencies, interests
New elements in occupational perceptions and preferences	Occupations as adult roles	Sex type	Prestige level	Field of work

(Source: Gottfredson, 1981)

occupations of an inappropriate type will be identified. With this sequence the number of acceptable occupations – occupations that are congruent with the individual's self-concept – is reduced. This process Gottfredson names 'circumscription'.

In this way, the development of career aspirations is a process driven by an increasingly refined understanding, both of one's self and of the world of work. As this understanding becomes more sophisticated, so the number of preferred occupations is reduced, until an occupation can be named as the one for which the individual aspires.

Compromise

Once the process of circumscription is completed (around Year 10), young people try to implement their preferences. In doing so they encounter a number of constraints – the level of effort required, accessibility, cost and so on – which lead them to broaden their range of preferences. This process is called 'compromise'. Thus, the expression of an occupational aspiration is the outcome of the competing processes of circumscription and compromise.

Interests

Through the processes of circumscription and compromise individuals identify locations in the world of work defined by sex type and social status. This location is further delimited by the amount of effort required to obtain an occupation. Gottfredson (1981) sees this being set by the ability of the individual. Gottfredson's work also shows that within the world of work there are sectors associated with distinct types of work. For example, scientific types of occupation tend to have high social status, and typically have a higher proportion of males working in them. Manual types of occupation tend to have low social status and a high proportion of males working in them. Clerical jobs tend to have low social status and a high proportion of females working in them. Drawing on the work of Holland (1985; 1997), Gottfredson shows that these sectors are associated with individual occupational interests. Thus, there is not just a cognitive component to occupational aspirations but a personality component that is expressed by a liking for particular types of occupation.

Generic interests

Naylor (1993) shows that occupational interests can be regarded as generic. They are an expression of a deep trait that is consistently expressed in different contexts. He argues the relationship between types of interests and the types of jobs that people prefer can also be observed when examining educational preferences. That is, types of interests, types of occupations preferred, and types of educational courses preferred tend to be congruent with each other. This argument has received some empirical support (Harvey-Beavis & Elsworth, 1998).

For Gottfredson and Naylor, interests are conceptualised in terms of John Holland's 'RIASEC' typology (Holland, 1985, 1997). Holland classifies occupations and occupational interests into six broad types:

1. Realistic: a person with Realistic interests is attracted to occupations and activities involving manual or physical work. Examples of Realistic occupations include: plumber, motor mechanic, mechanical engineer, chef;
2. Investigative: a person with Investigative interests is attracted to occupations and activities involving abstract or conceptual work. Examples of Investigative occupations include: mathematician, scientist, medical doctor;
3. Artistic: a person with Artistic interests is attracted to occupations and activities involving literary or artistic work. Examples of Artistic occupations include: actor, journalist, music composer, dancer;
4. Social: a person with Social interests is attracted to occupations and activities involving caring or nurturing work, especially with people. Examples of Social occupations include: nurse, primary school teacher, receptionist, clinical psychologist;
5. Enterprising: a person with Enterprising interests is attracted to occupations and activities to do with money and the exercise of power. Examples of Enterprising occupations include: finance manager, real-estate agent, lawyer and member of parliament;
6. Conventional: a person with Conventional interests is attracted to occupations and activities associated with running an office or routine collection, storage or retrieval of information. Examples of Conventional occupations include: meter reader, clerk, computer database manager, and accountant (Holland, 2001b; Shears & Harvey-Beavis, 2001).

For Naylor, there should be a consistent pattern expressed in educational and occupational interests and preferences. For example, an individual with Investigative interests will be more likely to choose science-type subjects at school, science-type courses in post-school educational institutions, and to seek a scientific job.

The next section shows what evidence there is to support this view concerning school subjects and university course preferences. The evidence concerning interests and occupational choice is well established (Holland, 1985, 1997).

School subject choice and interests

Care and Naylor (1984), employing the RIASEC dimensions to measure interests, showed that subject choice at school is related to the vocational interests of individuals.

Using a sample of 1,814 Year 10 students from Australian schools, they presented the students with 31 different school subject titles and asked them to indicate the extent to which they liked them. Factor analysis of the data indicated there were six underlying dimensions that could be systematically related to Holland's RIASEC typology. Their results are summarised in Table 13. It can be seen that there were six factors identified, of which two were construed as Investigative. There were also Artistic, Realistic, Conventional and Social factors identified. Table 13 also shows that there was no Enterprising factor identified. Despite the less than perfect fit to the RIASEC types, these results support the view that school subject preferences are shaped by vocational interests.

Ainley et al. (1990) reported on a large-scale study of school subject choice in Australia. There were 22,047 Year 12 students and

Table 13 Six dimensions in the subject preferences of school students reported by Care and Naylor

Dimension	Subjects loading on the dimension
Artistic	Art, Creative writing, English composition, Debate, History, Literature, Music, Poetry and Speech
Realistic	Carpentry, Electronics, Mechanical drawing, Metalwork, and Woodwork
Investigative (Mathematics)	Algebra, Arithmetic, General mathematics, and Geometry
Conventional	Bookkeeping, Office practices, Typewriting
Social	Health, Home economics, Physical education, Social studies
Investigative (Science)	Chemistry, General science, Physics

(Source: Care & Naylor, 1984)

24,932 Year 11 students from the six Australian States in the study (Ainley et al., 1990, p. 16). The authors drew upon the work of Holland by relating individual interests to the subject areas in which students were enrolled. Some of the key findings from the Ainley et al. study included:

1. Students with the strongest Investigative interests were three times more likely to enrol in 'physical science' subjects[3] than those students with weak Investigative interests;
2. Enrolment in Mathematics was strongly associated with Investigative interests;
3. There was a negative association between Investigative interests and enrolment in Humanities and Social Sciences[4], the Creative and Performing Arts and Physical Education subjects;
4. Students with the strongest Realistic interests were around 10 times more likely to enrol in Technical Studies than those with weak Realistic interests;
5. Students with high Artistic interests had high levels of enrolment in the Creative Arts and the Performing Arts, as well as in language subjects. These students were unlikely to enrol in Computer Studies, Technical Studies and the Physical Sciences;

Students with high Conventional interests were more likely to enrol in Home Science, Economics and Business subjects. They were less likely to enrol in Physical Sciences and Agriculture subjects (Ainley et al., 1990, pp. 83-86).

These results have been well replicated (Ainley, Robinson, Harvey-Beavis, Elsworth, & Fleming, 1994).

Other factors known to shape school subject choice include: (a) socio-economic status of the family; (b) school type (Catholic, private and government); (c) achievement in earlier years of schooling; (d) language background – coming from a non-English speaking background is associated with a reduced

3.Examples of 'Physical science' subjects are physics and chemistry (Ainley et al., 1990, p. 7).

4.Examples of 'Humanities and Social Sciences' subjects are history, geography, social psychology, general studies, society and culture, social studies, politics (Ainley et al., 1990, p. 7).

enrolment in English-language intensive subjects, and; (e) gender (Ainley et al., 1990; Ainley et al., 1994; Fullarton & Ainley, 2000; Myhill, Herriman, & Mulligan, 1994).

The relationship of interests to fields of study

It has been demonstrated empirically that fields of study can be identified from clusters found in applications to tertiary institutions, and that these fields can be meaningfully mapped to the Holland typology of interests (Harvey-Beavis & Elsworth, 1998).

Table 14 shows the relationship between the RIASEC classification of interests and fields of study. Consider those Year 12 students who had interests measured as 'Social'. Typically, they preferred a course from the 'Applied Social Science, Child Care and Teaching, Health Studies, Community Service and Sport and Recreation' field.

Interests and post-school plans to commence family formation

There is no known research on the influence of interests on post-school plans where these plans involve forming a new family. One hypothesis is that Social interests might be associated with having a preference for starting a family.

OVERVIEW OF THE THEORY

This appendix aimed to provide a clear understanding of the content and origin of post-school plans.

Post-school plans mainly involve educational and occupational elements. The formation of these elements emerges from a process of circumscription and compromise. Circumscription sees the universe of options narrowed with an increasing understanding of the main dimensions of the social world. Compromise involves expansion as ideal preferences encounter the difficulties of implementing preferences. Driving these dynamics are underlying personality traits which shape the content of preferences. As a consequence, post-school plans – occupational and educational aspirations – are closely related, and can be classified using the same typology of interests.

Table 14 The relationship between the RIASEC classification of interests and fields of study

Interest type	Field of study
Realistic	—
Investigative	Building and Design, Engineering and Computing, and Professional and Applied Science (including Medicine and Dentistry)
Artistic	Visual Arts and Music
Social	Applied Social Science, Child Care and Teaching, Health Studies (but not Medicine or Dentistry), Community Service and Sport and Recreation
Enterprising	Humanities, Social Science, and Communications (e.g. Journalism)
Conventional	Business, Commerce, Law, Hospitality, Business Languages, and Library and Information Processing

(Source: Harvey-Beavis and Elsworth, 1998)

A NOTE ON HOLLAND'S WORK

In 1995, John Holland was awarded the American Psychology Association's award for Distinguished Contributions to Knowledge. This recognised his work over some 40 years in the area of vocational psychology and careers counselling. His ideas have come to form one of the dominant theories of vocational psychology in the USA, Australia and many western industrial countries. They have been widely adapted and used in vocational tests (Holland, 2001a, 2001b; Naylor, 1997), in occupational classifications used by statistical agencies (Department of Employment and Industrial Relations and the Australian Bureau of Statistics, 1983), career guidance programs (Nanyang Technological University National Institute of Education, 1993; US Department of Labor Employment and Training Administration, 2000), related undertakings (Gottfredson & Holland, 1989, 1996; Rosen, Holmberg, & Holland, 1994), and a wide range of academic research endeavours (Ainley, 1993; Ainley & Elsworth, 1997; Ainley et al., 1990; Ainley et al., 1994; Elsworth, Harvey-Beavis, Ainley, & Fabris, 1999; Elsworth, 1994; Elsworth & Day, 1987; Gottfredson & Holland, 1989, 1996; Gottfredson, 1981, 1996; Grandy & Stahmann, 1974; Holland, 1985, 1996, 1997; Lokan & Taylor, 1986; Naylor, 1984, 1993; Naylor et al., 1997; Spokane, 1996). The *Journal of Vocational Behavior*, devoted its August 1999 issue[5] to review the contribution of Holland.

At the heart of Holland's work is a typology used to classify both the interests of individuals and the environments that are associated with occupations. Using this typology it is possible to identify the types of occupations that someone is likely to seek out by measuring their interests. (This is something careers counsellors are concerned to do, as are human resource management personnel when appointing or reorganising staff.) For example, in Holland's theory, if a person has artistic interests they are likely to seek out work which involves, encourages and rewards them for the display of artistic behaviours, competencies and achievement. If this person is put into another environment, one for example that encourages and rewards the accurate recording and retrieval of data in a routine way, then they are likely to be dissatisfied, feel incompetent and seek an escape from it to one which is more congruent with their interests.

The simplification of Holland's theory, in this way, appears to reduce it almost to banality. But it is deceptively complex and surprisingly powerful. It provides an efficient way to link a huge amount of information about the characteristics of people and of occupations. In doing this, it places the individual at the heart of understanding the dynamics of career choice. This approach should also remind various schools of social engineers that the demands 'of the economy', or of 'society' are not to be successfully met by compelling, or forcefully advising, individuals to undertake roles in which they are not interested. The choices made by young people are best accepted by policy makers and educationalists (as long as the students are sufficiently well informed). At first such a view seems uncontroversial, but it has been criticised for being unduly conservative, especially when programs are developed to encourage girls into non-traditional careers, or boys interested in relatively low social status occupations (for example, labouring) to seek 'better' ones by staying at school longer.

The RIASEC classification that Holland has developed has been shown to be stable across time and across cultures in many studies (Holland, 1997, p.78 and following). Most recently, in Australia, the work of Naylor (1997) in the development of the *Australian Interest Measure* has empirically confirmed the existence of six types of interest interpretable using the RIASEC classification.

The way the RIASEC classification is used in this appendix suggests that it is simplistic because it uses so few categories to classify people and occupations. In counselling, the RIASEC classification is used to describe an individual's interest *profile*. For example, a person interested in engineering is likely to have very strong Investigative interests, but

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also to have strong Realistic interests and moderate Conventional interests. This person would be classified as having an IRC type. Such an approach means that in a career counselling setting the interests of an individual can be classified into one of 720 different types. Similarly, occupations can also be classified into 720 different types. In practice there are not enough occupations to use all of the available 720 categories. For example, there are only some 300 occupations at the four-digit level of the *Australian Standard Classification of Occupations* (Australian Bureau of Statistics, 1996). See Appendix 2 for examples of four-digit level occupations. Further, the stability, strength and the clarity of individual interests are also considered in the counselling setting.

For the research reported here, the level of refinement used in a counselling setting is neither justifiable (the data are not measured well enough), nor necessary (only broad patterns are being investigated).

For further information on Holland's work, there can be no better source than his most recent edition of *Making Vocational Choices* (Holland, 1997). This is a book that is easy to read, evidenced on every key point and thorough. His gruff directness is most refreshing.

Appendix 2: Recoding Occupational titles into RIASEC categories

The recoding of LSAY data into RIASEC categories was based on information provided by the *Self Directed Search Occupations Finder, Australian Edition* (Holland, 2001b), which matches occupations classified into RIASEC categories to the *Australian Standard Classification of Occupations* (ASCO). The LSAY data use ASCO to classify occupational titles.

ASCO is a hierarchically structured classification. The classification at the highest level of generality uses a one-digit code. At the lowest it uses a six-digit code. Consider the example below of *Intermediate Production and Transport Workers* – a category from the highest level of ASCO. Within this classification, there is a set of more detailed occupational titles coded at the two-digit level. In the example below, one of these occupations is listed – *Road and Rail Transport Drivers*. Within this category there are a number of yet more detailed occupational titles coded at the four-digit level. One of these is listed in the example below – *Truck Drivers*. Finally, at the lowest level of generality in ASCO there are occupational titles coded to six digits. In the example below two titles are given – *Heavy Truck Drivers and Furniture Removalists*.

The *Occupations Finder* (Holland, 2001b) uses six-digit ASCO codes and LSAY data use four-digit ASCO codes. To allocate a RIASEC category to an ASCO four-digit category, the RIASEC values for the set of six-digit codes, subsumed within the ASCO four-digit code, were listed and the modal RIASEC value chosen. The plausibility of this code was then checked against the occupational title at the four-digit level using expert judgment. All allocated codes using this method appeared plausible. Tied, bimodal distributions were treated as missing, so some four-digit ASCO codes were not allocated a RIASEC category.

Table 15 shows the (weighted) number of respondents for each RIASEC type. Realistic occupations were the most often cited by students. These tend to be relatively low socio-economic status jobs often involving manual (skilled and unskilled) work. These types of jobs predominantly have more males than females working in them. The distribution of respondents across the types does not, however, strongly reflect the distribution seen in the Australian workforce. This distribution can be seen in the far-right-hand column of Table 15. (Data were taken from the 1996 Australian Census of Housing and Population.) There is a much higher proportion of LSAY respondents with Investigative and Artistic orientations than positions available in the Australian world of work. Both types of work are difficult to access: Investigative occupations because of the amount of education required, Artistic occupations because there are not many of them, and there are few places available. This discrepancy in the distribution of types of vocational orientation for LSAY respondents and the distribution of opportunities in the world of work suggests that for some respondents the process of compromise, as described by Gottfredson (1981; 1996; 2002), has yet to be completed, and that therefore some post-school plans will need to be modified.

7 Intermediate Production and Transport Workers

73 Road and Rail Transport Drivers

7311 Truck Drivers

7311-11 Heavy Truck Drivers

7311-13 Furniture Removalists

Table 15 Number of respondents for each type of vocational orientation and the proportion of persons in each type of occupation, Australia 1996

RIASEC Type	Weighted n	%	% in Australian population
Realistic	1065.1	27.7	38.5
Investigative	930.9	24.2	8.0
Artistic	528.4	13.7	1.3
Social	708.4	18.4	25.5
Enterprising	332.8	8.6	14.9
Conventional	285.5	7.4	11.7

(Source: Australian Bureau of Statistics Census of Housing and Population, 1996)

Appendix 3: Overview of the Australian PISA data

In Australia, a total of 5176 students were tested and surveyed. These students were randomly selected from within 231 randomly selected schools. All students were aged 15 years at the time the sample was drawn. The sample was a nationally representative sample of the population of 15-year-old Australian school students with a capacity to complete the tests or questionnaire. There was some 'over sampling' in Australia to ensure that enough indigenous students participated in the study (Lokan et al., 2001, pp. 16 and 17).

A number of indices are reported below and some are calculated on a standardised score that uses the OECD population average as zero on the scale. This means that if Australia scored below this average, sometimes all scores will fall below zero. This is a function of the scaling procedure and is not an indication of whether the students responded positively or negatively.

The background characteristics of the PISA 2000 sample are presented in Table 16. These are provided to give a sense of the characteristics of the respondents in each quintile of socio-economic status.

The participants are divided into socio-economic status quintiles as measured by the PISA family wealth variable (OECD, 2001, p. 142). The ownership of various possessions in the family home were used as indicators of family wealth. Students were not asked to provide estimates of family wealth.

Those in the lowest quintile are more likely to be female, living in a single parent household, have a father who is not tertiary educated and not working full-time. In addition, those in the lowest quintile are slightly more likely to speak a language other than English at home and were more likely to have been born overseas.

Table 16 Characteristics of students by socio-economic status quintiles expressed as percentages

		SES Quintiles					Overall
		Lowest	Low	Average	High	Highest	
Sex	Male	46	51	55	53	56	52
	Female	54	49	45	47	45	48
Birth Year	1984	63	64	62	62	63	62
	1985	38	36	38	38	37	38
Family Structure							
	Single	35	20	11	9	6	17
	Nuclear	52	67	77	79	81	71
	Mixed	10	11	9	10	8	10
	Other	3	2	3	2	4	3
Fathers' Current Status							
	Working FT	67	77	85	89	91	82
	Working PT	10	7	4	3	3	6
	Looking	7	5	2	2	2	4
	Other	16	11	8	7	4	10
Father's Tertiary Ed							
	Yes	22	31	33	38	46	33
	No	78	69	67	62	54	67
Language at Home							
	English	83	84	87	87	86	85
	Other	17	16	13	13	14	15
Country of Birth							
	Australia	86	87	89	89	91	88
	Overseas	14	13	11	11	9	12
Fathers' Country of Birth							
	Australia	65	70	70	68	68	68
	Overseas	35	31	30	32	32	32
Mothers' Country of Birth							
	Australia	68	70	70	71	69	70
	Overseas	32	31	30	29	31	30
N of respondents		1112	1061	1190	1046	767	5176

(Source: OECD PISA 2000 data)

Appendix 4: Predicting expected occupational types

Two logistic regression analyses were performed using Australian PISA data to examine whether the selection of a particular occupational type can be predicted from a range of background measures and whether measures of an orientation to lifelong learning adds to this prediction.

Dichotomous variables were created with 1 for the RIASEC occupational group of interest and 0 for the remaining groups. For logistic regression to work effectively the dichotomous dependent variable should be relatively evenly split. As this is not the case for the Artistic, Social, Enterprising and Conventional occupational groups, logistical regressions were only performed using the Realistic and Investigative types.

Realistic occupations

A two stage hierarchical logistic regression was performed to examine whether social background and an orientation to lifelong learning predict the expectation of a Realistic type of occupation. As the frequency of Realistic occupations was 34% the base-line correct classification rate was 66%. In the first block the following background variables were included as independent variables: a measure of ability, family structure, father's employment status, gender, family wealth, father's education and the home language. These variables significantly improved the odds ratio of correctly classifying participants as expecting a Realistic occupation (N=2258, $x^2(9)=17990$ $p<0.0001$). These variables explained 14%[6] of the variance in selection of a Realistic occupation and the classification rate improved from 66% to 73%.

In the second block were the background variables and the following measures of lifelong learning – participation in cultural activities, cultural communication with parents, ease with computers, effort and persistence when learning, self-efficacy as learner, interest in maths, instrumental motivation and cooperative learning. These variables significantly improved the odds ratio of correctly classifying participants as expecting a Realistic occupation (N=2258, $x^2(10)=4952.8$ $p<0.0001$). The inclusion of lifelong learning variables explained a further 4%[7] of the variance in the selection of a Realistic occupation. The classification rate improved a further 2% from 73% to 75% with the inclusion of the lifelong learning variables.

Investigative occupations

The prediction of an investigative occupation from background characteristics and lifelong learning orientation variables was significant. However as the frequency of an expectation of obtaining an investigative occupation was only 26% the baseline predictability was 74%. The inclusion of these variables did not improve the predictability of a preference for an Investigative type of occupation beyond this baseline and therefore has no practical utility.

6. Cox and Snell R Square. Nagelkerke R Square =.20.

7. Cox and Snell R Square= 18. Nagelkerke R Square =.25.

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End notes

i The LSAY research program is managed jointly by ACER and the Commonwealth Department of Education, Science and Training. LSAY data are publicly available from the Social Science Data Archives, Australian National University, Canberra.

ii For Holland, the personality type most disliked by Realistic is the Social type (Holland, 1997, p. 35).

iii According to Kerlinger and Pedhazur (1973, p. 3), regression is a method for investigating "the collective and separate contribution of two or more independent variables ... to the variance of a dependent variable." It is, essentially, an elaboration of correlational studies using the product moment coefficient of correlation (r). This coefficient, Kerlinger and Pedhazur (1973, pp. 11-12) argue, is an 'index' of the strength and direction of relations between 'sets of ordered pairs'. This index is expressed as an equation in which an estimate of the unique contribution of each independent variable to the prediction of the dependent variable. These values help to establish whether an independent variable makes a real (statistically significant) contribution, and if real, the strength of its contribution. By comparing the strength of each independent variable it is possible to show their relative importance.

The regression procedure provides not only information about the strength and direction of the relation, but also the coefficient of determination (R2). This coefficient indicates the proportion of the variance observed in a dependent variable that is accounted for by the independent variable(s) entered into the regression equation. More precisely, it shows what proportion of variance is attributed to the 'linear combination' of the dependent variable(s) (Kerlinger & Pedhazur, 1973, p. 39). This value helps to assess the extent to which the set of independent variables provides an adequate account of changes in the dependent variable. For example, if the analysis shows that a group of dependent variables accounts for 1% of the variance in the independent variable, then these variables are not likely to be useful or to provide an adequate account.

For the analysis of post-school outcomes, where the dependent variable is dichotomous, a modified regression technique is used called 'logistic regression'.

iv This is a finding consistent with that reported in The Smith Family's *Barriers to Participation* report (Zappalà 2003) that showed higher income families spend proportionately more on education than lower income families.

Notes

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