

# The effect of grade level on WISC-R IQs of 6-year-olds

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To obtain the most accurate results of the Wechsler Intelligence Scale for Children—Revised (WISC-R), Wechsler (1974) standardized the instrument using six demographic variables. One variable that was not considered in the standardization was grade level. The current study assessed the differences in IQ scores of 6-year-old children who were at different grade levels. A total of 40 children were assessed with the WISC-R. The sample included 20 first-grade and 20 kindergarten students. Analyses of variance indicated significant differences between grade levels in full-scale and verbal IQs, suggesting the need for grade level to be considered as a standardization variable. The study also indicated gender differences between and within the groups.

The Wechsler Intelligence Scale for Children—Revised (WISC-R) is reported to be the fifth most widely used psychological test in the United States (Lubin, Larsen, & Matarazzo, 1984). Furthermore, Brown and McGuire (1976) reported that the WISC-R is the most widely used intelligence test for children. Given the extensive use of the WISC-R and in consideration of the impact that assessment results may have on a child, accuracy of the instrument is essential.

Wechsler (1974), in an attempt to make the WISC-R as accurate as possible, incorporated six demographic variables to be utilized in the standardization procedures. These variables were age, sex, race, geographic region, occupation of head of household, and urban-rural residence. However, grade level, which may have an effect on IQ, was not included in the standardization of the WISC-R. The present study was designed to assess the effect of grade level on WISC-R scores.

## METHOD

### Subjects

The sample consisted of 40 children who were 6 years of age at the time of testing. Ten boys and 10 girls were currently in kindergarten, and 10 boys and 10 girls were currently in first grade. The mean age for kindergarten students was 6 years, 2.2 months ( $SD = 2.63$ ). The mean age for first-grade students was 6 years, 6.7 months ( $SD = 2.88$ ). The children were middle class and were selected from three schools that were located in small rural towns in the Midwest.

### Procedure

Permission to conduct the study was obtained from the children's parents and through the administrators of each school. Between November 21, 1990, and December 6, 1990, the WISC-R was administered to each child by either of two individuals who had been trained in ad-

ministering the WISC-R. The tests were administered under standard conditions.

## RESULTS

The data were analyzed through a  $2 \times 2$  analysis of variance (ANOVA). The variables were kindergarten versus first grade and male versus female. Separate  $2 \times 2$  ANOVAs were conducted on full-scale, verbal, and performance IQs.

The mean full-scale IQ score for the total group was 106.6 ( $SD = 14.02$ ). For a summary of the descriptive statistics from the WISC-R IQ results, see Table 1. The statistical analysis of the full-scale IQs yielded significance between kindergarten and first-grade groups [ $F(1,34) = 6.50, p < .05$ ]. The analysis also indicated significance between males and females [ $F(1,36) = 6.50, p < .05$ ]. Summaries of all the ANOVAs are presented in Table 2.

The mean verbal IQ score was 102.5 ( $SD = 14.02$ ). The ANOVA on the verbal IQs indicated significance between kindergarten and first-grade groups [ $F(1,36) = 8.05, p < .05$ ].

The mean performance IQ score for the total group was 110.17 ( $SD = 13.75$ ). The ANOVA of the performance IQ scores showed significance between males and females [ $F(1,36) = 7.247, p < .05$ ].

## DISCUSSION

Through statistical analysis, it was found that six-year-old children in the first grade demonstrated significantly higher full-scale IQs than did kindergarten children. Furthermore, there was a significant difference between the two groups on verbal IQs. However, no significant difference was indicated with performance IQs.

In considering these findings, it appears that grade level does have an effect on WISC-R IQs. Although significance was not achieved with the performance IQs, the fact that higher scores were demonstrated on the full-scale and verbal IQs suggests that grade level should be considered as a variable for standardization.

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**Table 1**  
**WISC-R IQ Descriptive Statistics for Grade Level and Gender**

Grade/Gender	Full-scale		Verbal		Performance	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Kindergarten	101.5	14.08	98.5	14.73	104.6	15.01
Male	105.7	13.52	104.5	15.14	106.6	13.75
Female	97.3	13.34	92.5	11.53	102.6	15.93
First grade	111.7	12.38	106.5	13.45	115.7	10.26
Male	117.7	11.10	112.6	11.74	120.0	6.69
Female	105.7	12.31	100.4	12.24	111.5	11.38
Total group	106.6	14.02	102.5	14.02	110.2	13.75
Male	111.7	12.61	108.5	14.14	113.3	12.72
Female	101.5	13.51	96.4	12.53	107.1	14.54

**Table 2**  
**ANOVA Summary Table of WISC-R Scores**  
**by Grade Level and Gender**

Source of Variability	<i>SS</i>	<i>df</i>	<i>MS<sub>e</sub></i>	<i>F</i>
Full-scale				
Grade level	1040.40	1	1040.40	6.50*
Gender	1040.40	1	1040.40	6.50*
Interaction	32.40	1	32.40	.20
Within groups	5760.40	36	160.01	
Verbal				
Grade level	640.00	1	640.00	3.54
Gender	1464.10	1	1464.10	8.05*
Interaction	.10	1	.10	.0005
Within groups	6501.80	36	180.60	
Performance				
Grade level	1243.22	1	1243.22	7.24*
Gender	390.62	1	390.62	2.27
Interaction	50.63	1	50.63	.29
Within groups	6175.30	36	171.53	

\**p* < .05.

Interestingly, there were also differences indicated between gender. Significant differences were found between boys and girls on both full-scale and performance IQs. One possible explanation for these results is that at this age, males are at a higher stage of intellectual development than are females. However, this explanation is not supported by previous WISC-R standardization results (Wechsler, 1974).

Another possible explanation is that an as-yet-unknown biasing factor played a part in the results. This explanation is debatable for two reasons. First, the difference between the boys and girls occurred at both grade levels. It would seem unlikely that a random effect would have occurred at both levels. Another explanation is that both examiners were male, possibly leading to a biasing effect on the children. This explanation is debatable given the amount of training each examiner had previously received in assessment procedures, specifically with the WISC-R. Further research is needed to help explain this gender difference.

It must be noted that these data clearly do not reflect the national norms presented in the WISC-R manual. Regardless of the discrepancies, additional research, including larger and more representative samples, are needed to further investigate the effect of grade level on WISC-R results. Also, future research might also investigate the effect of grade level at higher age and grade levels. If similar results are found using more representative samples and at other grade levels, then grade level may need to be considered as a variable in the norming of tests designed to measure the abilities of children.

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