The South African Standard Group «ZA2013»

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 South African 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 South African Standard Group of 2013 is constructed. First the working population of South Africa 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 South African workforce population is discussed.

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About the population

Based on the Census data (last update October-December 2012) of the South African Bureau of Statistics[1], one can conclude that South Africa has a working population of circa 13.6 million people.
The current national labor force consists out of 56.66% male workers and 43.34% female employees. Five age categories are represented as following: 15 to 24 year olds 9.28%, 25 to 34 year olds 33.13%, 35 to 44 year olds 29.98%, 45 to 54 year olds 18.82% and 55 to 64 year olds 8.79%. Also data concerning occupation categories was available.

About the sample

The 2013 Standard Group is based on 787 persons working in South Africa, who completed the iWAM questionnaires between January 2002 and April 2013. Of this group 16.39 % completed the iWAM in the on-line demo environment. The rest of the sample participated in various research projects and commercial projects conducted in South African work environments. A comparison with the 2006 sample is hardly relevant since there were only 77 respondents representing South Africa 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 South African working population': '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 manufacturing, sales and executive functions), persons from major commercial projects were filtered out[2].

Gender

Concerning gender, the sample represents perfectly the working population in South Africa: Both sample and population data have an exact 53/47 male-female ratio. Obviously a 'perfect' chi-square test ($\chi 2$ (1) = 0.00, p= 1.00) shows that the sample distribution does not significantly differ from the population distribution.

[1] http://www.statssa.gov.za/publications/P0211/P02114thQuarter2012.pdf
[2] 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	446	56.67	Male	7.693.000	56.66
Female	341	43.33	Female	5.885.000	43.34
Total	787	100.00	Total	13.577.000	100.00

Age

If we compare age categories in table 2 (see also Appendix 1) we can state that the 2013 Standard Group represents very closely the age categories of the working population in South Africa: the age categories 25-34, 35-44 and 45-54 years old, show a slightly minor over-representation (1.5% to 4%) and the categories at both ends show a minor under-representation (2.6% and 4.6%). The largest difference is found in the category 15-24 years old where the under-representation 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	%
15-24	29	3.68%	15-24	1.260.000	9.28%
25-34	294	37.36%	25-34	4.498.000	33.13%
35-44	256	32.53%	35-44	4.071.000	29.98%
45-54	159	20.20%	45-54	2.555.000	18.82%
55-64	49	6.23%	55-64	1.193.000	8.79%
Total	787	100.00	Total	13.577.000	100.00

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% ('Government/Military') up to almost 13% ('Sales/Marketing/Advertising'). The category 'Other' accounts for more than 15% indicating that their profession is other than the categories mentioned.

Although the census data of South Africa is differently distributed -only 10 occupation categories are differentiated (see Appendix 2)- we made an attempt to compare the sample versus the working population.

Table 3: Comparison of iWAM Standard Group (occupations)

iWAM Standard Group 2013	N	%
Accounting/Finance	60	7.62%
Computer related (other + internet)	49	6.22%
Consulting	44	5.59%
Customer service/support	53	6.73%
Education/training	27	3.43%
Engineering	31	3.94%
Executive/senior management	73	9.28%
General administrative/supervisory	38	4.83%
Government/military	3	0.38%
Manufacturing/production/operation	50	6.35%
Other	120	15.25%
Professional (medical,legal, etc.)	25	3.18%
Research and development	11	1.40%
Sales/marketing/advertising	102	12.96%
Self-employed/owner	39	4.96%
Tradesman/craftsman	62	7.88%
Total	787	100.00

The census data reports 14.7% 'sales & services' whereas we combine the 'Sales/marketing/advertising' category with 'Customer service/support', we come up with a 19.7%. The population data shows 7.9% 'managers' whereas the sample reflects 9.3% 'Executive/senior management'.
If we compare 'Professionals' we find 5.9% in the population and 3.2% in the sample data.
The census data states 10.6% 'clerical' jobs and 12.2% 'craft & related trade' jobs whereas the sample data respectively mirrors 4.8% in the 'General administrative/supervisory' and 7.9% in the 'Tradesman/craftsman' category[3].

The census data reports 22.3% in the category 'elementary' which accounts for the vast majority of the working population in South Africa. Furthermore following occupation categories are reported: 'technicians' 11.1%, 'plant and machine operator' 8.4%, 'domestic workers' 6.3% and 'skilled agriculture' 0.4%. These categories are more difficult to compare because iWAM was not designed to assess blue collar jobs. In the sample we find only 6.4% in the 'Manufacturing/production/operations' category which implies an understandable, defendable under-representation.

Following jobEQ categories could not be related directly to the census data: 'Accounting/finance', 'Computer related (Internet or other)', 'Consulting', 'Education/training', 'Government/military' and 'Self-employed/owner'.

Despite a difficult job occupation comparison between population and sample, the 17 occupation categories in the standard group are well varied, showing widespread heterogeneity in different occupations.

[3] The category 'Tradesman/craftsman' in the 2013 Standard Group consists out 92% respondents of the same company (i.e. Afrisam) which suggests to be careful with generalizations in this occupation category.

Test Language

Another variable to mention is test language. South Africa has 11 official languages. Although the iWAM can be administered in various different languages, only one language (i.e. English) applies to the standard group: the complete standard group filled out the questionnaire in English.

Ethnicity

The administration of the iWAM does not include a variable that gives information about ethnicity or racial background. Since South Africa combines different ethnical backgrounds like white, black, colored, Indian, … it is not unimportant to investigate possible cultural differences linked to ethnical background. The results of this research can be found in the following document *The South African Standard Group Annex.*

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 10% up to 76%. All parameters show a sufficient variation in scores (standard deviations ranging from 11% to 26%). The averages and standard deviations of each scale are used to calculate the individual norm groups.

Standard errors vary from 0.40% to 0.92% with an average of 0.65%. 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=787) 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	58.12%	21.26%	0.76%	So1A	14.82%	16.03%	0.57%	Co1A	75.60%	14.22%	0.51%
OF1MA	42.15%	14.35%	0.51%	So2A	76.14%	15.21%	0.54%	Co2A	27.61%	19.83%	0.71%
OF2PA	75.13%	18.44%	0.66%	So3A	59.27%	16.74%	0.60%	Co3A	34.60%	26.26%	0.94%
OF2MA	29.23%	18.02%	0.64%	WA1A	44.53%	18.35%	0.65%	Co4A	55.04%	20.83%	0.74%
OF3PA	65.97%	18.88%	0.67%	WA2A	76.91%	16.84%	0.60%	Co5A	56.86%	16.73%	0.60%
OF3MA	36.07%	15.83%	0.56%	WA3A	60.13%	18.46%	0.66%	Co6A	46.01%	23.97%	0.85%
OF4PA	65.67%	18.11%	0.65%	TP1A	43.46%	15.64%	0.56%	Co7A	65.92%	19.86%	0.71%
OF4MA	46.48%	25.78%	0.92%	TP2A	73.43%	14.78%	0.53%	Co8A	26.96%	19.29%	0.69%
OF5PA	65.84%	24.28%	0.87%	TP3A	55.94%	15.98%	0.57%	IF1A	52.58%	19.82%	0.71%
OF5MA	29.58%	21.78%	0.78%	Mo1A	47.86%	17.27%	0.62%	IF2A	54.64%	17.57%	0.63%
OF6PA	36.30%	20.09%	0.72%	Mo2A	28.92%	17.50%	0.62%	IF3A	54.42%	16.86%	0.60%
OF6MA	45.33%	18.63%	0.66%	Mo3A	70.90%	18.66%	0.67%	IF4A	70.22%	14.71%	0.52%
OF7PA	47.74%	24.98%	0.89%	N1A	61.89%	14.91%	0.53%	IF5A	28.59%	20.99%	0.75%
OF7MA	21.95%	20.57%	0.73%	N2A	9.62%	11.10%	0.40%	IF6A	39.83%	18.13%	0.65%
OF8PA	56.96%	18.30%	0.65%	N3A	72.01%	12.48%	0.44%	IF7A	49.07%	21.16%	0.75%
OF8MA	45.38%	17.64%	0.63%	N4A	44.87%	15.53%	0.55%	IF8A	52.89%	17.59%	0.63%

Conclusions

The data used in this research provides a substantial basis to build a new standard group which is far more representative than the 2006 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 South Africa.

When examining the age distribution, one will find that the sample is representative for the vast majority of the age groups. Only the category under 24 years old is 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’, ‘retired’, etc…) and the exclusion of major clients are important to prevent the standard group from possible bias. Information about the occupations in the South African 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 almost 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 1%. Second, the scales show enough variation in scores (standard deviations up to 26%) to apprehend the heterogeneity of the standard group.

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

Appendix 1: Age groups working population

Table 6: Socio-demographic characteristics - South Africa									
	Oct–Dec 2011	Jan–Mar 2012	Apr–Jun 2012	Jul–Sep 2012	Oct–Dec 2012	Qrt to Qrt change	Year on year change	Qrt to Qrt change	Year on year change
	Thousand	Thousand	Thousand	Thousand	Thousand	Thousand	Thousand	Percent	Percent
Age group of the employed	**13 497**	**13 422**	**13 447**	**13 645**	**13 577**	**-68**	**80**	**-0,5**	**0,6**
15-24 yrs	1 306	1 305	1 217	1 278	1 260	-18	-46	-1,4	-3,5
25-34 yrs	4 522	4 491	4 519	4 572	4 498	-74	-24	-1,6	-0,5
35-44 yrs	3 921	3 899	3 993	4 033	4 071	38	150	0,9	3,8
45-54 yrs	2 553	2 551	2 551	2 555	2 555	0	2	0,0	0,1
55-64 yrs	1 196	1 175	1 167	1 206	1 193	-13	-3	-1,1	-0,3

Appendix 2: Occupation categories working population

Table D: Employment by occupation

Occupation	Oct-Dec 2011	Jul-Sep 2012	Oct-Dec 2012	Qtr-to-qtr change	Year-on-year change	Qtr-to-qtr change	Year-on-year change
	Thousand					Per cent	
Total	**13 497**	**13 645**	**13 577**	**-68**	**80**	**-0,5**	**0,6**
Manager	1 130	1 135	1 075	-60	-55	-5,3	-4,9
Professional	745	798	805	7	60	0,9	8,1
Technician	1 498	1 523	1 503	-20	5	-1,3	0,3
Clerk	1 523	1 390	1 443	53	-80	3,8	-5,3
Sales and services	1 960	2 062	1 996	-66	36	-3,2	1,8
Skilled agriculture	67	67	60	-7	-7	-10,4	-10,4
Craft and related trade	1 637	1 662	1 660	-2	23	-0,1	1,4
Plant and machine operator	1 126	1 150	1 139	-11	13	-1,0	1,2
Elementary	2 933	2 982	3 034	52	101	1,7	3,4
Domestic worker	878	876	861	-15	-17	-1,7	-1,9

*Due to rounding, numbers do not necessarily add up to totals.