# The *BAS3* standardisation project

## INTRODUCTION

This paper provides full details about the *BAS3* standardisation project. It explains the formation of the norm groups and their representativeness.

The primary objective of the UK standardisation project was to achieve a valid normative frame of reference for the use of the *BAS3* in the UK with children in the age range 3:00 to 17:11 years. The standardisation project was conducted at the University of Cambridge.

The norms are presented in the *BAS3* Scoring and Reporting Service (SRS) which can be accessed at http://rgt.testwise.net/bas3 once you have purchased a *BAS3* Complete Set.

## DESCRIPTION OF THE UK SAMPLE

The *BAS3* norms are derived from a validation sample representative of the UK population of children. A stratified sampling plan was used to ensure that representative proportions of children from each demographic group would be included.

The sampling plan defined a cell structure that identified the appropriate number of children for each cell. The cells were defined in terms of:

- 12 levels of **geographic region**
- two levels of **gender**
- four levels of **race/ethnic group**
- five levels of **educational level of parents**
- 11 levels of **age**.

Data gathered from the 2001 Census (England and Wales, Office for National Statistics, 2001)* provided the basis for the stratification by geographic region, gender, race/ethnic group and educational level of parents.

# GEOGRAPHIC REGION

The 2001 Census divided England and Wales into ten geographic regions:

- East Midlands
- East of England
- London
- North East
- North West
- South East
- South West
- West Midlands
- Yorkshire and the Humber
- Wales.

The 2001 Census also took place in:

- Scotland
- Northern Ireland.

The number of children required for each cell of the sample was in accordance with the proportions of the UK population of children living in each region listed above, as listed in the 2001 Census.

Areas of different population density within each region (rural, suburban and urban) were chosen on the basis of the general density characteristics of that region.

# GENDER

Within the overall cell structure, the project aimed to recruit the children who were the closest in demographic characteristics to each cell in terms of gender and age, from 3:00 to 17:11 years inclusive. The target sample was 1360 children. The actual number of children involved totalled 1480. Of these, 720 were male and 760 female, making a percentage split of 48.6 per cent boys/51.4 per cent girls.

# RACE/ETHNIC GROUP

Each child in the sample was categorised by his or her parents as belonging to one of the following race/ethnic groups: White, Black (African), Black (Caribbean), Black (Other), Asian (Indian), Asian (Pakistani), Asian (Bangladeshi), Asian (Other), Chinese and Other (please specify). Parents were permitted to endorse more than one category.

For sampling purposes, however, these ten groups were combined as follows:

- White
- Black (including African, Caribbean and Black Other)
- South Asian (including Indian, Pakistani, Bangladeshi and South Asian Other)
- Other (also includes Chinese and mixed race).

Within each geographic region and for each age group, the target ratios for ethnic groups were based on the race/ethnic group proportions for persons under the age of 17 years in the UK population according to the 2001 Census.

# EDUCATIONAL LEVEL OF PARENTS

The sample was stratified within each region on the basis of the 2001 Census results for educational qualifications. The father's educational level was used where available, otherwise the mother's educational level was used. Educational level data are particularly unstable across age in the UK, owing to the very significant changes made in the examination systems over the past 60 years. For this reason, sampling was based only on data from the population aged between 25 and 29 years at the time of the 2001 Census.

Information on educational level was obtained from parental consent forms. Significant efforts were made to ensure that the proportion of children whose parents were at each educational level was proportionate to the distribution of these educational levels among parents in the population at large who had children of this age.

## AGE

The age levels targeted were:
- 80 children aged 3:00 to 3:05 years
- 80 children aged 3:06 to 3:11 years
- 100 children aged 4:00 years
- 200 children each at 5:00, 6:00 and 7:00 years
- 100 children each at 9:00, 11:00, 13:00, 15:00 and 17:00 years.

This made a total target sample of 1360. The actual total achieved was 1480.

# THE SAMPLING PROCEDURE

In summary, the basis of the sampling plan was a matrix of the five educational levels of parents by 12 geographic regions for each combination of gender, age and race/ethnic group. Expected cell frequencies were adjusted to the nearest whole number.

Invitations to participate in the project were made by e-mail, letter and telephone to the nurseries, primary and secondary schools and colleges chosen to be representative of geographic region, educational level of parents, population density (rural, suburban and urban) and race/ethnic composition. Within each region, several nurseries, schools and colleges were sampled to include children of all ages and to represent the rural/suburban/urban mix of the region. In all, 162 schools and colleges participated in the study.

Parental consent forms and instructions for distributing these for whole classes of children were sent to participating schools. The consent form requested the child's date of birth, gender, race/ethnic group and use of English as well as the parents' educational qualifications. The sample was drawn from state and private schools as well as both faith and non-faith schools. Children receiving special needs support in the school were not excluded from testing. No special schools were involved in the study. Children were tested only if they could speak and understand English.

The returned consent forms contained the demographic information needed to select children for testing within the sampling plan. The lists of identified children within a nursery or school, along with a list of possible substitutes in the event of non-availability, were distributed to the *BAS3* standardisation test administrators.

All the test administrators, most of them educational psychologists, were fully trained in the administration and scoring of the *BAS3* standardisation edition. Most test administrators had experience in the use of individually administered tests or had previously demonstrated proficiency in administering psychological tests in a school or nursery setting.

Each child was assigned to a specific test administrator and testing was carried out between November 2009 and October 2010.

# REPRESENTATIVENESS OF THE SAMPLE

Analyses of variance (ANOVAs) are ways of studying the relationships between sampled data. The ANOVAs and Pearson's Chi-square tests of association and goodness of fit for the *BAS3* sample showed that in the areas under consideration there was no statistically significant deviation between observed and expected values. The data show that, for the stratification criteria selected, the UK validation sample closely approximated the 2001 Census data.

## Geographic region

Table 1 shows the number of children in each region of the UK who took part in the standardisation, also split by percentage per region, alongside the 2001 Census figures. The Census figures show the number of children in each region of the UK on Census Day and the percentage in each region. The source here is Table P5: Population on Census Day 2001 – Local Authority and other geographies (England and Wales, Office for National Statistics, 2001).

**Table 1: Geographic region: characteristics of the *BAS3* standardisation sample**

| UK region | *BAS3* standardisation sample | | UK population (2001 Census) | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| East Midlands | 57 | 3.9 | 126 | 8.5 |
| East of England | 91 | 6.1 | 92 | 6.2 |
| London | 127 | 8.6 | 149 | 10.1 |
| North East | 81 | 5.5 | 68 | 4.6 |
| North West | 131 | 8.9 | 146 | 9.9 |
| South East | 226 | 15.3 | 250 | 16.9 |
| South West | 84 | 5.7 | 89 | 6.0 |
| West Midlands | 120 | 8.1 | 136 | 9.2 |
| Yorkshire and the Humber | 241 | 16.3 | 176 | 11.9 |
| Wales | 28 | 1.9 | 61 | 4.1 |
| Scotland | 227 | 15.3 | 138 | 9.3 |
| Northern Ireland | 67 | 4.5 | 49 | 3.3 |
| **Total** | **1480** | **100.0** | **1480** | **100.0** |

**Key:** The *n* for the 2001 Census column represents the number of children targeted in each region. Virement (that is, transfer of surplus data) was exercised between adjacent or related regions.

# Race/ethnic group

Table 2 breaks down the sample of children by race/ethnic group. The targets are based on the percentage of children who belong to each group according to the 2001 Census. Chi-square tests of goodness of fit showed that the percentage of children from ethnic minorities was larger in the *BAS3* standardisation sample than in the 2001 Census. However, the increase is in line with demographic trends in this group since that time.

## Table 2: Race/ethnic group: characteristics of the *BAS3* standardisation sample

| Race/ethnic group | *BAS3* standardisation sample | | UK population (2001 Census) | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| **White** (White British, White European and Other White) | 1206 | 81.5 | 1297 | 87.6 |
| **Black** (Black Caribbean, Black African and Other Black) | 57 | 3.9 | 41 | 2.8 |
| **Asian** (Indian, Pakistani, Bangladeshi and Other Asian) | 108 | 7.3 | 84 | 5.7 |
| **Other** (Chinese, Other and all mixed categories) | 109 | 7.4 | 58 | 3.9 |
| **Total** | **1480** | | **1480** | |

**Note**: Chi-square test of goodness of fit = 64.33 (3 *df*), *p* <0.001 (*sig*)

# Educational level of parents

Table 3 summarises the distribution of educational level of parents for the sample. As you look at this table, please bear in mind that the 2001 Census data for parental levels of qualification are based on those for UK adults between the ages of 25 and 29 years.

The source here is Table T03: Theme table on people aged 16 to 29 years (England and Wales, Office for National Statistics, 2001), column 6. This cohort was aged 25 to 38 years in 2010 and is a good approximation of the population of parents of children in the *BAS3* standardisation sample.

In Table 3, expected percentage figures based on the 2001 Census ratios appear in brackets. Chi-square tests of goodness of fit showed that for educational level of parents there was no statistically significant deviation between observed and expected values.

## Table 3: Educational level of parents: characteristics of the *BAS3* standardisation sample

|  | Level 0 | Level 1 | Level 2 | Level 3 | Levels 4/5 | Totals |
|---|---|---|---|---|---|---|
| *BAS3* standardisation sample | 215 (14.53%) | 296 (20.00%) | 298 (20.13%) | 165 (11.15%) | 506 (34.19%) | 1480 |
| UK population (2001 Census) | 224 (15.14%) | 289 (19.53%) | 328 (22.16%) | 151 (10.20%) | 488 (32.97%) | 1480 |

**Key**

Educational level data are based on the highest level of qualification classified as follows:

- Level 0: No academic qualifications
- Level 1: One or more O levels, CSEs or GCSEs (each at any grade)
- Level 2: Five or more O levels, five or more CSEs (Grade 1), five or more GCSEs (Grades A–C), School Certificate, one or more A levels or AS levels
- Level 3: Two or more A levels, four or more AS levels, Higher School Certificate
- Levels 4/5: first (Bachelor's) degree, higher (Master's) degree or equivalent

**Note**

- Chi-square test of goodness of fit = 8.32 (4 *df*), $p = 0.08$ (*ns*).
- Analysis of variance (ANOVA) comparing mean educational level of parents with age in years $f = 1.65$, $p = 0.16$ (*ns*).
- There were also no significant differences on the Scheffe procedure.

## Age

As explained earlier, data was collected on 1480 children throughout the UK. Their ages are given in Table 4.

**Table 4: Children's ages: characteristics of the *BAS3* standardisation sample**

| Age group (years:months) | Frequency obtained | Target frequency |
|---|---|---|
| 3:00–3:05 | 69 | 80 |
| 3:06–3:11 | 92 | 80 |
| 4:00–4:11 | 108 | 100 |
| 5:00–5:11 | 193 | 200 |
| 6:00–6:11 | 189 | 200 |
| 7:00–8:05 | 199 | 200 |
| 8:06–10:05 | 158 | 100 |
| 10:06–12:05 | 133 | 100 |
| 12:06–14:05 | 137 | 100 |
| 14:06–16:05 | 100 | 100 |
| 16:06–18:05 | 102 | 100 |
| **Total** | **1480** | **1360** |