The Australian Standard Group «AU2013»

What is a Standard Group?

A standard group is used as an indication of how a population will typically score on one of the 48 patterns of the iWAM. The indication is a range of typical scores. jobEQ uses this range on its feedback reports in order to give a relative indication of where a person scores in comparison to others. The standard group can be any group, such as a team of sales people, all employees of a certain organization, or the population of a country. In this case the standard group represents the Australian working population.

Once we know how a group typically scores, we can determine, in relative terms, whether a person's score is lower than, the same as, or higher than that of a particular population.

iWAM standard groups are calculated by taking the means of a sample of a group, adding one standard deviation to these means to find the upper limit of the standard group and subtracting one standard deviation from the mean to find the lower limit. If we presuppose that the population is approximately normally distributed, we know by definition that approximately two-thirds of the population will fall within the standard group range for the scale. In addition, we can assume that 1 out of 6 individuals will score higher than the standard group and 1 out of 6 will score lower.

Purpose of a Standard Group?

Standard groups are not intended to add statistical validity. Rather, standard groups help people understand the test results by showing how individuals compare to a given population or group. We use a standard group in iWAM reports to generate visual charts and/or textual explanations of a person's scores as those in the standard group would experience them.

Standard groups are less relevant when jobEQ questionnaires are used for making decisions such as in hiring or promotions. A more useful technology for making decisions in these cases is to compare an individual’s scores to those of top performers in a certain position. This kind of comparison uses jobEQ's *Model of Excellence* technology.

Purpose of this paper

This paper will explain how the Australian Standard Group of 2013 is constructed. First the working population of Australia and the used sample is documented with essential demographics like gender, age and occupation. Further descriptive characteristics concerning meta-programs are displayed. The extent in which the standard group is representative for the Australian workforce population is discussed.

The research for this standardgroup was funded by EQ at Work and jobEQ.

About the population

Based on the Census data 2011 (last update February 2013) of the Australian Bureau of Statistics (www.abs.gov.au), one can conclude that Australia has a working population of circa 11.6 million people. The current national labor force consists out of 54.30% male workers and 45.70% female employees. Eight age categories are represented as following: 15 to 19 year olds 5.82%, 20 to 24 year olds 10.26%, 25 to 34 year olds 22.81%, 35 to 44 year olds 22.27%, 45 to 54 year olds 22.32%, 55 to 59 year olds 8.38%, 60 to 64 year olds 5.75%, and 65 years or older 3.39%. Also data concerning occupations was provided by the Bureau.

About the sample

The 2013 Standard Group is based on 2711 persons working in Australia, who completed the iWAM questionnaires between January 2002 and March 2013. Of this group 12.77 % completed the iWAM in the on-line demo environment. The rest of the sample participated in various research projects and commercial projects conducted in Australian work environments. A comparison with the 2002 sample was not relevant since there were only 84 respondents representing Australia in that period.

Filters

The following filters where used to construct the 2013 Standard Group:

- First a test criteria filter was used: people who left more than 6 items of 40 unchanged in the questionnaire were not used because of reliability reasons: the test administration of people who leave more 15% of the items unchanged is considered as not valid;
- Duplicate candidates were filtered out as well;
- Students were filtered out because they have almost no experience in a work environment;
- The following occupation categories were deleted as well cause of 'not representative for the Australian working population': 'homemaker', 'retired' and 'unemployed/between jobs';
- Also people from the occupation category 'not specified' were deleted from the sample to match the sample with the population distribution of occupations;
- To prevent distortion by one or more major clients (mainly in engineering functions), persons from major commercial projects were filtered out[1].

Gender

Concerning gender, the sample represents closely the working population in Australia. The sample has a 53/47 male-female ratio whereas the population has a 54/46 ratio. A chi-square test ($\chi 2$ (1) = 1.21, p= 0.27) shows that the sample distribution is not significantly different to the population distribution.

[1] A common mistake in creating standard groups for tests is to rely only (or mainly) on a 'sample of convenience' (i.e. a student population or data from one organization) which is an example of nonprobability sampling which can provoke bias in the standard group.

Table 1: Comparison of iWAM Standard Group 2013 and working population

iWAM Standard Group	n	%	Working population	N	%
Male	1.445	53.30	Male	6.298.977	54.35
Female	1.266	46.70	Female	5.289.833	45.65
Total	2.711	100.00	Total	11.588.811	100.00

Age

If we compare age categories (see table 2) we can report following findings: in comparison with the Australian population, we find that the major categories where more than 90% of the working population (ranging from 20 to 64 years old) is situated are well represented by the standard group. The new reference group accounts for more than 98% in these categories[2].
Only the first two categories (< 24 years old) are under-represented which is a normal finding. Most people who take the iWAM had some extra years of education and are 21 years or older whereas in the working population this is not the case. Because the iWAM is constructed to measure motivation and attitude in a work environment, people under 18 years can be considered as a source of distortion.

Table 2: Comparison of iWAM Standard Group 2013 and working population (age)

iWAM Standard Group	n	%	Working Population	N	%
< 20 years	12	0.44%	< 20 years	673.951	5.82%
20-24	92	3.39%	20-24	1.188.882	10.26%
25-34	696	25.67%	25-34	2.642.837	22.81%
35-44	891	32.87%	35-44	2.581.184	22.27%
45-54	678	25.01%	45-54	2.471.215	21.32%
55-59	229	8.45%	55-59	971.487	8.38%
60-64	73	2.69%	60-64	666.279	5.75%
65+	26	0.96%	65+	392.975	3.39%
Unknown	14	0.52%	Unknown		
Total	2.711	100.0	Total	1.1588.811	100.0

Occupation

Table 3 shows the distribution of the occupation categories of the standard group. As one can see the occupations of the respondents are quite varied ranging from less than 1% ('Research and Development) up to almost 10% ('Accounting/finance'). The category 'Other' accounts for almost 12% indicating that their profession is other than the categories mentioned.

[2] Note that the category 35-44 years old accounts for almost 33% of the sample in comparison with the population which entails 22%. To assure this subgroup doesn't bias the results an analysis between this age group and the total sample was conducted. Results show that there was hardly any difference between the averages of all 48 patterns between the two groups: mean difference = 0.54% (median 0.45% min .01% max 1.84%).

Table 3: Comparison of iWAM Standard Group (occupations)

iWAM Standard Group 2013	N	%
Accounting/Finance	270	9.96%
Computer related (other + internet)	110	4.06%
Consulting	226	8.34%
Customer service/support	120	4.43%
Education/training	154	5.68%
Engineering	208	7.67%
Executive/senior management	246	9.07%
General administrative/supervisory	166	6.12%
Government/military	109	4.02%
Manufacturing/production/operation	67	2.47%
Other	321	11.84%
Professional (medical,legal, etc.)	201	7.41%
Research and development	13	0.48%
Sales/marketing/advertising	237	8.74%
Self-employed/owner	229	8.45%
Tradesman/craftsman	34	1.25%
Total	2.711	100.00

In comparison with the census data[3], we find the following: first of all, the census data entails 9.4% laborers where the 2013 sample represents 2.5%. This is a normal finding since the iWAM was not designed in the first place to assess blue collar workers.
The census data further reports 21.3% 'professionals' containing arts and media, business, HR, sales, marketing & PR, 'design and engineering, science and transport professionals. If we combine 'Consulting', 'Engineering', 'Professionals', 'Research and development' and 'Sales/marketing/advertising' we can see that these occupations categories account for 32.6% in the 2013 sample.
The census data states that 12.9% are Managers and 14.7% Clerical and Administrative Workers whereas the sample represents 9.1% 'Executive/senior management' and 6.1% 'General administrative/supervisory'.
Furthermore the population data reports 14.2% Technicians and Trade Workers and 9.7% Community and Personal Service Workers. Respectively, the sample of 2013 includes 1.3% 'Tradesman/craftsman' and 4.4% 'Customer service/support'. The categories 'Accounting/finance', 'Computer related', Education/training', 'Government/military' were more difficult to align with the census data. The 'Other' category is non-defined and can contain people of categories that are lacking in the census data that maybe under-represented.

Nevertheless, The 16 occupation categories in the standard group are well varied, showing widespread heterogeneity in different occupations. None of the defined categories shows a percentage above 10% preventing a possible distortion in the sample.

[3] http://www.abs.gov.au/websitedbs/censushome.nsf/home/CO-65#occupation

Meta-programs

Table 4 shows the absolute means, standard deviations and standard errors of the 48 patterns. The absolute averages of the meta-programs range from 7% up to 80%. All parameters show a sufficient variation in scores (standard deviations ranging from 9% to 26%). The averages and standard deviations of each scale are used to calculate the individual norm groups.

Standard errors vary from 0.17% to 0.49% with an average of 0.34%. When .95 confidence intervals (i.e. mean $\pm$ 1.96 SEM) are constructed around the sample means, one can conclude that in 95% of the cases the mean will fall within a margin less than 1%. One can conclude that the estimation of the population means for the 48 patterns using the Standard Group 2013 (n=2711) is quite accurate.

Table 4: patterns of iWAM Standard Group 2013: means, standard deviations and standard errors

pattern	Mean	SD	SEM	pattern	Mean	SD	SEM	pattern	Mean	SD	SEM
OF1PA	55.26%	20.03%	0.38%	So1A	15.49%	15.29%	0.29%	Co1A	80.47%	12.01%	0.23%
OF1MA	45.96%	14.03%	0.27%	So2A	78.22%	13.77%	0.26%	Co2A	34.71%	19.15%	0.37%
OF2PA	79.44%	16.34%	0.31%	So3A	56.62%	17.16%	0.33%	Co3A	22.94%	21.56%	0.41%
OF2MA	25.56%	16.62%	0.32%	WA1A	41.56%	17.53%	0.33%	Co4A	53.82%	20.30%	0.39%
OF3PA	65.78%	18.45%	0.35%	WA2A	81.20%	14.08%	0.27%	Co5A	67.57%	16.45%	0.31%
OF3MA	40.74%	16.99%	0.32%	WA3A	60.69%	17.51%	0.33%	Co6A	43.43%	25.77%	0.49%
OF4PA	67.45%	17.26%	0.33%	TP1A	44.61%	14.65%	0.28%	Co7A	61.51%	20.80%	0.40%
OF4MA	41.65%	23.90%	0.46%	TP2A	76.61%	13.15%	0.25%	Co8A	26.66%	19.07%	0.36%
OF5PA	67.73%	24.15%	0.46%	TP3A	51.71%	16.77%	0.32%	IF1A	60.64%	19.02%	0.36%
OF5MA	23.67%	20.93%	0.40%	Mo1A	41.94%	18.29%	0.35%	IF2A	51.21%	19.44%	0.37%
OF6PA	41.76%	20.89%	0.40%	Mo2A	38.30%	19.52%	0.37%	IF3A	50.29%	18.54%	0.35%
OF6MA	41.41%	16.97%	0.32%	Mo3A	70.92%	19.43%	0.37%	IF4A	71.38%	15.08%	0.29%
OF7PA	53.87%	24.40%	0.47%	N1A	62.11%	15.67%	0.30%	IF5A	24.47%	19.45%	0.37%
OF7MA	18.51%	19.85%	0.38%	N2A	7.42%	8.67%	0.17%	IF6A	36.16%	18.83%	0.36%
OF8PA	54.28%	18.23%	0.35%	N3A	73.74%	12.00%	0.23%	IF7A	47.33%	18.87%	0.36%
OF8MA	44.39%	16.95%	0.32%	N4A	42.69%	15.24%	0.29%	IF8A	56.60%	18.88%	0.36%

Conclusions

The data used in this research provides a substantial basis to build a new standard group which is far more representative than the 2002 sample, which was almost non-existent. Demographics of the sample shows a distribution of men and women resembling the real life distribution of the working people in Australia.

When examining the age distribution, one will find that the sample is representative for the vast majority of the age groups. The categories under 24 years old are somewhat under-represented. In perspective of the goal of the iWAM this under-representation is strength instead of a

weakness. Young people who have almost no working experience can bias the results. That is also one of the main reasons that the student population is filtered out.

Other filters used on the occupation variable (‘not specified’, ‘homemaker’, etc…) and the exclusion of major clients are important to prevent the standard group from possible bias. Information about the occupations in the Australian working population allows a comparison with the predefined categories in the iWAM. The under-representation of blue collar workers is justified by the fact that the iWAM was constructed for white collar workers. One can state that the sample contains a wide variety of occupation categories where none of the defined categories reaches 10%.

Looking at the descriptive statistics of the iWAM, we can report two important conclusions. First, we can state that the iWAM scales can measure quite accurately: all standard error measures are below 0.50%. Second, the scales show enough variation in scores (standard deviations up to 20%) to apprehend the heterogeneity of the standard group.

We can conclude that the Australian Standard Group 2013 is well balanced and heterogeneous if you take into account gender, age and job occupation.