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**Comparison of the WAIS-III and WISC-IV in 16 year old
special education students**

By

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**Comparison of the WAIS-III and WISC-IV in 16 year old
special education students**

Summary

Background Previous research with earlier versions of the WISC and WAIS has demonstrated that when administered to people who have intellectual disabilities, the WAIS produced higher IQ scores than the WISC. The aim of this study was to examine whether these differences still exist. A comparison of the Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) with the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) was conducted with individuals who were 16 years old and receiving special education.

Materials and Methods All participants completed the WAIS-III (UK) and WISC-IV (UK). The order of administration was counterbalanced; the mean Full Scale IQ and Index scores on the WAIS-III and WISC-IV were compared.

Results The WAIS-III mean Full Scale IQ was 11.82 points higher than the mean Full Scale IQ score on the WISC-IV. Significant differences were also found between the Verbal Comprehension Index, Perceptual Reasoning/Organisation Index and Processing Speed Index on the WAIS-III and WISC-IV, all with the WAIS-III scoring higher.

Conclusions The findings suggest that the WAIS-III produces higher scores than the WISC-IV in people with intellectual disabilities. This has implications for definitions of

intellectual disability and suggests that Psychologists should be cautious when interpreting and reporting IQ scores on the WAIS-III and WISC-IV.

Introduction

Definitions of intellectual disabilities tend to include three core criteria: significant impairment of intellectual functioning, significant impairment of adaptive/social functioning and age of onset before adulthood (British Psychological Society, 2000). A significant impairment in intellectual functioning is generally regarded as an IQ below 70, assessed on a well-standardised and reliable assessment on intellectual functioning. The Wechsler Adult Intelligence Scale – Third Edition (WAIS-III, Wechsler, 1997; UK edition, Wechsler, 1998) and the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV, Wechsler, 2003; UK edition, Wechsler, 2004) are probably the most widely used tests of intelligence in children and adults. Although these tests have been found to be highly reliable and valid when used with individuals functioning within the normal range of intelligence, (Wechsler, 1997; 2003) there have been some concerns about how accurately these tests measure intellectual functioning at the extreme ends of the range (Whitaker & Wood, 2008; Whitaker, 2008). Previous research (Nagle & Lazarus, 1979; Spitz, 1988) has suggested that earlier versions of the WAIS produced higher scores than earlier versions of the WISC, in individuals who were functioning in the low IQ range.

Nagle and Lazarus (1979) compared the WAIS with the WISC-R in a group of 30 participants who received special education classes for children with an IQ between 55

and 75. The WAIS yielded significantly higher IQ scores, scoring 13 points higher on the Full Scale IQ than the WISC-R. Significant correlations between the corresponding subtests and IQ scales were found, suggesting that the content was related, despite the non-equivalence of scores. Spitz (1988) investigated whether the difference between the WAIS-R and WISC-R was consistent across different levels of IQ. He looked at existing data from seven previously published studies and combined this with the data from two new studies, giving a total of 236 participants overall. He found that “there was an inverse relationship between the size of the WISC-R/WAIS-R score disparity and the level of the WISC-R IQ, such that the lower the WISC-R IQ, the higher the increment in IQ derived from the WAIS-R” (Spitz, 1988, p.377). However, there has been a lack of recent research to replicate these findings using the most recent versions of the tests and also a lack of research using a sample of participants from the UK. Whitaker and Wood (2008) and Whitaker (2008) examined the criteria for gaining a scaled score of two, as outlined in the manuals for the WISC-IV (UK), the WISC-III (UK) and the WAIS-III (UK). On the basis of this they suggested that the WAIS-III (UK) would produce significantly higher IQs in the low ability range than either the WISC-III or WISC-IV. An unpublished dissertation (Bresnahan, 2008), reported an American study where the WISC-IV and WAIS-III were given to 20 school children with IQs less than 75. The results showed that the mean Full Scale IQ score on the WISC-IV was 14 points lower than the mean Full Scale IQ score on the WAIS-III. Therefore, there is a need to look at the relationship between the UK versions of these tests.

Method

Participants

Participants were selected from four special education schools within one Local Authority area. The inclusion criteria for participants were that they had to be able to speak English, be 16 years of age (the age at which both the WISC-IV and the WAIS-III can be given) and attend a special school. Adolescents who had severe or profound intellectual disabilities and would not be able to complete the IQ assessments were excluded from the study. A total of 17 participants were recruited to the study, which included 8 female and 9 male students. The mean age of participants at the time of the first testing was 16 years 2 months with a range between 16 years 0 months and 16 years 6 months.

Design and Procedure

The research proposal was approved by Division of Clinical Psychology Research Committee at Liverpool University, who also considered the ethical issues. The head teachers of each of the schools involved gave written informed consent to take part in the study.

The Wechsler Adult Intelligence Scale – Third UK Edition (Wechsler, 1998) and The Wechsler Intelligence Scale for Children – Fourth UK Edition (Wechsler, 2004) were administered to all participants. The standardised instructions were followed for both tests. All the compulsory subtests were administered alongside the optional subtests if

they appeared on both the WAIS-III and the WISC-IV. A total of 13 WAIS-III subtests and 13 WISC-IV subtests were administered. There were four participants who did not complete the optional subtests on the WISC-IV (Picture Completion, Information and Arithmetic); however, analysis using these subtests is not reported in this paper.

A repeated measures design was used, with the administration order of the tests counterbalanced to reduce practice effects. Participants were randomly assigned to groups. Group 1 consisted of nine participants who completed the WAIS-III first followed by the WISC-IV. Group 2 consisted of eight participants who completed the WISC-IV first and then the WAIS-III. The testing sessions took place during school hours and in a suitable quiet room within each school. The number of sessions needed to complete the two tests ranged between two and three. The mean test-retest interval was two weeks and ranged between one and 10 weeks. A total of 12 participants had their tests administered and scored by the principal researcher, with an assistant psychologist administering and scoring the tests for five participants. There were no systematic differences between the two examiners. Paired samples *t*-tests were used to compare the mean results of Group 1 and Group 2.

Results

----- Put Table 1 here -----

Table 1 provides a summary of the means and standard deviations of the Full Scale IQ and Index scores. The mean Full Scale IQ score on the WAIS-III was 64.82, (SD = 8.51)

and 53.00 (SD 10.08) on the WISC-IV, 11.82 points lower. A paired samples *t*-test was used to determine the significance of difference between the IQ and Index Scores on the WAIS-III and the WISC-IV. The results were that the WAIS-III yielded significantly higher scores on the Full Scale IQ ($t(16) = 13.02, p < .001$), Verbal Comprehension Index ($t(16) = 7.98, p < .001$), Perceptual Organisation/Perceptual Reasoning Index ($t(16) = 3.68, p < .002$) and Processing Speed Index ($t(16) = 4.86, p < .001$) than on the WISC-IV. There was no significant difference between the WAIS-III and WISC-IV scores on the Working Memory Index ($t(16) = 1.93, p < .071$).

Significant correlations were found between the WAIS-III and WISC-IV Full Scale IQ scores ($r = .93, p < .001$), Verbal Comprehension Index scores ($r = .77, p < .001$), Perceptual Organisation/Reasoning Index Scores ($r = .76, p < .001$), Processing Speed Index scores ($r = .88, p < .001$) and Working Memory Index scores ($r = .67, p < .005$), which suggests that the content of the IQ and Index scores on the two tests was strongly related.

The differences between participant's Full Scale IQ scores on the WAIS-III and WISC-IV ranged between 5 and 20 points and all participants had a higher score on the WAIS-III. There was a negative correlation ($r = -.57, p < .05$) between these differences and the WISC-IV Full Scale IQ, suggesting a greater disparity in Full Scale IQ between the two tests at lower IQ levels. It is also notable that four participants' Full Scale IQ scores on the WISC-IV were 40, which was also the modal score for this test. This is also the lowest Full Scale IQ obtainable on the WISC-IV, which suggests the possibility of a floor

effect. The lowest Full Scale IQ score obtained on the WAIS-III was 49, which was well above the test's lowest obtainable score of 45. With regard to the diagnosis of intellectual disabilities, using the WISC-IV only one participant had a Full Scale IQ of 70 or greater; however, on the WAIS-III six participants had Full Scale IQ scores of 70 or more.

Discussion

The WAIS-III produced a significantly higher mean Full Scale IQ score than the WISC-IV, in a sample of 16 year olds who attended special school. The difference between the mean Full Scale IQ score on the WAIS-III and the WISC-IV was 11.82 points, with the WAIS-III scoring higher. All the participants scored lower on the WISC-IV than the WAIS-III, the smallest difference between any participant's scores was 5 points. The Index Scores, with the exception of Working Memory, were also significantly higher on the WAIS-III, with the differences ranging between 9.50 and 12.58 points. Although this result was obtained with a small sample, it is consistent with the predictions made by Whitaker (2008), a similar unpublished study by Bresnahan (2008) in the US and studies comparing earlier versions of the WISC and WAIS.

Part of this almost 12 point difference is likely to be due the Flynn Effect, which is the trend for the intellectual ability of the population as a whole, including people with low intellectual ability, to increase from one generation to the next (Flynn, 2006). Flynn has estimated this growth in ability to be about 0.3 of an IQ point per year. Since the WISC-IV was standardised 6 years after the WAIS-III, it would be expected to score two points

less than the WAIS-III. Therefore, there is likely to be a 10 points difference between the two assessments in the low IQ range that is due to factors other than the Flynn Effect. It is not clear why the remaining 10 points difference in scores occurs and further research is clearly called for.

The large difference in scores obtained by special education students on the WAIS-III and WISC-IV, which has been found in this study, clearly has implications for professionals working with people who have intellectual disabilities. Currently the WAIS-III and WISC-IV are both used to measure an individual's intellectual ability, in order to determine whether they meet the diagnostic criteria of having an IQ less than 70 for a diagnosis of intellectual disability. Having a diagnosis of intellectual disability can influence many decisions about an individual's life, including parenting assessments, capacity to consent, access to services, and access to educational courses. If the tests are producing different scores, and it is unclear which test is producing the most accurate results, then important decisions are being made on the basis of inaccurate information. Therefore, professionals working with people who have intellectual disabilities need to exercise caution when interpreting IQ scores on the WAIS-III and WISC-IV, particularly when the IQ score is in the mild or borderline ability range.

This study has provided the first empirical comparison of the WAIS-III and WISC-IV in people with intellectual disabilities in the UK. However, the study is limited by the use of a small sample of adolescents, who were all aged 16 and from a single area of the UK. There was also a relatively large range of test re-test intervals. Therefore, further

investigations are needed using larger samples in other countries to add support to these findings. Further research is also needed to investigate the reasons for these differences. The results of such research could help to improve the process of standardisation of future versions of the Wechsler tests.

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Tables

Table 1: Comparison of WAIS-III and WISC-IV means, standard deviations (SD), *t* scores and correlation coefficients (*r*) for the Full Scale IQ and Index Scores

IQ scale/ Index Score	WAIS-III		WISC-IV		Diff	<i>t</i>	<i>R</i>
	M	SD	M	SD			
FS IQ	64.82	8.51	53	10.08	11.82	13.02***	.93***
VCI	67.59	7.62	55.76	9.50	11.83	7.97***	.77***
PRI/ POI	70.29	10.59	62.88	12.58	7.41	3.68**	.76***
WMI	64.35	9.21	60.71	10.09	3.65	1.93	.68**
PSI	71.41	10.38	64.82	11.89	6.59	4.86***	.88***

p* < .05, *p* < .005, ****p* < .001

WAIS-III, Wechsler Adult Intelligence Scale – Third Edition; WISC-IV, Wechsler Intelligence Scale for Children – Fourth Edition; FS, Full Scale; VCI, Verbal Comprehension Index; PRI, Perceptual Reasoning Index; POI, Perceptual Organisation Index; WMI, Working Memory Index; PSI, Processing Speed Index