

Using Census data to inform aspects of The Smith Family's program

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This is an updated version using 2001 Census data. The original paper used 1991 Census data. Results and so also the discussion differ slightly from those given in the original paper. A number of errors from the original paper have also been fixed. The major conclusions remain unchanged.

Abstract

The Smith Family aims to be an evidenced-based organisation and the Australian Census of Housing and Population has provided an important source of information. This paper outlines one example of how Census data were used by The Smith Family. Census data were used to check the truth of a theory of the development of vocational aspirations (Gottfredson 1981; 1996; 2002). Once its likely truth was established, this theory was used to identify a rich set of criteria that could be used for assessing outcomes of The Smith Family's educational scholarship program Learning for Life.

Using Census data to inform aspects of The Smith Family's program

The Smith Family (TSF) is a national, independent, social enterprise that supports disadvantaged Australian children and their families to create a better future through education.¹ It aims to be an evidenced-based organisation and the Australian *Census of Housing and Population* provides an important source of information. This paper illustrates how TSF has used Census data to inform one aspect of its work.

Background

The Learning for Life program

It is The Smith Family's view that education unlocks opportunities for disadvantaged Australians. Studies have shown, for example, that students may choose school subjects because their families cannot afford the cost of preferred alternatives and that parents can feel anxious about not being able to provide the uniforms and 'extras' that other children can enjoy (Orr 1994; The Smith Family 1997). There is also some evidence that parents keep children away from school because they cannot pay the required costs of school activities (Grogan 1997). A key objective of The Smith Family's work therefore is to make the educational experience of students from financially disadvantaged backgrounds more participatory and inclusive. (See Smyth et al 2002, for a more detailed account of the research.)² Learning for Life is the Smith Family program designed to achieve this outcome. Learning for Life provides children and their families with access to personal and financial support through qualified staff and volunteer mentors and access to additional programs, advocacy, emotional guidance and referrals to specialist services. It currently provides Learning for Life scholarships to around 25,000 children and young people.

The Smith Family research program

The Smith Family aims to be an evidence-based organisation and so has an internal research capacity. It also commissions or supports the work of external research agencies.

¹ More information on The Smith Family can be found at: <http://www.smithfamily.com.au/>

² Available at: http://www.smithfamily.com.au/documents/briefing_paper11_68365.pdf

The focus of The Smith Family research is to:

- examine the different forms of disadvantage in the Australian community and its impact on individuals, families and communities;
- promote social capability through research into the processes of prevention and early intervention and education that build capacity for individuals, families and communities, and;
- evaluate internal programs and contribute to program development and enhancement.

These research priorities are a part of a long-term Smith Family agenda for:

- increased opportunities for participation and engagement;
- the strengthening of families in the context of community regeneration/renewal;
- innovation enterprising sector leadership;
- sustainable societal change;
- a societal culture of inclusion.

With this long-term focus, it has been important for The Smith Family's research program to consider not just the short-term outcomes of Learning for Life, but also longer term outcomes. It is in considering some of these longer term outcomes that Census data have been especially important.

Use of data from the Australian Census of Housing and Population

An on-going issue for the evaluation or assessment of a program such as Learning for Life is what is to count as a successful outcome. One measure, widely used in sociological research, is the extent to which social mobility occurs between generations (Blau & Duncan 1967; Featherman 1981; Ganzeboom et al 1991; Jencks et al 1972; Marks & Jones 1991; Sewell et al 1970; Sewell & Hauser 1993; Svalastoga 1965). On this criterion, if participants achieve higher socio economic status than their parents, then the program would be judged a success. However while this has a number of pragmatic advantages in terms of the conduct of research – it is relatively easy to obtain the names of occupational titles in a survey – from a policy perspective, a richer set of outcomes is desirable. In particular, outcomes need to be conceived in such a way that a person who attains a low socioeconomic status occupation which they enjoy, take pride in, or to which they see themselves as well suited does not count as a failure for the program. However it is difficult to know if this good match between people and positions has been achieved.

One possible solution to this problem emerged from work undertaken for The Smith Family by the Australian Council for Educational Research (Beavis et al 2005a; Beavis et al 2005b; Beavis et al 2004). This research drew upon the traditions of vocational psychology, in particular the work of Holland (1985; 1997) and Gottfredson (1981; 1996; 2002). Central to this undertaking was the use of Census data.

Gottfredson's Common Cognitive Map of Occupations

In her developmental theory of occupational preferences and choices, Gottfredson (1981; 1996; 2002) links perceived sex role and social prestige with the 'type' of occupations to provide a graphical representation of occupational stereotypes and a theoretical account of the development of occupational preferences and choices. Gottfredson (1981; 1996; 2002), proposed that occupational stereotypes consist of mental images of the world of work that are shared by people. These images may be described in terms of a 'common cognitive map of occupations' which is bounded by the social prestige of occupations and the extent of their sex typing. Prestige and sex-type thus define the coordinates within which types of work are located.

The classification of types of work used in Gottfredson's common cognitive map of occupations derives from Holland's (1985; 1997) 'RIASEC' typology, which proposes that people can be categorised in terms of six personality types. There are also six types of work environment, each one of which is "dominated by a given type of personality" (Holland 1985, p. 3), and so can be labelled using the same categories as the personality types. Occupations come to be characterised according to the type of environment with which they are typically associated. It is the RIASEC typology that Gottfredson takes from Holland to describe occupational types. (See Appendix A for a description of each RIASEC type.)

Gottfredson (1981) used the perceptions people reported of the prestige and sex-type for 129 occupations to construct a graphical depiction of the common cognitive map of occupations. She then grouped occupational titles by RIASEC type and then found the mean and standard deviation for sex-type and social prestige for each of these types. (See Figure 1). This graphical display of the common cognitive map of occupations is, according to Gottfredson, depicting aspects of the *stereotypes* that people have of occupations. It is, in other words, a theoretical representation of their perceptions or of their mental images of the world of work. So, for example, the display indicates that the stereotype for Realistic types of occupations is one which has a highly masculine sex-type and a low social prestige. It is Gottfredson's argument that this map is used by people to navigate their way through the world of work to a destination which they most prefer – their occupational aspiration. That is, people match themselves to occupations by using stereotypes, the three main features of which are: (1) sex type, (2) social prestige and (3) type. If an individual finds an occupation which matches their gender, their perceived ability (for which social prestige is a marker) and personality type as expressed by their vocational interests, then they will be most likely to be satisfied and enjoy their work.

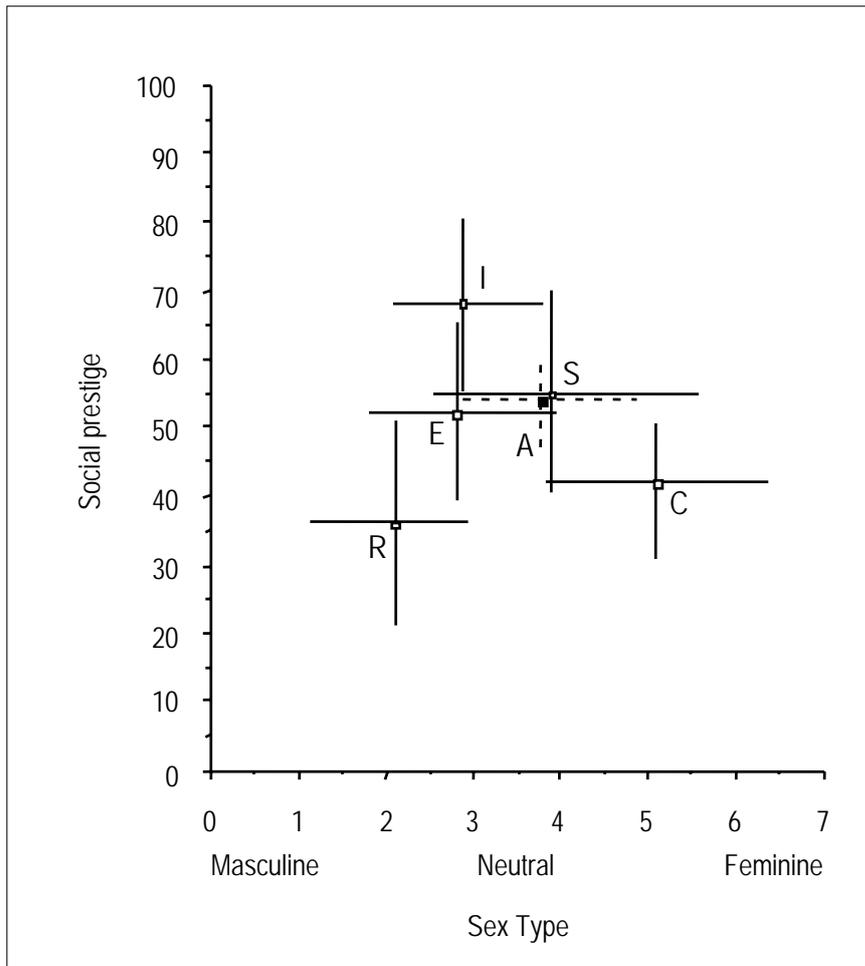


Figure 1 The Common Cognitive Map of Occupations (one standard deviation each side, bisecting at the means), after L. Gottfredson (1981; 1996; 2002)

So, to what extent was Gottfredson's graphical representations of occupational stereotypes reflected in the real world of work? It was to address this question that Census data were used.

The map of Australian Occupations

To obtain a measure of the sex composition of occupations, a two-dimensional cross tabulation of data taken from the 2001 Australian *Census of Housing and Population* was used. It consisted of counts by gender and occupation. Occupations were classified using categories taken from the second edition of the Australian Standard Classification of Occupations (ASCO) (Australian Bureau of Statistics 1996). These categories were defined at the 4-digit level or Unit group level of ASCO. This level was chosen because the only available socioeconomic status scale (Jones & McMillan 2001) was matched to the ASCO at the 4-digit level.

The classification of occupational titles to RIASEC categories used the *Alphabetised Occupations Finder* for the Australian edition of the *Self Directed Search* (Holland 2001). This document, a career guidance inventory, lists nearly all occupations from ASCO (2nd Edition) and allocates each a RIASEC code.

The term 'sex-type,' used by Gottfredson is replaced here by 'sex composition'. What is being measured with the sex composition variable is the extent to which particular roles are being taken by men and women. Thus, the proportion of each sex in an occupation can be treated as a measure of the extent to which a role, as represented by an occupation, is presently accessible to men and women. In this way, sex composition is referring not to the characteristics of persons in the role but to the participation of the sexes in the role. The sex composition of an occupation was estimated by calculating the percentage of females in each occupation.

As a first step in developing the representation of Australian occupations, a scatter plot was constructed using the sex composition and socioeconomic status of occupations. This scatter plot is shown in Figure 2. A feature of this plot is the weak linear relation in it (Pearson's $r = 0.25$), with an increase in socioeconomic status being weakly associated with an increase in the proportion of females in an occupation.

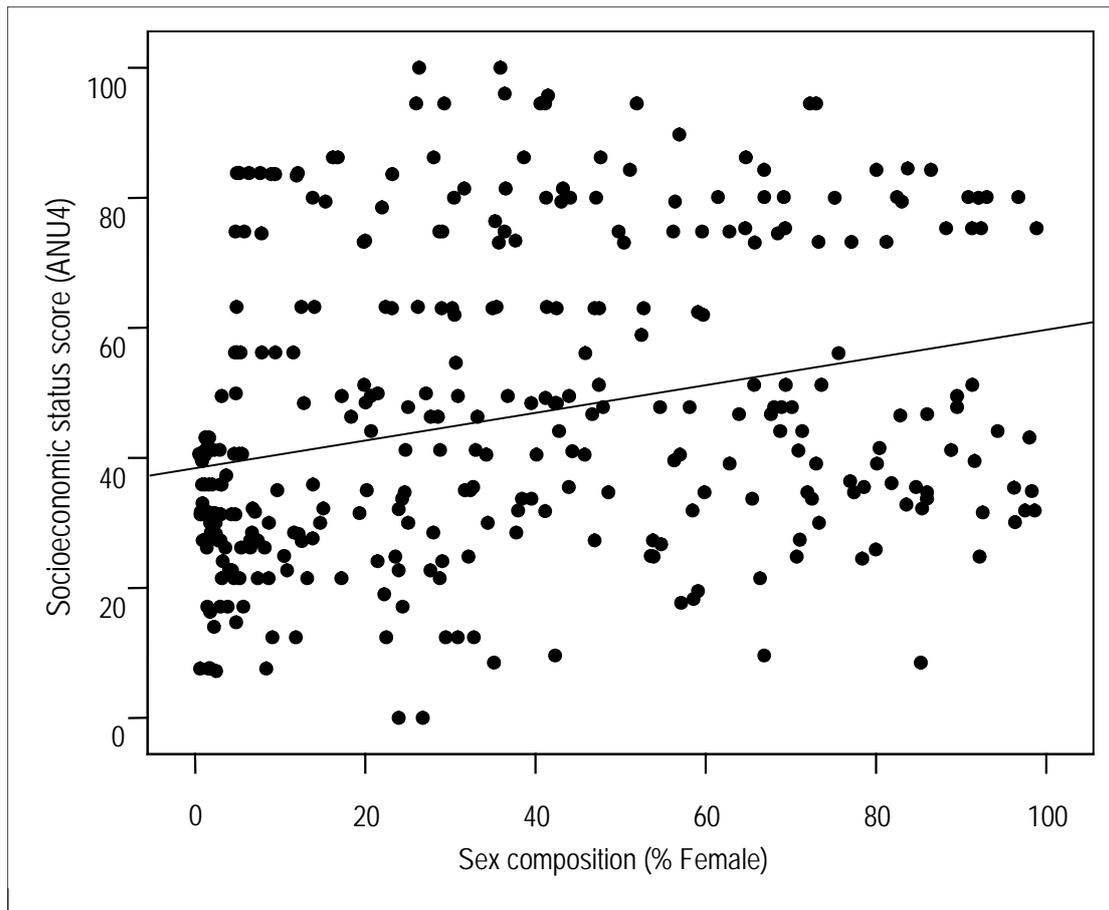


Figure 2 Scatter plot showing the sex composition and socio-economic status of 317 Australian occupations in 1991, showing line of best fit ($R^2=0.06$)

Figure 3 shows a graphical depiction of Australian occupations organised by the type of occupation. There were 317 occupations used to construct Figure 3 (not all 4-digit level occupations could be allocated to a RIASEC category). Of these, 137 were Realistic, 39 were Investigative, 17 were Artistic, 38 were Social, 49 were Enterprising, and 37 were Conventional. (Appendix B shows the distribution of persons, females and males across these categories using data taken from the 2001 Census.)

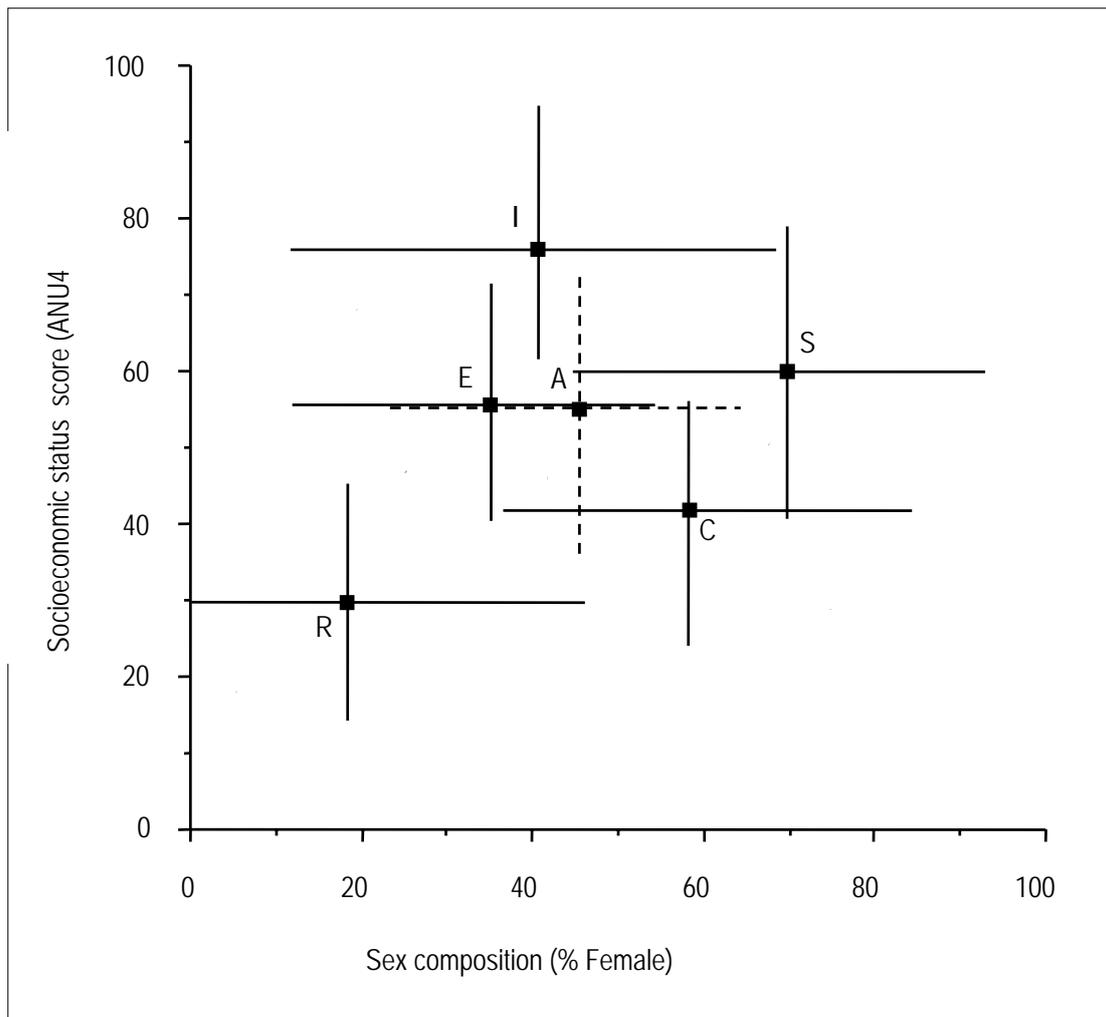


Figure 3. Map of Australian occupations showing the socioeconomic status and the sex composition of 317 occupations in 2001 (standard deviation bisecting at mean) grouped by RIASEC type

Figure 4, shows a graphical depiction of Australian occupations organised by the type of occupation using different measures of central tendency and dispersion from those used by Gottfredson (1981) in her depiction of the common cognitive map of occupations. In Figure 4, the representation is by median and by lines drawn to the 25th and 75th percentiles. This enables a more accurate portrayal because it better depicts the broad shape of the distributions. It suggests greater separation between the occupational types, and considerable skew in their distributions. Notice in particular how the two lowest groups on the socioeconomic status scale – Realistic and Conventional – are skewed so that the distribution piles up towards the extremes of the sex composition scale. The highly masculine Realistic occupations are concentrated at the low end of the sex composition scale, and conversely the highly female Conventional occupations are concentrated at the high end of the sex composition scale.

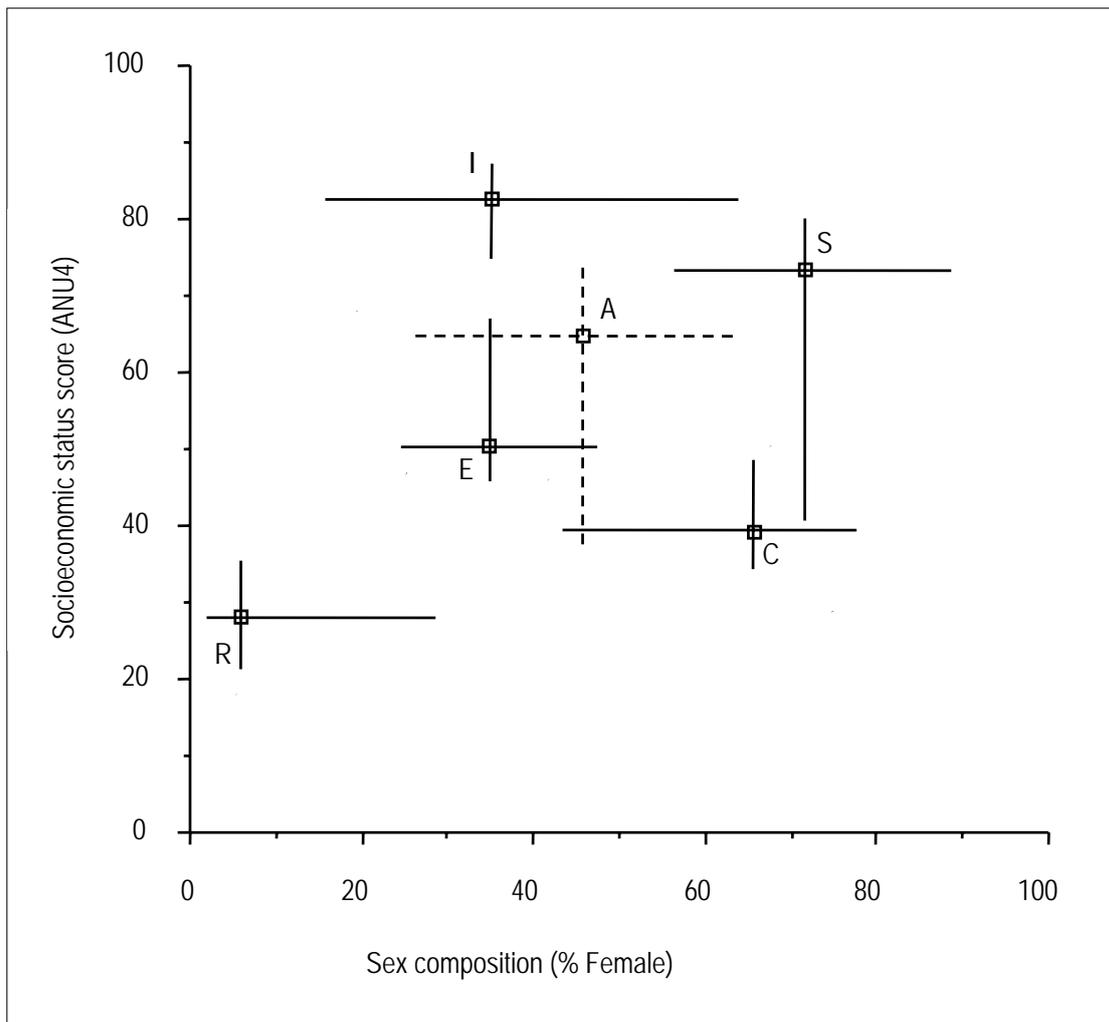


Figure 4. Map of Australian occupations showing the socioeconomic status and the sex composition of 317 occupations in 2001 (interquartile range bisecting at median) grouped by RIASEC type

There is considerable similarity in the distribution of the groups of occupations across Gottfredson's common cognitive map of occupations and the distribution of these groups in the 2001 Australian world of work. In both maps, where the summary measures are the mean and standard deviation:

- Realistic occupations typically are highly masculine and have the lowest socioeconomic status
- Conventional occupations typically are feminine and also have low socioeconomic status
- Investigative occupations typically are sex neutral and have the highest socioeconomic status
- Enterprising and Artistic occupations typically are sex neutral and have a medium level of socioeconomic status

This similarity suggests that, if the common cognitive map is depicting aspects of mental images of the world of work, then these images accord well with the empirical structure of that world. This is consistent with the claims made by Gottfredson (1981) and implies that the world of work may show similar relations between socioeconomic status, sex composition, and occupational type.

Social occupations, however are markedly more feminine in the map of Australian occupations having a higher mean score than Conventional occupations, and so are, on average, the most highly female occupations. In Gottfredson's common cognitive map of occupations, Conventional occupations are the most highly female. Additionally, when the distributions are displayed using the median and interquartile range, this difference persists. One possible explanation for this change in the location of Social occupations is that the world of work has changed since Gottfredson first proposed her theory. There is some evidence for this change. A map of Australian occupations using 1991 Census data shows that the location of Social occupations is very similar to that seen in the common cognitive map of occupations. This can be seen in Figure 5. (Investigative occupations in 1991 were, however, far more masculine than depicted either in the common cognitive map of occupations or in the 2001 map of Australian occupations, so even in 1991 there was one difference to be observed between Gottfredson's map and the world of work.)

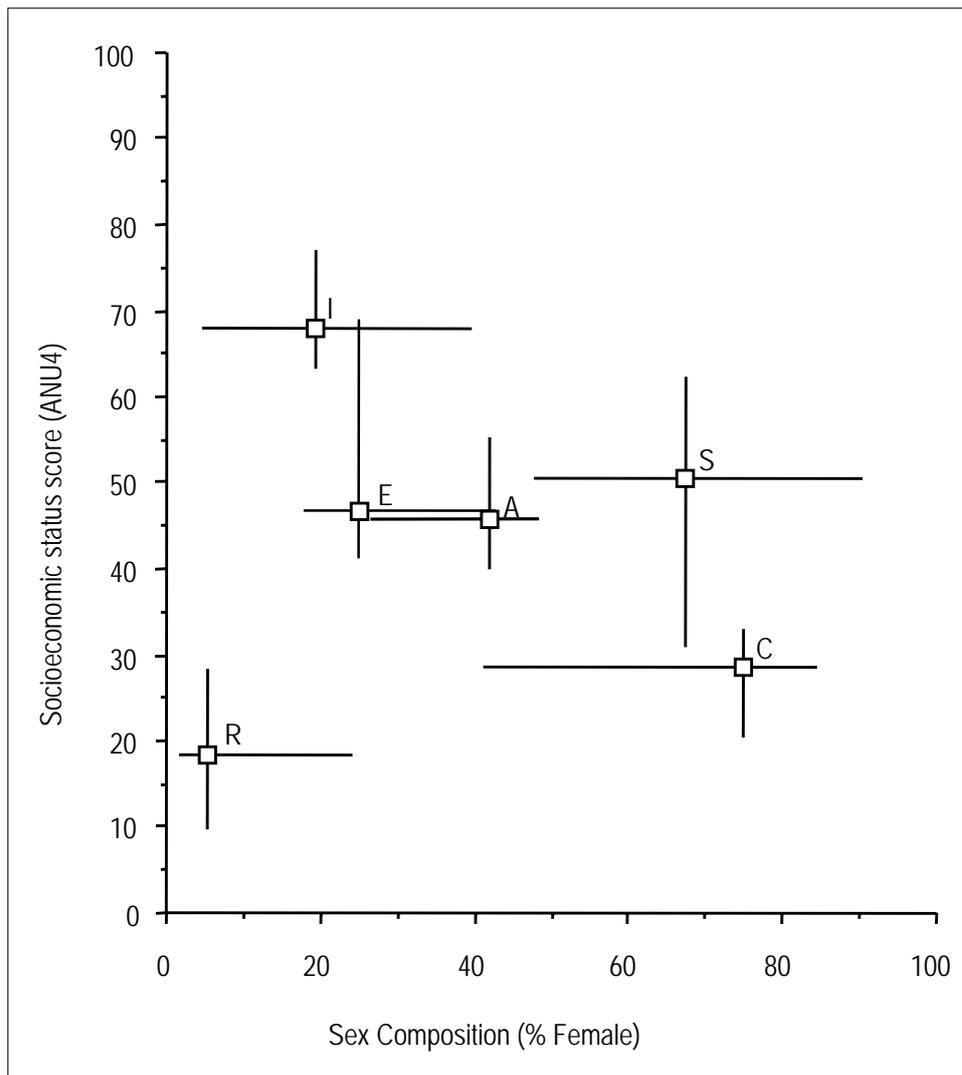


Figure 5. Map of Australian occupations showing the socioeconomic status and the sex composition of 229 occupations in 1991 (interquartile range bisecting at median) grouped by RIASEC type

The changes in the socioeconomic status of Social and Artistic occupations – they appear somewhat higher – is difficult to interpret because the socioeconomic status scores for the 1991 data were derived from the ANU3 scale (Jones 1989), and following the introduction of a new version of ASCO in 1996, the 2001 socio-economic status scores were derived from the ANU4 scale (Jones & McMillan 2001). These two scales were constructed using different methods, and it is not clear to what extent the differences seen in the 1991 and 2001 maps are an artefact of these different methods.

Conclusion

Gottfredson's depiction of the common cognitive map of occupations and the arguments with which she surrounds it are important because;

- she identifies what seem to be the three key dimensions in the world of work as perceived by people
- she helps to focus attention on the social dimensions to occupations, rather than their technical requirements or contents.

The census data were the best data available to empirically assess the extent to which the theory proposed by Gottfredson was true. These data suggest that people's stereotypes of occupations are accurate.

With this knowledge it has become possible for The Smith Family to develop a richer set of criteria for assessing the outcomes of Learning for Life. On this approach it is not the extent to which off-spring attain more socioeconomic status than their parents, but whether they find a destination in the world of work which matches their interests and ability, irrespective of the socioeconomic status of their parents. This approach is not without its own problems. Most importantly, we do not know the extent to which students from disadvantaged backgrounds are more circumscribed in the development of their interests than other students, nor how accurately they assess their ability.

Appendix A: Holland's RIASEC occupational types

The following lists each of the six types of occupations that Holland (1983) describes. (Taken from Holland (1985) and Ainley (1994).)

Realistic occupations involve activities such as building, repairing and making objects. This type of occupation provides an environment which fosters technical competencies and mechanical ability because of the frequent use of machines and tools. Examples of Realistic occupations are plumber and plant operator.

Investigative occupations involve activities such as experimenting, analysing and inquiring. This type of occupation provides an environment which fosters scientific competence and scholarship. Examples of Investigative occupations are mathematician and biologist.

Artistic occupations involve activities such as painting, writing, sculpting, dancing, acting and playing music. This type of occupation provides an environment which fosters artistic competencies and encourages people to be expressive, original and intuitive. Examples of Artistic occupations are author and sculptor.

Social occupations involve activities directed towards helping others. Examples of Social occupations are teacher and nurse.

Enterprising occupations involve activities such as organising and selling. Enterprising occupations provide an environment which encourages people to see the world in terms of power, status and responsibility. Examples of Enterprising occupations are salesperson and parliamentarian.

Conventional occupations involve activities such as record keeping and filing. Examples of Conventional occupations are accountant, clerk and bookkeeper.

Appendix B: Distribution of persons and occupations across occupational types (2001 Census)

a) Number of females, males and persons

	N of Females	N of Males	N of persons
Realistic	662470	1978212	2640682
Investigative	141820	300817	442637
Artistic	85186	90091	175277
Social	805681	324268	1129949
Enterprising	580723	907149	1487872
Conventional	840712	336135	1176847
Sub Total	3116592	3936672	7053264
Missing	455916	282538	738454
Total	3572508	4219210	7791718

b) Percent of females, males and persons (including missing)

	% of Females	% of Males	% of persons
Realistic	18.5	46.9	33.9
Investigative	4.0	7.1	5.7
Artistic	2.4	2.1	2.2
Social	22.6	7.7	14.5
Enterprising	16.3	21.5	19.1
Conventional	23.5	8.0	15.1
Missing	12.8	6.7	9.5
Total	100.0	100.0	100.0

c) Percent of females, males and persons (excluding missing)

	% of Females	% of Males	% of persons
Realistic	21.3	50.3	37.4
Investigative	4.6	7.6	6.3
Artistic	2.7	2.3	2.5
Social	25.9	8.2	16.0
Enterprising	18.6	23.0	21.1
Conventional	27.0	8.5	16.7
Total	100.0	100.0	100.0

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