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Male–female differences on the Japanese WAIS-R

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Summary—This paper analyzes the standardization sample of the Japanese WAIS-R for male–female differences. It was found that males have a higher full scale IQ by 3.3 IQ points, that differences on the subtests are similar to those in the American standardization sample, and that there has been no tendency for the differences to diminish over a period of ca. 50 yr separating the youngest and oldest cohorts in the sample. © 1997 Elsevier Science Ltd

INTRODUCTION

In this paper, we present data on male–female differences in intelligence in the standardization sample of the Japanese Wechsler Adult Intelligence Scale-Revised (WAIS-R). The data are analyzed to provide information on three questions. These concern the male–female difference in full scale IQ, the differences in the subtests, and whether the difference has changed over time.

The general interest of these questions lies in whether male–female differences in Japan are similar to those in the United States and other countries for which information is available. In respect of the full scale IQ, in the American standardization sample males obtained a mean IQ 2.1 points higher than females (Reynolds, Chastain, Kaufman & McLean, 1987). In respect of the subtest differences, the largest difference favouring males in the American standardization sample were on vocabulary, block design and information, while there were differences favouring females on digit symbol and digit span. With regard to possible changes in male–female differences over time, it has been shown by Feingold (1988) that the male advantage in the differential abilities scale has shown a secular reduction. The Japanese WAIS-R standardization data make it possible to examine whether a similar reduction has occurred in Japan.

METHOD

The Wechsler Adult Intelligence Scale-Revised was constructed and standardized in the United States in 1980 (Wechsler, 1981). A Japanese edition of the test was standardized in 1989 (Shinagawa, Kobayashi, Fujita & Maekawa, 1990). The Japanese standardization sample consisted of 702 males and 700 females aged 16–74 drawn as a representative sample of the population in forms of educational level and geographical location.

RESULTS

Means and standard deviations for males and females on the 11 subtests and the verbal, performance and full scale IQ's for the age groups of 16–19, 20–34, 35–54 and 55–74 yr and for the total sample are shown in Table 1. These differences are expressed as *d* (the difference divided by the pooled standard deviation) in Table 2. The statistical significance of the differences was tested by analysis of variance and the significance levels are designated by asterisks. The *d*'s of the American standard sample are shown for comparison in Table 2, calculated from Kaufman, McLean & Reynolds (1988) and Reynolds *et al.* (1987).

In order to ascertain how far the male–female differences in Japan are similar to those in the United States, the correlation was run for the *d* scores of the total samples in the two countries. The correlation is 0.69, statistically significant at 0.018.

DISCUSSION

The answers to the three questions posed in the introduction can be seen in the data presented in Tables 1 and 2. Firstly, on the full scale IQ, Japanese males obtain a significantly higher mean of 0.22*d*, equivalent to 3.3 IQ points, than females. This compares with the American difference of 0.14*d*, equivalent to 2.1 IQ points. The only other data known to us on male–female scores on the WAIS-R are for the Chinese standardization sample, where the male advantage is 5.0 points (Lynn & Dai, 1994).

Secondly, with regard to the question of the pattern of male–female differences on the subtests in Japan and the United States, the figures given in the last two columns of Table 2 show a fairly close similarity. Notice that in both countries there are relatively large male advantages on information, arithmetic and block design, while the largest female advantage is on

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Table 1. Sex differences on the 11 WAIS-R subtests and IQ's for four age groups and all sample population of Japanese edition

Test	Age / Sex	16–19 M	16–19 SD	20–34 M	20–34 SD	35–54 M	35–54 SD	55–74 M	55–74 SD	All M	All SD
Verbal scale											
Information	Male	10.47	3.22	10.23	3.13	10.32	3.07	10.63	3.20	10.43	3.16
	Female	9.54	3.01	9.96	2.91	9.75	3.32	9.22	2.94	9.58	3.04
Digit span	Male	9.97	3.24	9.88	2.95	9.60	2.91	10.05	2.64	9.90	2.91
	Female	9.97	2.75	9.68	3.02	9.67	2.76	9.36	2.66	9.64	2.79
Vocabulary	Male	10.18	3.14	10.24	3.10	10.39	3.05	10.53	3.25	10.36	3.15
	Female	9.25	2.63	9.49	3.05	9.34	2.97	9.13	2.76	9.29	2.85
Arithmetic	Male	10.09	3.12	10.47	3.17	10.21	3.03	10.42	3.10	10.31	3.11
	Female	9.46	2.65	9.64	2.74	9.68	2.87	9.41	2.52	9.54	2.68
Comprehension	Male	10.28	3.14	10.17	2.80	10.41	3.18	10.61	3.05	10.39	3.04
	Female	9.69	2.92	10.06	3.07	9.60	2.94	9.62	2.80	9.73	2.92
Similarities	Male	10.60	2.93	10.41	2.61	10.07	3.22	10.23	3.32	10.32	3.06
	Female	10.02	2.80	10.51	3.03	10.12	2.98	9.72	3.07	10.06	2.98
Performance scale											
Picture completion	Male	10.19	3.12	10.12	3.00	10.07	3.05	9.84	3.21	10.03	3.11
	Female	9.89	2.84	9.98	2.88	10.08	3.08	10.00	3.20	9.99	3.02
Picture arrangement	Male	10.45	2.55	10.36	2.72	10.40	2.97	10.64	2.93	10.48	2.81
	Female	9.97	2.82	10.16	3.01	10.18	2.78	9.55	3.11	9.93	2.95
Block design	Male	10.51	2.96	10.57	2.69	9.40	3.11	10.06	3.11	10.13	2.98
	Female	9.44	3.09	9.68	3.20	8.86	2.98	9.97	2.88	9.53	3.03
Object assembly	Male	10.48	2.78	10.33	2.93	10.27	3.14	10.13	2.86	10.28	2.92
	Female	10.01	2.60	9.88	3.09	10.11	2.75	10.00	2.98	10.00	2.88
Digit symbol	Male	9.32	3.05	9.74	3.16	9.80	3.29	10.20	3.03	9.81	3.12
	Female	10.68	2.71	10.49	2.58	10.38	2.76	9.71	2.94	10.26	2.77
IQ											
Verbal IQ	Male	101.95	15.85	101.74	14.36	101.34	15.65	102.91	16.22	102.09	15.60
	Female	98.03	12.84	99.50	14.18	98.27	15.02	96.45	14.30	97.91	14.13
Performance IQ	Male	100.88	15.67	100.80	14.10	98.88	15.79	101.04	15.03	100.48	15.13
	Female	99.28	14.40	99.20	15.86	98.48	14.54	98.93	14.93	98.97	14.94
Full scale IQ	Male	101.82	16.23	101.21	13.97	100.39	15.93	102.33	15.37	101.54	15.38
	Female	98.31	13.51	98.95	14.73	98.33	15.09	97.59	14.62	98.23	14.52

Table 2. *d*-Score between males and females on the 11 WAIS-R subtests and IQ's by age

Test	Age group / Population	16–19 Japan	16–19 US	20–34 Japan	20–34 US	35–54 Japan	35–54 US	55–74 Japan	55–74 US	All Japan	All US
Verbal scale											
Information		0.30***	0.17	0.09	0.35***	0.18	0.31***	0.46***	0.31***	0.27***	0.29
Digit span		0.00	0.01	0.07	0.01	−0.02	−0.04	0.26***	−0.07	0.09*	−0.02
Vocabulary		0.32***	0.01	0.24**	0.07	0.35***	0.06	0.46***	0.07	0.36***	0.05
Arithmetic		0.22**	0.17	0.28**	0.37***	0.18	0.44***	0.36***	0.31***	0.27***	0.33
Comprehension		0.20*	−0.09	0.04	0.06	0.26**	0.17**	0.34***	0.16**	0.22***	0.08
Similarities		0.20*	0.13	−0.03	−0.01	−0.02	0.00	0.16*	−0.04	0.09	0.02
Performance scale											
Picture completion		0.10	0.17	0.05	0.09	0.00	0.21**	−0.05	0.21**	0.01	0.17
Picture arrangement		0.18	0.02	0.07	0.18**	0.08	0.26**	0.36***	0.09***	0.19***	0.14
Block design		0.35***	0.31***	0.30***	0.33***	0.18	0.28***	0.03	0.13	0.20*	0.26
Object assembly		0.17	0.05	0.15	0.20**	0.05	0.20**	0.05	−0.06	0.10***	0.10
Digit symbol		−0.47***	−0.44***	−0.26**	−0.29***	−0.19*	−0.27***	0.16*	−0.29***	−0.15***	−0.32
IQ											
Verbal IQ		0.27**	0.08	0.16	0.18	0.20*	0.18	0.42***	0.14	0.28***	0.14
Performance IQ		0.11	0.00	0.11	0.14	0.03	0.18	0.14	0.03	0.10*	0.09
Full scale IQ		0.24**	0.06	0.18	0.16	0.21	0.13	0.12***	0.32	0.22***	0.14

d-Scores and ANOVA results of United States subscales were calculated from Kaufman *et al.* (1988).
d-Scores and ANOVA results of United States IQ's were calculated from Reynolds *et al.* (1987).
* $P<0.1$.
** $P<0.05$.
*** $P<0.01$.

digit symbol. The correlation (0.69) between the *d*'s on the subtests in Japan and the United States shows a high degree of similarity in the pattern of the male–female differences in the two countries.

Thirdly, the question of whether the male–female difference in intelligence is diminishing over time in Japan can be answered by examining the cohort differences in the *d*'s shown in the last row of Table 2. It will be seen that the greatest differences are among the 55–74 yr old (0.32*d*) and the second greatest among the 16–19 yr old (0.24*d*), while the smallest differences are among the two intermediate cohorts of 20–34 yr old and the 35–54 yr old. Analysis of variance shows that there is no significant relationship between age and the male–female differences ($F=0.000$). It is evident therefore that there

has been no tendency for the male–female difference in mean IQ to diminish over a period of ca. 50 yr between the births of the oldest and the youngest cohorts.

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