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Two Studies of Sex Differences on the WAIS in Russia

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Data are reported for two studies of sex differences on the WAIS in Russia. In the first study a sample of 16 year old males obtained a 1.96 points higher Full Scale IQ than females and higher scores on the Arithmetic and Picture Completion subtests while females obtained a higher score than males on the Digit Symbol Search subtest. Males showed less variability than females on the Full Scale IQ. Sex differences for IQs and subtest scores are compared with those in the United States. In the second study a sample of 18 to 35 year old males obtained a higher Full Scale IQ than females by 3.44 IQ points.

Key Words: IQ; Russia; sex differences; WAIS

It has been asserted for more than a century that there is no sex difference in general intelligence defined as the average of a number of abilities and expressed as the IQ obtained from tests like the Wechsler, the Stanford-Binet, the Cattell Culture Fair and many others. For example, in textbooks on intelligence it has been stated that “Gender differences in general intelligence are

small and virtually non-existent" (Brody, 1992, p. 323) and "Males and females do not differ in IQ" (Jensen, 1980, p. 360). This assertion was disputed by Lynn (1994, 1998, 1999), who contended that there is no sex difference in general intelligence up to the age of 15 years but that from the age of 16 years onwards males have a small advantage that increases with age reaching approximately 4-5 IQ points among adults. This position has been confirmed by Lynn and Irwing (2004) in a meta-analysis of sex differences on the Progressive Matrices, a test of non-verbal reasoning ability, that found no difference up to the age of 14 years, a small difference favoring males of 1.5 IQ points at age 15 years, a difference among 16-18 year olds of 2.6 IQ points, and a difference of 5 IQ points among adults. The male IQ advantage from the age of 16 years and over has been confirmed in studies by Nyborg (2003, 2005, 2015), Colom and Lynn (2004), Meisenberg (2009) and Irwing (2012). Despite these results, some scholars have continued to assert that there is no sex difference in intelligence. This position has been restated in a textbook on sex differences by Halpern (2012, p. 233), who writes "females and males score identically on IQ tests."

The Wechsler tests provide some of the best data with which to evaluate this issue because they measure a wide range of verbal, spatial, perceptual, reasoning and memory abilities that are summed to give the Full Scale IQ as a measure of general intelligence. Those who contend that there is no sex difference in intelligence have asserted that there is no difference between men and women in the Wechsler Full Scale IQ (Anderson, 2004; Halpern (2000, p. 91; Halpern 2012, p. 115). This assertion has been shown to be incorrect in a number of studies including four American standardization samples (Piffer, 2016) and standardization samples in which men have obtained a higher average Wechsler Full Scale IQ than women of 4.95 IQ points on the WAIS-R in China (Lynn & Dai, 1993), of 3.1 IQ points on the WAIS-R in Japan (Hattori & Lynn, 1997), and of 3.6 IQ points on the WAIS-III in Spain (Colom et al., 2002). In the present paper we provide further evidence on this issue by presenting data for males and females in two studies of the WAIS in Russia.

Study 1

The Wechsler Adult Intelligence Scale (WAIS) was constructed and standardized in the United States in the 1950s (Wechsler, 1955) and has been used extensively in many countries. It consists of 11 tests shown in Table 1. The first six of these are measures of verbal ability and are summed to give a Verbal IQ. The remaining five are measures of non-verbal ability and are summed to give a Performance IQ. The 11 tests are summed to give a Full Scale IQ. The test has been translated into Russian and was administered to a sample of 155 male and

141 female school students aged 16.0 years in Moscow in 1997-2001. In 2005, average length of schooling in Russia was 11.88 years for those aged 20-24 (www.barrolee.com), so we can be rather certain that everyone was still in school at that age.

Table 1 gives means and standard deviations for males and females for the subtests and the Verbal, Performance and Full Scale IQs, followed by the *d*s (difference between means divided by the pooled standard deviation). The right hand column gives the *d*s for the American WAIS given by Matarazzo (1972). The statistical significance of the sex differences was determined by two-tailed t tests and is denoted by asterisks (*p<.05; ** p<.01; ***p<.001).

Table 1. *Means and standard deviations for males and females on the Russian WAIS, and Cohen's d for sex differences in Russia and the United States.*

Subtests	Males Mean ± SD	Females Mean ± SD	Russia *d*	USA *d*
Information	8.52 ± 3.06	7.86 ± 2.76	.22	.18
Comprehension	8.65 ± 2.33	9.01 ± 2.72	-.14	.11
Arithmetic	9.51 ± 2.82	8.26 ± 2.49	.47***	.32**
Similarities	10.71 ± 2.71	10.50 ± 2.30	.08	-.02
Digit span	9.45 ± 2.38	9.47 ± 2.60	-.01	.00
Vocabulary	10.79 ± 1.99	10.73 ± 2.45	.03	-.12
Digit symbol	10.12 ± 2.24	11.61 ± 2.95	-.56***	-.36***
Picture completion	9.08 ± 1.52	8.64 ± 1.67	.27*	.24*
Block design	12.80 ± 2.62	12.01 ± 2.58	.30**	.13
Picture arrangement	7.83 ± 1.67	7.58 ± 1.94	.14	.00
Object assembly	9.09 ± 2.55	8.82 ± 2.62	.10	.02
Verbal IQ	102.9 ± 11.6	101.1 ± 11.3	.15	.10
Performance IQ	100.3 ± 9.1	99.7 ± 10.7	.06	.10
Full Scale IQ	101.9 ± 10.0	100.5 ± 10.7	.13	.10

Study 2.

This study by Stepanova (2000) reported WAIS Full Scale, Verbal and Performance IQs for a Russian sample of 900 males and 900 females aged 18-35 years collected in 1965-1976. The sample consisted of 5 subsamples differing by the level of education: (1) persons with 8 grades education (incomplete middle education at the time of study) and did not continue to study; (2) students of 9th and 10th grades of "evening schools" (IQ of the students of evening schools is presumably lower than that of the students of the "day" schools); (3) persons with 10 grades education (completed middle education at the time of the study) and did not continue to study; (4) university students; and (5) persons with completed higher (tertiary) education. Males obtained higher IQs than females by .23*d* (3.44

IQ points) on the Full Scale IQ, by .28*d* (4.2 IQ points) on the Verbal IQ, and by .15*d* (2.3 IQ points) on the Performance IQ.

Discussion

There are six points of interest in the results. First, in Study 1 the males obtained a higher Full Scale IQ than the females of .13*d.* This is equivalent to 1.95 IQ points and is about what would be predicted from the theory advanced by Lynn (1994) that at the age of 16 years males begin to obtain a slightly higher average IQ than females that increases with age up to a 4-5 IQ point advantage in adults.

Second, the higher male Full Scale IQ of 1.95 IQ points of the present sample is virtually identical to the male advantage of .10*d* (1.5 IQ points) obtained in the American standardization sample given in the right hand column of Table 1. These results are a further refutation of the assertions by Anderson (2004) and Halpern (2012, p. 115) that there is no difference between men and women in the Wechsler Full Scale IQ.

Third, the sex differences on the subtests in the present sample are closely similar to those in the American standardization sample given in the right hand column of Table 1, shown by the correlation between the *d*s for the Russian and the American samples of .871 (statistically significant at p<.001). In particular, the males obtained significantly higher scores than females on Arithmetic and Picture Completion in both Russia and the United States. The higher score obtained by both samples on Arithmetic confirms the male advantage on this subtest reported by Lynn and Irwing (2008) and interpreted as a measure of a male advantage in working memory capacity. The higher score obtained by both samples on Picture Completion confirms the male advantage on this subtest of spatial ability reported in numerous studies of a male advantage in spatial ability reviewed fifty years ago by Tyler (1965) and more recently by Voyer, Voyer and Bryden (1995). This male advantage is further confirmed by the significantly higher score obtained by males on Block Design, another test of spatial ability, in the Russian sample and in the American sample, although the male advantage is not significant in the American sample. A further consistency in the two samples is that females obtained significantly higher scores than males on Digit Symbol. This is a test of perceptual speed in which the participant has to copy the symbol corresponding to a number and requires the rapid matching of stimuli. The advantage of females in the present samples confirms the results of several studies that have reported that females perform better than males on these tasks, e.g. Jensen (1998); Burns and Nettlebeck (2005); Weiss et al., (2003). This female advantage is also present on the Processing Speed Index IQ (.25*d*) in the standardization sample of the

American WAIS-III by Kaufman and Lichtenberger (2002, p.98), and in processing speed on the Woodcock-Johnson test reported by Camarata and Woodcock (2006).

Fourth, there was no sex difference in Vocabulary (.03*d*) in the Russian sample and no significant difference in the American sample (-.12*d*) confirming Tyler's (1965, p.244) review of early studies concluding that "girls and women do not have larger vocabularies than boys and men".

Fifth, males showed less variability than females shown by their standard deviation of 9.96 on the Full Scale IQ compared with 10.73 for females. This is an unusual result inconsistent with the greater variability of males reported in numerous studies, e.g. Arden and Plomin (2006) and Dykiert, Gale and Deary (2009).

Sixth, in Study 2 the males obtained a higher Full Scale IQ than females by 3.44 IQ points. This is in the middle of the range of the male advantages reported in the seven previous studies summarized in the introduction that varied between the lowest 1.5 IQ points male advantage on the American standardization sample of the WAIS obtained in 1955 (Matarazzo, 1972, Table 12.10, p. 353) and the 4.95 IQ point male advantage on the WAIS-R in China (Lynn & Dai, 1993). This study also showed that the male advantage is present on both the Verbal and Performance IQs. These results provide yet another refutation of the assertions by Anderson (2004) and Halpern (2012, p. 115) that there is no difference between men and women in the Wechsler Full Scale IQ.

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