MANKIND QUARTERLY 2020 61:2 324-328

Sex Differences on the WAIS-III in Taiwan and the United States

Hsin-Yi Chen
Department of Special Education,
National Taiwan Normal University, Taipei, Taiwan.

Richard Lynn*
Ulster Institute for Social Research, London

* Corresponding author; email: lynnr540@aol.com

Sex differences are reported in the standardization samples of the WAIS-III in Taiwan and the United States. In Taiwan, men obtained a significantly higher Full Scale IQ than women of 4.35 IQ points and in the United States men obtained a significantly higher Full Scale IQ than women of 2.78 IQ points. The sex differences on the 14 subtests are generally similar with a correlation between the two of .65. In the Taiwan sample there were no conistent sex differences in variability.
Key Words: Taiwan; WAIS-III; Sex differences; Intelligence; Variability

It has been widely asserted that there is no average sex difference in intelligence, e.g., "There are negligible gender differences in omnibus IQ assessments" (Ackerman, 2018, p. 8) and "When it comes to intelligence, it has been convincingly established that there is no difference between women and men" (Saini, 2017, p. 85). This contention has been disputed by Lynn (1994, 1998, 1999, 2017) in what he has designated the developmental theory of sex differences in intelligence. This states that while boys and girls have the same average intelligence up to the age of 15 years, at the age of 16 years, boys have a slightly higher average intelligence than girls and this increases with age reaching an advantage among adults of around 4 to 5 IQ points. This contention was supported in a meta-analysis of sex differences on the Progressive Matrices among general population samples that showed a male advantage of 5 IQ points among adults (Lynn & Irwing, 2004).

The Wechsler Adult Intelligence Scale (WAIS) provides some of the best data with which to examine the positions that there is no sex difference in general intelligence or that average intelligence of men is higher than that of women in adults. It has been claimed that these tests confirm that men and women have the same average intelligence. Thus, Haier et al. (2004, p. 1) have written that "Comparisons of general intelligence assessed with standard measures like the WAIS show essentially no differences between men and women", and Halpern (2012, p. 115) states of the American WAIS-IV standardization sample that "It yields … an overall IQ score which does not show sex differences". These assertions are however not invariably correct. Thus, Piffer (2016) has reported that on the American WAIS-IV standardization sample males obtained a higher Full Scale IQ of 2.25 points, statistically significant at $p<.001$; and Chen and Lynn (2018) have reported that on the Taiwan WAIS-IV standardization sample males obtained a higher Full Scale IQ of 5.25 points, statistically significant at $p<.001$. To provide further evidence on this issue, we report here a study of sex differences in intelligence on the WAIS-III in Taiwan and the United States.

Method

The Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) was constructed and standardized in the United States on a sample of 2,450 and sex differences have been reported by Irwing (2012). The test was standardized in Taiwan from July, 2001 to October, 2001. The standardization sample consisted of 888 individuals (50% male, 50% female) aged from 16 to 84 years and was drawn from the north, central, east and south geographical regions with education level percentages matched to those of the population given in the census.

The main structure of the Taiwan WAIS-III (Wechsler, 2002) is the same as the American WAIS-III (Wechsler, 1997) in consisting of 14 subtests: Similarities, Vocabulary, Information, Comprehension, Block Design, Matrix Reasoning, Picture Completion, Picture Arrangement, Object Assembly, Arithmetic, Digit Span, Letter-Number Sequencing, Coding and Symbol Search.

Seven composites (three traditional IQ scales and four index scales) were produced by combining subtests. The three traditional IQ scales are the Full Scale IQ (FSIQ), Verbal IQ (VIQ) and Performance IQ (PIQ). The Full Scale IQ is calculated as the sum of the 11 subtests Similarities, Vocabulary, Information, Comprehension, Arithmetic, Digit Span, Block Design, Matrix Reasoning, Picture Completion, Picture Arrangement, and Digit Symbol-Coding. The Verbal IQ is calculated as the sum of the Similarities, Vocabulary, Information, Comprehension, Arithmetic, and Digit Span subtests. The Performance IQ is

calculated as the sum of the Block Design, Matrix Reasoning, Picture Completion, Picture Arrangement and Digit Symbol-Coding subtests.

The four index scales are the Verbal Comprehension Index (VCI), the Perceptual Organization Index (POI), the Working Memory Index (WMI), and the Processing Speed Index (PSI). The Verbal Comprehension Index (VCI) is the sum of the Similarities, Vocabulary and Information subtests; the Perceptual Organization Index (POI) is the sum of the Block Design, Matrix Reasoning and Picture Completion subtests; Working Memory Index (WMI) is the sum of the Arithmetic, Digit Span and Letter-Number Sequencing subtests; and Processing Speed Index (PSI) is the sum of the Digit Symbol-Coding and Symbol Search subtests.

Results

Table 1. *Sex differences on the WAIS-III in Taiwan and the United States. Shown are standardized sex differences d (♂ mean – ♀ mean)/standard deviation); variance ratio (VR) defined as ♂ standard deviation/♀ standard deviation; and t statistic.*

IQ/subtest	Taiwan *d*	VR	t	US *d*
Full Scale IQ	0.29***	1.02	4.40	0.185***
Verbal IQ	0.30***	0.99	4.54	-
Performance IQ	0.24***	1.02	3.59	-
Verbal Comprehension Index	0.37***	1.02	5.45	0.233***
Perceptual Organization Index	0.30***	1.06	4.49	0.219**
Working Memory Index	0.15*	1.03	2.16	0.238***
Processing Speed Index	0.09	0.98	1.37	-0.308***
Similarities	0.21**	0.97	3.19	0.095
Vocabulary	0.31***	0.98	4.68	0.038
Information	0.46***	1.15	6.84	0.433***
Comprehension	0.22**	0.96	3.18	0.276**
Block Design	0.33***	1.07	4.81	0.274***
Matrix Reasoning	0.12	1.04	1.85	0.130*
Picture Completion	0.29***	1.00	4.23	0.076
Picture Arrangement	0.18**	1.09	2.76	0.217**
Object Assembly	0.27***	1.02	3.98	0.040
Arithmetic	0.25***	1.11	3.73	0.399***
Digit Span	0.05	0.95	0.77	0.069
Letter Number Sequencing	0.11	1.00	1.52	0.083
Digit Symbol-Coding	0.03	1.01	0.38	-0.456***
Symbol Search	0.16*	0.93	2.41	-0.108**

Note: *p<.05; **p<.01; ***p<.001, two-tailed statistical significance.

Table 1 gives, reading from left to right, for the Taiwan sample the sex differences expressed as *d* (male mean – female mean divided by pooled SD; positive *d*s denote higher means of males), the variance ratios (male SD/ female SD), the values of t for the statistical significance of the male-female differences, and the *d*s in the American standardization sample of the WAIS-III given by Irwing (2012).

Discussion

There are three points of interest in the results. First, in the Taiwan sample males obtained a higher Full Scale IQ of .29*d,* the equivalent of 4.35 IQ points. This confirms the thesis advanced by Lynn (1994, 1998, 1999) that in adults, males have a higher average IQ than females of around 4-5 IQ points. Males obtained a higher Full Scale IQ in the American standardization sample of the WAIS-III of .185*d* (2.78 IQ points). These two results disconfirm the assertions of Haier et al. (2004) and Halpern (2012) that "Comparisons of general intelligence assessed with standard measures like the WAIS show essentially no differences between men and women" (Halpern, 2012, p. 115).

Second, the sex differences in the Taiwan and American WAIS-III are generally similar. On the 14 subtests the correlation between the two is .65 ($p <$ .001). Thus, in both samples men obtained their greatest advantage on Information and their lowest advantage on Digit Symbol – Coding.

Third, there was no consistent sex difference in variability. On the Taiwan Full Scale IQ the VR of 1.02 is negligible, and males had greater variability in 9 of the 14 subtests while females had greater variability in 5 of the subtests. These results do not confirm the greater variability of males reported in numerous previous studies e.g., Arden and Plomin (2006) and Dykiert, Gale and Deary (2009).

References

Ackerman, P.L. (2018). Intelligence as potentiality and actuality. In: R.J. Sternberg (ed.), *The Nature of Human Intelligence*. Cambridge: Cambridge University Press.

Arden, R. & Plomin, R. (2006). Sex differences in variance of intelligence across childhood. *Personality and Individual Differences* 41: 39-48.

Chen, H.-Y. & Lynn, R. (2018). Sex differences on the WAIS-IV in Taiwan and the United States. *Mankind Quarterly* 59: 121-126.

Dykiert, D., Gale, C.R. & Deary, I.D. (2009). Are apparent sex differences in mean IQ scores created in part by sample restriction and increased male variance? *Intelligence* 37: 42-47.

Haier, R.J., Jung, R.E., Yeo, R.A., Head, K. & Alkire, M.T. (2004). The neuroanatomy of general intelligence: Sex matters. *NeuroImage* 11: 1-8.

Halpern, D. (2012). *Sex Differences in Cognitive Abilities*, 4th edition. New York: Psychology Press.

Irwing, P. (2012). Sex differences in *g*: An analysis of the US standardization sample of the WAIS-III. *Personality and Individual Differences* 53: 126-131.

Lynn, R. (1994). Sex differences in brain size and intelligence: A paradox resolved. *Personality and Individual Differences* 17: 257-271.

Lynn, R. (1998). Sex differences on the Scottish standardisation sample of the WAIS-R. *Personality and Individual Differences* 24: 289-290.

Lynn, R. (1999). Sex differences in intelligence and brain size: A developmental theory. *Intelligence* 27: 1-12.

Lynn, R. (2017). Sex differences in intelligence: The developmental theory. *Mankind Quarterly* 58: 9-42.

Lynn, R. & Irwing, P. (2004). Sex differences on the Progressive Matrices: A meta-analysis. *Intelligence* 32: 481-498.

Piffer, D. (2016). Sex differences in intelligence in the American WAIS-IV. *Mankind Quarterly* 57: 25-33.

Saini, A. (2017). *Inferior: How Science Got Women Wrong and the New Research that's Rewriting the Story*. London: Harper Collins.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) Manual.* San Antonio, TX: Pearson.

Wechsler, D. (2002). *Wechsler Adult Intelligence Scale – Third Edition (WAIS-III) Taiwan Manual.* Taipei, Taiwan: Chinese Behavioral Science Corporation.