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# Normative Values for 18-30 Ages of Benton Visual Retention Test Correct Scores and Intelligence Quotients: A Short Report for Clinical Comparison

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# Normative Values for 18-30 Ages of Benton Visual Retention Test Correct Scores and Intelligence Quotients: A Short Report for Clinical Comparison

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## Abstract

The Benton Visual Retention Test (BVRT) is a well known test used to assess visual memory deficits and visual spatial abilities in patients. There is normative data available for the 18-30 age range though it is not comprehensive and does not cover the higher intelligence quotient ranges. Findings from two studies are presented in combination for use as normative correct score values.

## Introduction

Thompson and Chinnery (2011) and Thompson and Gander (2011) examined undergraduates using the Benton Visual Retention Test (BVRT) (Benton Sivan, 1992), the Wechsler Adult Intelligence Scale Revised (WAIS-III) (Wechsler, 2002), National Adult Reading Test (NART) (Nelson, 1992), and the Hospital Anxiety and Depression Scale (HADS) (Snaith & Zigmond, 1994) to establish a pattern of scores on visual presentations of the BVRT to be reproduced from memory. The standard stimuli and time limits devised by Benton Sivan (1992) were implemented together with use of the computerised version applied by Thompson, Ennis, Coffin and Farman (2007).

## Methods

### Rationale

The aim of this study is to gain a set of normative data for performance (correct scores) on the BVRT for normal individuals aged between 18 and 30 years old.

### Materials

Benton Visual Retention Test: The BVRT has 3 similar (parallel) forms of task C, D and E, each consisting of 10 designs containing one or more figures. In this study, 3 types of administration were used: A – showing the images for 10 seconds then requiring immediate reproduction of the images from memory; B – showing the images for 5 seconds followed by immediate reproduction; and C – showing the images

for 10 seconds, then delaying participants' reproduction of the figures after a further 15 seconds. Only two different versions were used: C and E. Data is presented for administrations A and B, only.

### NART

In order to establish an estimate of pre-morbid IQ, the National Adult Reading Test (Nelson, 1992) is often administered. Benton Sivan (1992) shows BVRT scores together with pre-morbid IQs; hence, this study has collected similar data.

### HADS

The Hospital Anxiety and Depression Scale (Snaith & Zigmond, 1994) was used to establish baseline anxiety and depression levels of each participant. It is known the high levels of anxiety and/or depression can affect memory functioning.

### WAIS-III

The WAIS Third Edition (Wechsler, 2002) is a well-known test that reflects an individual's overall ability in terms of abstract reasoning, perceptual skills, and speed processes. Fourteen subtests give rise to intelligence quotient (IQ) scores for verbal and performance subtests together with an overall full-scale (FIQ) intelligence quotient.

## Experimental Hypotheses

**Based on previous experimental series, the following hypotheses were used:**

H1 There will be a significant relationship between NART scores (or WAIS-III full-scale IQ scores) and Total Errors scores and Total Correct scores on the BVRT.

### Study design

In order to determine if age or gender had any significant influence on the data collected, a 3 x 2 unrelated ANOVA was implemented to investigate a significant difference in performance on the BVRT between genders and age groups. The first independent variable was gender, which had two levels, Males and Females. The second independent variable was age group, and was split into 3 levels, 18-20 (mode = 19, median = 19), 21-33 (mode = 21, median = 21), and 24-27 (mode 26, median = 26). The

dependent variables were Total Errors score and Total Correct score.

### Participants

A collective cohort of 102 undergraduate UK students were examined using the BVRT, WAIS-III and NART in two separate studies documented elsewhere (Thompson & Chinnery, 2011; Thompson & Gander, 2011). The collective results are presented here for reference. Prior to the study, ethics approval was obtained from Bournemouth University Research & Ethics Committee (November 2009) and consent was obtained from each participant according to strict ethical guidelines.

## Results

### Statistics

Spearman's Rank Order correlation was used to determine the relationship between NART scores with Anxiety and also with Depression, as assessed by the HADS. No statistical evidence was found between these measures (NART plus Anxiety:  $r = -.137$ ,  $n = 53$ ,  $p > .05$  two tailed; and NART plus Depression:  $r = -.219$ ,  $n = 53$ ,  $p > .05$  two tailed). Statistical significance ( $p > .05$ ) was obtained for correlations between BVRT correct scores and full-scale intelligence quotients of the WAIS-III. This allows for presentations in intelligence quotient bands (Illustration 1).

## Discussion and Conclusions

BVRT correct scores collected in this study compare with that collected by Benton Sivan (1992) which is stated in terms of correlating with parallel versions of stimuli together with intelligence quotients. The value of correct scores for administration A (10-second exposure; stimulus design covered; immediate reproduction from memory) rises with an increase in intelligence quotient. Data collected for administration B (5-second exposure; stimulus design covered; immediate reproduction from memory) also rise for the higher intelligence quotient banding but is equal across bands 90-110; 111-116, and 117-130, respectively. This data complements the extensive data collected by Benton, Eslinger and Damasio (1981) and allows for potential comparisons with patients with memory and visual spatial deficits (Thompson, 2002) such as those with head injury (Thompson, 2011a) and Alzheimer's disease (Thompson, 2006; Thompson, 2011b).

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## Illustrations

### Illustration 1

WAIS-III full-scale IQs (FIQ) and BVRT correct scores

| <b>FIQ</b>    | <b>BVRT Correct-Admin A</b> | <b>BVRT Correct-Admin B</b> |
|---------------|-----------------------------|-----------------------------|
|               |                             |                             |
| 130 and above | 9                           | 8                           |
| 117 - 130     | 8                           | 5                           |
| 111 - 116     | 7                           | 5                           |
| 90 -110       | 6                           | 5                           |

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