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THE EFFECTS OF AGE ON WECHSLER-BELLEVUE TEST PERFORMANCE IN MENTAL DEFECTIVES

by

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B.S. In Ed., Northwestern University, 1931
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1955

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A.B.

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CHAPTER I

BACKGROUND OF THE PROBLEM

The measurement of intelligence of adults and the intellectual decline that takes place with age has received considerable attention in recent years. A summary of research[1] in this field indicates that results of investigations do not yield a definite pattern, and that while many studies show that individual scores on intelligence tests decline after the third decade, the actual rate and amount of decline depend upon the individual, the group, and the test itself.

The measurement of changes that accompany age is complex because of the many variables which must be considered. One of these is the greater variability in older age groups as increasing life experiences introduce more sources of variation, and the more common experiences, such as schooling, which members of our culture share, fall farther into the background. Complexities of the culture add to the opportunities for variability in older and younger groups alike. Anastasi and Foley[2] point out that in research studies these increases in variability are

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[1] Behrens, Herman D., and Royal F. Nestor, "Intellectual Changes During Maturity and Old Age", Review of Educational Research, 20, 361-366, 1950.

[2] Anastasi, Anne, and John P. Foley, Jr., Differential Psychology, New York, MacMillan Company, 284.

important in view of the possible effect on selection of subjects in older age groups. They suggest that the more energetic and possibly the more intelligent individuals may be more available for studies conducted on aging populations, thus introducing a selective factor in sampling.

A common method of measuring decline involves the comparison of older groups with adolescents or young adults. This comparison is often affected by differences in education, with the advantage frequently falling to the younger group. Also many of the tests are patterned after the materials of formal education, thus giving the advantages to the group with the most recent school experiences.

Wechsler's[3] basis for evaluating intelligence is the direct comparison of an individual with his age peers, which provides a more valid measurement of ability in older people and avoids the difficulties mentioned above. Standardization groups, however, may become out of date as a result of social change, such as increase in average years of schooling. An individual of 50 years may have the same relative position in his age group as he had at 20 years, but there may be differences between the performance of 50 year olds of the present year and those of twenty years ago. So while comparisons with an individual's age peers is useful in

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[3] Wechsler, David, The Measurement of Adult Intelligence, Baltimore, Williams and Wilkins, 3rd Edition, 1944, P. 30.

assessing his ability, the problem of comparing age groups presents difficulties as standardization groups become out-dated.

One variable that appears to be of particular significance in changes with age is the original level of ability of the subjects. In general, investigations suggest that the higher the level of ability the smaller the amount and the slower the rate of decline. Owens[4] retested a large group of men of above average ability (originally a class of college freshman) after thirty years, using the Army Alpha test. The results showed no significant decline in any part of the test, but instead an increase of one half sigma in the total score.

In contrast to this, we have Wechsler's[5] standardization data that indicates decline in mental defectives begins earlier, and proceeds faster than it does in average and above average individuals. In his formula for estimating abnormal deterioration, Wechsler uses as a base the "normal decline" found in his standardization group. This is figured from the highest level of performance on this scale, which occurs at 20-24 years of age. The "normal decline" begins with a smoothed value of 1% at 25-29 years and increases to 16% at years 55-59. That this can apply only to the group close to the mean is shown by an analysis of

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[4] Owens, Wm. A. Jr., "Age and Mental Abilities: A Longitudial Study", Genetic Psychological Monographs, 48:3-54, 1953.

[5] Wechsler, Op. Cit. P. 66.

tables of I. Q. scores.

In these tables we find that the performance of individuals of superior intelligence at the age of 45-49 is very little below that of individuals of the same I. Q. score at age 20-24. For example, those with an I. Q. score three standard deviations above the mean on the Wechsler-Bellevue Scale (I.Q. 142, Mean is 100.07 and S. D. is 14.01) show a loss of only five weighted points from individuals a like distance above the mean at age 20-24, (I.Q. 141, Mean is 100.16 and S. D. is 13.7). This is a loss of only three percent in weighted score points. In contrast to this, individuals a corresponding distance below the mean at ages 45-49 (I.Q.58) have a weighted score of 31 points, or 70% less than those of the same I. Q. score at ages 17-19 (point of highest development). Figure 1 shows the rise and fall with age of performance on the Wechsler-Bellevue Scale in terms of total weighted scores for individuals at the mean, three standard deviations above the mean, and three standard deviations below the mean, at age intervals from 10 to 55 years.[6]

Wechsler, Israel and Balinsky[7] studied 134 mental defectives

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[6] Wechsler, Op. Cit. Pp. 236-238.

[7] Wechsler, David, Hyman Israel and Benjamin Balinsky, "A Study of the Subtests of the Bellevue Intelligence Scale in Borderline and Mental Defective Cases", American Journal of Mental Deficiency, XLV, 553-558, April 1941.

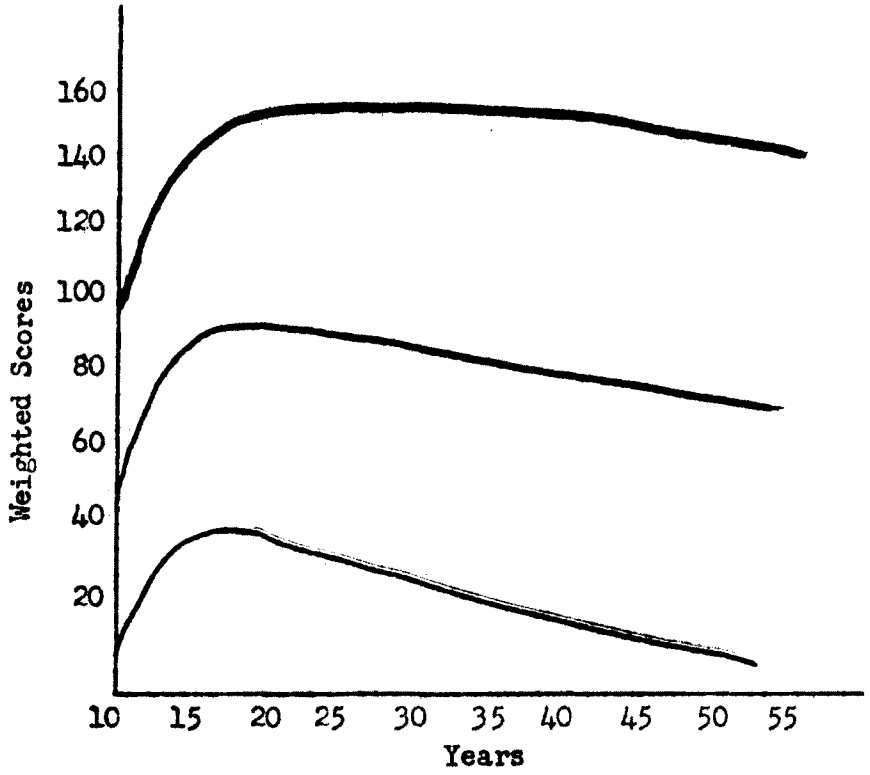

FIGURE 1

WEIGHTED SCORES REQUIRED FOR I. Q. SCORES OF 58, 100, AND 142, AT AGES 10 TO 50.

and 198 borderline cases to determine the discriminative value of various subtests of the Wechsler-Bellevue Scale in the diagnosis of mental deficiency. This study gives patterns of scores of the ten subtests (Vocabulary omitted) shown by subjects in these groups. The older age group in this investigation, made up of subjects from 20-49 years of age, probably included some individuals who had experienced little or no decrease in ability due to age. The difference between the age groups would therefore be suggestive of changes which take place with age in mental defectives, but would not give information as to degree.

In general, the two younger groups (ages 10-14 and 15-19) did best in the Performance tests, with Arithmetic being the lowest of all subtest scores. A comparison of the scores of the younger groups with older mental defectives showed a slight decline with age in all Verbal scores, except Arithmetic which showed a slight increase in the older group. Performance tests showed greater drops with increasing age, the most pronounced being in Picture Arrangement, Picture Completion, and Digit Symbol.

A comparison of the decline in the group of mental defectives in the study quoted and average individuals is shown in Figure 2. This Figure gives mean subtest scores for four different groups. Two of these are average groups of ages 17-19 and 45-49, taken from the standardization data of the Wechsler-Bellevue Scale[8],

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[8] Wechsler, Op. Cit. P. 222

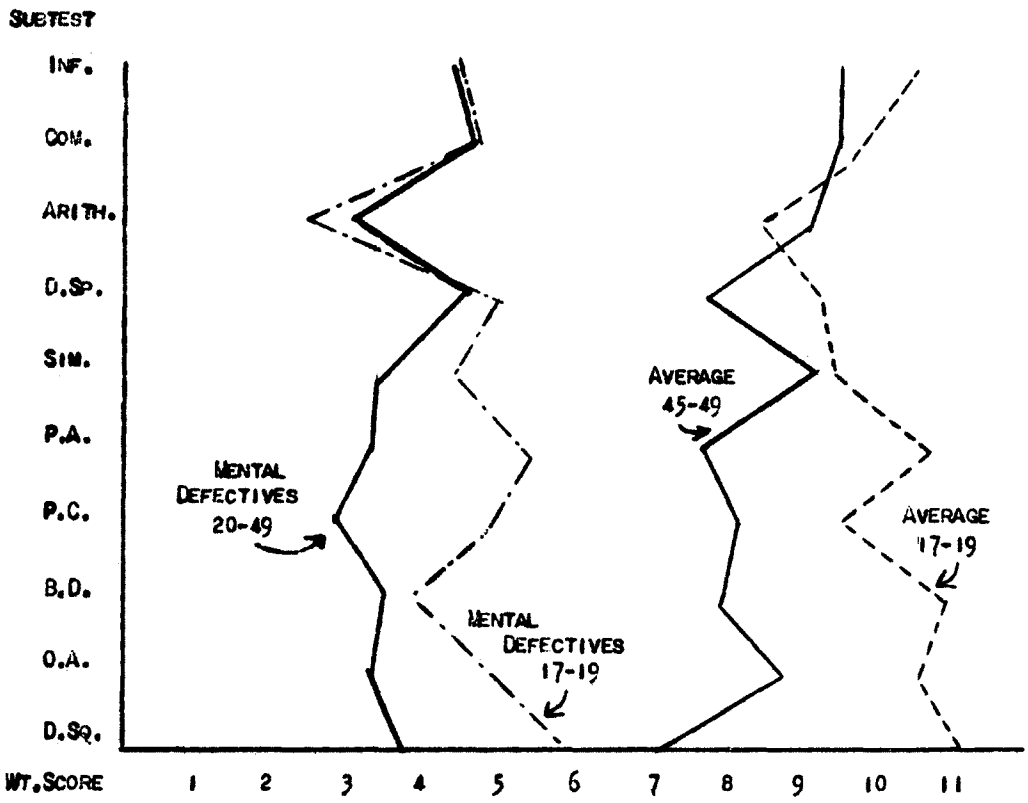

FIGURE 1

MEAN SUBTEST SCORES ON WECHSLER-BELLEVUE SCALE

FOR MENTAL DEFECTIVES AND AVERAGE

INDIVIDUALS

Data on scores of Mental Defectives taken from Wechsler, Israel and Balinsky study.

Data on scores of Average Individuals from Wechsler, "The Measurement of Adult Intelligence" Pages 222.

and the other two are mental defectives (I.Q. 50-65) of ages 15-19 and 20-49, taken from the Wechsler, Israel and Balinsky study.

In comparing the loss shown by these two groups it is seen that the standardization group also showed a slight gain in Arithmetic by the older group and the greatest losses with age in Picture Arrangement and Digit Symbol. The loss on Picture Completion was also marked, but a greater loss was shown in Block Design by the average group, while in the group of mental defectives this showed the least decline with age of any of the Performance subtests.

The marked decline in performance with age in the case of mental defectives as shown in Figure 1 suggests that all subtests of this scale may show loss. The question of how individual subtests contribute to this loss has not been fully answered. That mental defectives tend to have a different pattern of functioning than the average individual, or in terms of Wechsler-Bellevue testing, a different subtest score pattern, is generally accepted and is supported by the data presented in Figure 2. Since the percentage of loss and the original pattern of performance in mental defectives differ from the average, possibly there may be different patterns of decline as well as differing rates.

A study by Corsini and Fassett[9] of 1072 adults with 372 of

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[9] Corsini, Raymond J., and Katherine Fassett, "Intelligence and Aging", Journal of Genetic Psychology, 83, 249-264, 1953.

them above the age of 49, using the Wechsler-Bellevue Scale, supports the other evidence presented that there is decline with age in test performance. They believe the variation downwards is affected by non-intellectual factors such as experiences, education, visual and motor loss, and it is accentuated by the inclusion of tests with visual and motor factors and lessened by material dependent upon continued learning. This is in accord with Wechsler's[10] data that the greatest decline is in those areas involving motor and visual factors.

The stability of vocabulary with age has been more or less accepted from a clinical point of view, although methods of measurement have been challenged. In his standardization material Wechsler does not give statistics on Vocabulary scores, although he considers this subtest as one of the best "hold with age" subtests.[11]

Fox and Birren,[12] in one of their many studies of intellectual functioning in later maturity, investigated "Factors Affecting Vocabulary Size in Later Maturity". This study, made on 216 white men and women residents of a home for aged indigents,

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[10] Wechsler, Op. Cit. P. 222

[11] Wechsler, Op. Cit. P. 64

[12] Fox, Charlotte, and James E. Birren, "Some Factors Affecting Vocabulary Size in Later Maturity: Age, Education, and Length of Institutionalization", Journal of Gerontology, 4, 19-26, 1949.

showed no relationship between vocabulary size and either length of institutionalization or age. They also found no significant sex difference for any age when educational levels were equated. There was a low positive correlation between vocabulary and years of education.

Thompson,[13] who was interested in the course of aging in mental defectives, studied a group of subjects ages 16 and older with Stanford-Binet I. Q. scores in the range of 50-69. He used a series of non-verbal tests, including performance tests taken from both the Wechsler-Bellevue Scale and the Stanford Later Maturity Scale, and reached the conclusion that defectives showed the same pattern of decline with increasing age as did average individuals, but defectives "reached bottom" sooner, with relatively little decline after age 30. In other words, the decline in performance items by morons began earlier and was completed sooner than in normals.

A new test, the Wechsler Adult Intelligence Scale (WAIS)[14] similar in many respects to the Wechsler-Bellevue Scale, Form I, which was used in this study, was released in 1955 after this investigation was under way. At this time there are no available

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[13] Thompson, Clare Wright, "Decline in Limit of Performance Among Adult Morons", American Journal of Psychology, 64, 203-215, 1951.

[14] Wechsler, David, Wechsler Adult Intelligence Scale Manual, New York, Psychological Corporation, 1955, Pp. 81, 91.

studies comparing the two tests, but standardization data on the WAIS does not show the marked decline with age in the case of mental defectives as does the Wechsler-Bellevue Scale. The Wechsler-Bellevue Scale requires a weighted score of 43 points at age 17-19 for a full I. Q. score of 58, and a weighted score of 5 to obtain the same score at age 55-59. This is a loss of 88% in performance as measured by weighted score points. The WAIS requires 36 weighted points for an I. Q. score of 58 at age of 18-19, and 22 weighted points for the same score at age 55-64, or a loss of 38.8%.

The study reported by Thompson, the standardization data of the Wechsler-Bellevue Scale, and the tables for the new WAIS give differing findings as to the rate and amount of decline that takes place with age in individuals at the moron level of ability. This inconsistency indicates that measurement of intelligence of adults in the moron range is a problem needing further study.

CHAPTER II

STATEMENT OF THE PROBLEM

The standardization of the Wechsler-Bellevue Scale brought into focus the decline in test performance as a function of age, and showed equally clearly the influence of the level of ability on the rate of decline. The more rapid decline with age in the case of mental defective subjects is demonstrated by this data. Some aspects of the nature of the loss can be inferred from the relatively greater decline in Performance scores, but there are little specific data as to the subtests which are most affected by age in the case of mental defectives.

We may hypothesize some of the changes with age in mental defectives from studies on other populations. For example, studies by Fox and Birren[1] on large numbers of individuals in late maturity point to relative stability of vocabulary. Other studies point to greater decline in test items involving visual-motor coordination.

Investigations of mentally defective populations with the Wechsler-Bellevue Scale, such as that by Wechsler, Israel and Balinsky[2]

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[1] Fox, Charlotte, and James E. Birren, "Some Factors Affecting Vocabulary Size in Later Maturity: Age, Education, and Length of Institutionalization", Journal of Gerontology. 4, 19-26, 1949.

[2] Wechsler, David, Hyman Israel and Benjamin Balinsky, "A Study of the Subtests of the Bellevue Intelligence Scale in Borderline and Mental Defective Cases", American Journal of Mental Deficiency, XLV, 553-558, April 1941.

suggest that subjects of this intelligence level have different subtest score patterns than do individuals in the average range of population and somewhat differing patterns of decline with age.

In order to study the effects of age on a mentally defective population, three groups of subjects were tested with the Wechsler-Bellevue Adult Intelligence Scale, Form I. Group A was made up of subjects 15-19 years of age; Group B was made up of subjects 25-34 years of age; and Group C included subjects from 40-49 years of age. The problem of the study is primarily one of discovering which subtests show the most significant decline with age and between which groups this decline is most apparent.

From the data of studies cited regarding the pattern of subtest scores of mental defectives and other studies covering large samples of older adults, the following general hypothesis was drawn:

I. There will be some decline in all subtest scores of the Wechsler-Bellevue Scale from Group A to Groups B and C, but subtest scores will show differing degrees of loss.

It was further hypothesized that

II. There will be stability in Vocabulary scores with age; therefore

A. Vocabulary scores of Groups A, B and C will not show significant differences.

B. Since the groups are equated on the basis of I. Q. scores and there will be marked decline in total weighted scores with age, the percentage which Vocabulary contributes to the total score will be greater in Group B than in Group A, and in Group C than in Group B.

III. The decline with age will be greater in Performance scores than in Verbal scores.

A. Group A Performance scores will be significantly above Verbal scores.

B. In Group C Verbal scores will be approximately equal to the Performance scores.

C. In Group B Performance scores will exceed Verbal scores but the difference will not be as great as in Group A.

IV. The greatest decline in Performance items will be found in Picture Completion, Picture Arrangement and Digit Symbol subtests.

A. There will be significant differences in Picture Completion, Picture Arrangement and Digit Symbol scores between Groups A and B, and between Groups B and C.

B. In Group C, Picture Completion, Picture Arrangement,

and Digit Symbol subtests will contribute a smaller Percentage to total weighted score than in Group B.

C. Likewise in Group B these tests will contribute a smaller percentage to the total score than in Group A.

IV. Arithmetic will be low in all groups with no significant differences between groups.

CHAPTER III

PROCEDURE

The problem investigated in this study involves the changes in Wechsler-Bellevue scores in a mentally defective population as a function of age. Ideally a longitudinal approach should be used to give an accurate picture of the changes which take place with age, but as this was not possible, a comparison of different age groups was undertaken, with a realization of the problems presented by such an approach.

All subjects were obtained from the population of the Montana State Training School at Boulder, Montana, and all had been residents of that institution for a minimum of four years. An effort was made to secure subjects with familial type of mental deficiency, and while the records of the school are not adequate to establish this diagnosis for a certainty with each subject, all cases with epilepsy, psychosis, cranial anomalies and mongolism were eliminated, as well as those cases where mental deficiency was ascribed to infection, head injury, or birth injury. In a large percentage of cases, the school records indicated other members of the family were mentally deficient. No case with serious hearing or visual defect was included, nor were cases with a language handicap. All were from the white race. No selection was made on the basis of sex as the test used was standardized on both sexes. Sex division was as follows: Group A, 9 males and 6 females; Group B, 7 males and 8 females; Group C, 9 males and 6 females.

Each group contained fifteen subjects with Group A having an age range of 15 through 19; Group B a range of 25 through 34; and Group C a range of 40 through 49 years. The groups were matched on the basis of Wechsler-Bellevue I. Q. scores, so that all cases fell within the range of 50 to 70 I. Q. score, and the means for all groups were between 57.9 and 58.7.

It is recognized that there may be differences among these groups of which the experimenter was unaware and which were not controlled. It is possible that the younger group was superior because it contained individuals who would be released eventually as capable of making a marginal adjustment "on the outside"; there may be possible differences in admission standards and in general public attitudes so that more children of upper levels were placed in such an institution for special training; in recent years some special education may have been available to these children before they entered the institution.

On the other hand, the possibilities should be considered that the older group may be superior because of higher death rates among lower defectives; some may have been admitted later in life, thus implying they were able to "adjust" longer in society; some may have been admitted in the depression years when economic adjustment of individuals and families was more difficult; and the greater length of time before institutionalization began may have resulted

in greater stimulation and opportunity to learn; or the reverse may be true that a longer time in the institution for some may have had a beneficial effect. As nearly as the experimenter can judge, however, from studying the records of the subjects, educational opportunities, health, socio-economic status, etc. were quite similar.

The Wechsler-Bellevue Adult Intelligence Scale, Form I, was administered to each of the subjects according to the standardized procedure as outlined in "The Measurement of Adult Intelligence", 3rd Edition, by David Wechsler. Administration was by the author and another psychologist[1], with scoring by the author and a random sampling checked by the other psychologist. Tests were given at the State School, either in the school office (for members of the School Department) or in the offices of the cottages (for members of the Custodial Department). These places were selected because routine testing at the school is carried on in these locations. This test had not been used at the school previously, and as every subject had been in the school for at least four years, it is certain that none had experience with this test within that period of time. Lists of subjects were prepared and the subjects were tested in random order. Because it was necessary to test a large number of subjects in Group C in order to meet the criteria of selection, a larger number from this group were tested during the last two days of testing.

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[1] My thanks to Miss Betty Wahlstedt, M. A.

All eleven subtests of the scale were used, and the six Verbal subtests (Information, Comprehension, Digit Span, Arithmetic and Similarities and Vocabulary) were prorated for the Verbal score. This is in accordance with Wechsler's recommendation[2] that Vocabulary be included as a regular subtest and the Verbal part of the scale be reduced to a 5 test base by taking 5/6 of the weighted Verbal score.

To secure as high a degree of cooperation from the subjects as possible small prizes were offered. The prizes were to insure cooperation and motivation, and in addition all subjects were encouraged at the midpoint of the test (after Vocabulary). All subjects were given prizes, but the examiner's impression was that while the awards were appreciated, they were not necessary to gain cooperation.

The choice of the Wechsler-Bellevue Adult Intelligence Scale, Form I, as the instrument of measurement was made on the basis of its standardization by age groups, the Full, Verbal and Performance I. Q. scores, and the subtest arrangement. It is true that the subtests do not necessarily measure specific abilities and are not designed with any particular theory of intelligence in mind, but this test has proved to be a useful clinical tool, and the advantages named above made it valuable in this study.

Statistical analysis of data was made as follows. The mean and standard deviations for weighted and raw scores were computed for each group. To determine the significance of the differences between Groups A and C, Groups A and B, and Groups B and C, *t*'s were

computed for Total, Verbal and Performance weighted scores and for the raw scores of each subtest. Scores of subtests cannot be considered independent data as the same individuals contributed to all subtest scores. The use of t's may be questioned on this basis. While acknowledging this, the method was used as the most satisfactory one available for the handling of this data.

Comparisons were made between raw scores rather than weighted scores because some details of transformation of raw to weighted scores present special problems on the level of ability of these groups. For example, no weighted score of 1 is possible in the Digit Span subtest, as a raw score of 5 equals a weighted score of 0, and a raw score of 6 equals a weighted score of 2. In the average range of intelligence this is of little practical consequence, but in the groups studied because of the cluster of raw scores around 5 and 6, a comparison of raw scores made possible a much finer discrimination.

Groups A, B, and C were also compared by figuring the percentage each subtest, including Vocabulary, contributed to the total weighted score. Subtest scores which decline markedly with age would contribute a smaller percentage in the older groups, and the tests which held relatively stable would contribute a larger percentage to the total score in the older groups. This measure is not one that gives statistically reliable differences, but is included because it points up the direction of the changes that

take place with age.

The experimenter also wished to make some comparison of the pattern of loss with age in the group studied with that of average individuals. The difference in size of total weighted scores of Groups A, B and C, and the Wechsler standardization group average, made a direct comparison of loss in weighted scores meaningless. For this reason the percentage of loss was considered and a table made to show how each subtest contributed to the total weighted score for each group and the differences that are found between age groups. For comparison similar material was compiled from the standardization data of average individuals at corresponding ages. Because the standardization was based on only five Verbal subtests, it was necessary in making this comparison to use only these five Verbal subtests (Information, Comprehension, Digit Span, Arithmetic, Similarities) for Groups A, B and C. This necessitated a table slightly different from the one used in comparing Groups A, B and C.

In the following chapters the entire group studied is referred to as the "experimental group" and the age groups within the larger group are designated as A, B and C. In comparisons with Wechsler's data the term "standardization group" refers to the entire population upon which standardization of the Wechsler-Bellevue Scale was made. Groups A', B', and C' refer to age groups in the standardization population which correspond to Groups A, B and C, respectively.

CHAPTER IV

RESULTS

The means and standard deviations for Total, Verbal, and Performance weighted scores, and for both weighted and raw subtest scores are given in Table I. This shows some decline is present in all subtests from Group A to Group B and from Group B to Group C, with one exception. This is Arithmetic, in which Group A exceeded Group C, but Group C exceeded Group B. These data support the first part of the hypotheses I that there is decline with age in all subtest scores.

Comparisons of Total, Verbal and Performance weighted scores and raw scores of all subtests are found in Table II. This table shows the actual differences between the means of Group A and C, Groups A and B, and Groups B and C. In comparing the scores of Groups A and C it is found that Group A maintains higher Total, Verbal and Performance scores, all significant at the .001 level of confidence. The actual differences between Groups B and C are greater than those between Groups A and B. Between Groups B and C Total weighted scores show significant differences at the .001 level of confidence, the differences between the Performance weighted scores being significant at the .01 level of confidence and the Verbal weighted score differences being significant at the .05 level of confidence. In comparison of Groups A and B, the differences between Verbal weighted scores do not appear to be significant, and the Total and Performance weighted scores show

TABLE I

MEANS AND STANDARD DEVIATIONS OF WEIGHTED AND RAW SCORES

	Group A		Group B		Group C	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Full I.Q.	58.07	7.00	57.90	10.49	58.7	5.84
Total Wt.	42.50	8.78	31.00	12.00	16.5	8.21
Verbal Wt.	14.80	5.04	11.87	3.91	8.4	4.34
Perf. Wt.	27.73	7.69	19.13	10.44	8.1	7.54
Inform. Wt.	3.13	.89	2.93	1.78	2.07	2.07
Compre. Wt.	3.53	3.42	2.87	2.55	1.40	3.87
Dig. Sp. Wt.[a]	2.87	3.18	1.93	3.93	1.27	3.72
Arith. Wt.[b]	.33	2.59	0.00	0.00	.07	.26
Simil. Wt.	3.60	3.02	2.87	2.88	1.73	2.22
Vocab. Wt.	4.20	1.08	3.80	1.32	3.60	1.30
Pict. Ar. Wt.[b]	4.20	2.95	2.87	3.75	1.53	3.09
Pic. Com. Wt.[c]	5.20	2.73	3.67	3.70	1.13	2.36
Bl. Des. Wt.[b]	5.20	2.86	3.73	2.79	1.87	2.95
Obj. Assm. Wt.	7.67	3.91	5.33	7.09	2.27	7.37
Dig. Sym. Wt.	5.47	2.24	3.53	3.31	1.27	2.39
Inform. Raw	2.53	1.60	2.40	2.72	1.20	2.00
Compre. Raw	3.80	3.53	2.87	2.55	1.40	3.87
Dig. Sp. Raw	6.67	2.10	5.60	2.97	5.00	2.70
Arith. Raw	.87	2.30	.40	1.49	.53	1.61
Simil. Raw	3.67	2.64	2.67	4.08	1.13	2.77
Vocab. Raw	8.87	1.92	7.67	2.53	6.60	1.96
Pict. Ar. Raw[d]	3.80	4.09	2.27	4.40	.53	3.12
Picture Com.Raw	6.73	2.25	5.33	2.79	2.80	2.45
Bl. Des. Raw	9.20	6.17	5.80	7.09	1.60	3.96
Obj. Assem.Raw	14.53	4.47	11.87	6.65	7.33	6.26
Dig. Symb. Raw	23.73	8.11	15.67	10.56	6.40	11.93

[a] No weighted score of 1 or 5 possible
[b] No weighted score of 2 possible
[c] No weighted score of 5 possible
[d] No raw score of 1 possible

TABLE II

SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS OF TEST SCORES

FOR GROUPS A, B, AND C

	Differences in Scores between			t's showing significance of differences between		
	A and C	A and B	B and C	A and C	A and B	B and C
Wt. Scores						
Total	26.00	11.50	14.50	8.217[a]	2.461[c]	3.883[a]
Verbal	6.40	3.90	3.50	3.759[a]	1.818	2.231[c]
Performance	19.60	8.60	11.00	7.025[a]	2.568[c]	3.294[b]
Raw Scores						
Information	1.33	.13	1.20	1.962	.150	1.360
Comprehension	2.40	.93	1.47	1.750	.816	1.225
Digit Span	1.67	1.07	.60	1.890	1.130	.570
Arithmetic	.34	.47	+.13	.460	.511	.216
Similarities	2.54	1.00	1.54	2.560[c]	.794	.944
Vocabulary	2.27	1.20	1.07	3.164[b]	1.450	1.275
Pic. Arrange.	3.27	1.53	1.74	2.459[c]	.951	1.243
Pic. Compl.	3.93	1.40	2.53	4.545[a]	1.500	2.619[c]
Block Design	7.60	3.40	7.60	4.000[a]	1.811	2.000
Obj. Assemb.	7.20	2.66	4.54	3.616[b]	1.282	1.923
Dig. Symbol	17.33	8.06	9.27	4.652[a]	2.309[c]	2.232[c]

[a] Significant at .001 level of confidence
[b] Significant at .01 level of confidence
[c] Significant at .05 level of confidence

differences significant at the .05 level of confidence.

These significant differences are to be expected for the Total weighted scores due to the standardization of the test, which requires higher weighted scores for younger subjects of the same I. Q. level, and it would follow that Verbal and/or Performance weighted scores would likewise show differences.

An examination of the t's of subtests indicate that 10 out of 33 show significant differences at the .05 level of confidence and 5 at the .01 level and 3 at the .001 level of confidence. With the exceptions of Similarities and Vocabulary subtests all of these are found in the area of Performance tests. These results support the second part of the general hypothesis that subtest scores will show differing degrees of decline with age.

As the study involved a large number of t's and it was assumed that some of these might show significant differences by chance, the test of significance for a series of statistical tests was used. This procedure[1] gives the chance probability of obtaining a certain number of significant differences from a specified number of tests, but it does not indicate which of these are the result of chance and which are the result of "true" differences between groups. It is found that the chance probability of obtaining 10 scores significant at the .05 level of confidence out of 33 tests is less than

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[1] Sakoda, James M., Burton H. Cohen, and Geoffrey Beall, "Test of Significance for a Series of Statistical Tests", Psychological Bulletin, 51: 172-175, March 1954.

.001. The chance probability of obtaining 5 differences at the .01 level of confidence is also less than .001. Only thirty three tests were considered in this series as the differences in Total, Verbal and Performance weighted scores are due to the standardization of the test.

Table III shows the percentage which each subtest contributes to the total weighted score in Groups A, B, and C, and the differences between the age groups. In this table a minus figure in the column of differences indicates that in the older groups this subtest contributes less than in the younger groups. It can be seen that Information, Similarities and Vocabulary contribute a higher percentage in the older groups, and that Picture Completion, Object Assembly and Digit Symbol contribute a greater percentage in the younger group. This point is discussed further in connection with the other hypotheses.

Hypothesis II, relating to the stability of Vocabulary scores with age, is only partially supported by the data. Table II on page 24 shows that the difference in Vocabulary from Group A to Group C is significant at the .01 level of confidence. Part B of this hypothesis that Vocabulary will contribute a higher percentage to total weighted score in Group B than in Group A, and in Group C than in Group B, is upheld. Table III indicates that the Vocabulary contribution to the Total weighted score increases from .085 in Group A to .182 in Group C, or a total of 9.7% of the total

TABLE III

PERCENTAGE EACH SUBTEST CONTRIBUTED TO TOTAL WEIGHTED SCORES FOR GROUPS A, B, AND C, AND DIFFERENCES BETWEEN GROUPS

Subtest	Percentages Contributed			Differences		
	A	B	C	A to C	A to B	B to C
Information	.061	.079	.105	.044	.018	.026
Comprehension	.068	.076	.071	.003	.008	-.005
Digit Span	.056	.052	.064	.008	-.004	.012
Arithmetic	.007	.000	.003	-.004	-.007	.003
Similarities	.071	.076	.087	.016	.005	.010
Vocabulary	.085	.102	.182	.097	.017	.080
Picture Arrange.	.100	.093	.093	-.007	-.007	.000
Picture Complet.	.121	.118	.068	-.053	-.003	-.050
Block Design	.121	.120	.113	-.008	-.001	-.007
Object Assembly	.181	.172	.138	-.043	-.009	-.034
Digit Symbol	.129	.114	.077	-.052	-.015	-.037

- Indicates in older groups this subtest contributes lower percentage to total weighted score.

weighted score. Most of this change takes place between Groups B and C, with an increase of 8% here and only 1.7% between Groups A and B.

The data support Hypothesis III that decline in Performance scores will be significantly greater than in Verbal scores. In Group A, Performance scores are in excess of Verbal scores by 12.9 weighted points, and the *t* of 5.591 is significant at the .001 level of confidence. In Group B the Performance scores exceed Verbal scores by 7.3 weighted score points, and the *t* of 2.778 is significant at the .01 level of confidence. In Group C the difference between Verbal and Performance scores is not significant, as *t* is only .053 and the actual difference is .3 weighted score point.

Hypothesis IV that the greatest decline in Performance items will be found in Picture Completion, Picture Arrangement and Digit Symbol subtests was only partially supported by the data. From Table III the greatest decreases in percentage contributed to the total weighted scores from Group A to Group C are in Picture Completion with .053, Digit Symbol with .052, and Object Assembly with .043. Differences in percentage contributed by Picture Arrangement were small.

All of these subtests show a difference significant at the .05 level of confidence, and Block Design was also significant at the .001 level of confidence. In this study Picture Completion, Block Design, and Digit Symbol show the most significant

differences, with Digit Symbol being the test to show the greatest difference, not only between Groups A and C, but also between Groups A and B and Groups B and C. The hypothesized decline in Picture Arrangement did not appear, and Object Assembly, which was considered relatively stable did decline. Block Design showed a significant difference but the measure of change in percentage contributed to the total score was not as great.

The fifth hypothesis that Arithmetic scores would be low and that there would be little difference in age groups was upheld by the data. The smallest differences were found in this subtest and all scores were so low that the mean was below one weighted score point and this test contributed less than one percent to the total score in all groups.

Attempts to compare the pattern of decline in subtest scores of the experimental group with an average group were unsatisfactory. This was due primarily to the large standard deviations which were found in Groups A, B and C for all scores. A comparison of percentage each subtest contributed to total weighted scores for "normals" for corresponding age groups was made and is given in Table IV. Groups A', B' and C' are age groups from the standardization tables corresponding to A, B and C, respectively. In this table only five Verbal tests (Vocabulary omitted) are used for Groups A, B and C, as this is the plan in the standardization data.

TABLE IV

PERCENTAGE CONTRIBUTED BY SUBTESTS TO TOTAL WEIGHTED SCORES FOR GROUPS A, B, AND C, AND CORRESPONDING AGE GROUPS OF AVERAGE INTELLIGENCE*

Subtest	A	A'	B	B'	C	C'
Information	.076	.105	.099	.102	.142	.112
Comprehension	.086	.099	.097	.105	.096	.111
Digit Span	.069	.090	.065	.097	.087	.096
Arithmetic	.008	.088	.000	.097	.005	.103
Similarities	.089	.096	.097	.100	.118	.109
Picture Arrange.	.102	.108	.097	.099	.105	.089
Picture Complet.	.126	.097	.123	.099	.077	.098
Block Design	.126	.108	.124	.098	.128	.094
Object Assembly	.186	.101	.179	.099	.155	.101
Digit Symbol	.132	.108	.119	.100	.087	.087

A' - Average Score from Standardization - Age 15-19 years
B' - Average Score from Standardization - Age 25-34 years
C' - Average Score from Standardization - Age 40-49 years

* For this table only five Verbal subtests were used. This was so that comparison could be made with standardization data which uses only 5 Verbal subtests.

TABLE V

DIFFERENCES BETWEEN AGE GROUPS IN PERCENTAGE CONTRIBUTED BY SUBTESTS TO TOTAL WEIGHTED SCORE

Subtest	A and C	A' and C'	A and B	A' and B'	B and C	B' and C'
Inform.	.066	.007	.023	.003	.043	.010
Comprehen.	.010	.012	.011	.006	-.001	.006
Digit Span	.018	.006	-.004	.007	.022	-.001
Arithmetic	-.003	.015	-.008	.009	.005	.006
Similarities	.029	.013	.008	.004	.021	.009
Pict. Arr.	.003	-.019	-.005	-.009	.008	-.010
Pict. Com.	-.049	.001	-.003	.003	-.046	-.001
Bl. Design	.002	-.014	-.002	-.010	.004	-.004
Obj. Assem.	-.031	.000	-.007	-.002	-.024	.002
Digit Sym.	-.045	-.021	-.013	-.008	-.032	-.013

- Indicates in older age group the subtest contributed lower percentage to total weighted score

The greatest differences shown between the experimental and the standardization groups in this table are in Information, Picture Completion, Object Assembly, and Digit Symbol. Information shows a greater increase in percentage contributed to the total, and Picture Completion, Object Assembly, and Digit Symbol a greater decrease in percentage contributed with age in the experimental group.

These results are only suggestive and were not validated statistically. Inspection of the standard deviations of subtests showed great variability in the groups and raised serious question as to the significance differences in decline between the standardization and experimental group. To test the significance of these differences the following procedure was used, which is an analysis to discover whether the differences between the experimental and the average group at different ages indicate a trend or may be due to chance.

The differences in mean raw scores for each subtest between Wechsler's 15-19 age group and Group A were computed and used as a "base". The difference between Group B and the standardization group of corresponding age was then computed. If the difference between Group B and the corresponding age standardization group was significantly greater or less than the "base" difference, it would be more than two standard deviations of the Group B distribution from this "base". This difference would be

TABLE VI

DIFFERENCES IN DECLINE WITH AGE BETWEEN EXPERIMENTAL AND STANDARDIZATION GROUPS

Subtest	Base[a]	Difference between B and B'	2 S.D.[b] above and below base	Difference between C and C'	2 S.D.[c] above and below base
Inform.	11.47	10.55	6.03 - 16.91	11.60	7.47 - 15.47
Compre.	7.10	8.33	2.00 - 12.20	9.35	0.00 - 14.05
D. Span	4.36	5.82	0.00 - 10.30	5.70	0.00 - 9.76
Arith.	5.78	7.05	2.80 - 8.76	6.52	2.56 - 9.00
Simil.	7.96	9.08	0.00 - 16.12	10.37	2.42 - 13.50
Pict. Ar.	8.00	8.53	0.00 - 16.80	8.07	1.76 - 14.24
Pict.Com.	3.64	5.37	0.00 - 9.22	6.80	0.00 - 8.54
Bl. Des.	13.40	14.20	0.00 - 27.58	14.80	5.58 - 21.32
Obj. As.	3.64	5.83	0.00 - 16.94	9.52	0.00 - 16.16
Dig. Sym.	20.47	24.53	0.00 - 41.57	24.80	0.00 - 44.32

[a] Base is the difference in raw score points between the average group age 15-19 (Standardization data) and Group A

[b] Standard deviation of Group B distribution for each subtest

[c] Standard deviation of Group C distribution for each subtest

significant at the .05 level of confidence.

These computations were made for five Verbal and five Performance scores and are given in Table VI. The first column gives the "base" which is the difference in raw scores between average 15-19 year olds and Group A. Differences between Groups B and B' are given in the second column, and the third column shows the range about the "base" determined by two standard deviations of the distribution of Group Bs scores. Similar information is given for Group C in the next two columns.

All the differences fall within the limits set by two standard deviations on either side of the base difference. It must be assumed with such extreme variance in the experimental group that no conclusion can be reached concerning differing rates of decline in Groups B and C and in the groups of average individuals.

CHAPTER V

DISCUSSION

The present study emphasizes the conclusion reached by Behrens and Nestor[1] that the amount, rate, and pattern of decline in test performance with age varies with individuals. It seems reasonable to assume that the group studied had more similar experiences and learning opportunities than many experimental groups, in that all have lived together in a somewhat restricted institutional environment for at least four years. In spite of the many similarities in environment and some observable "institutionalized" responses, individual variation stands out. The extremely large standard deviations for all subtest scores emphasize this as do the individual scores reported in Tables VIII, IX, and X.

Some trends are observable, however. The marked loss in Performance scores as against Verbal scores is the most obvious. This pattern is found in normal individuals as shown by the standardization figures and such studies as that by Corsini and Fassett.[2] The experimental group showed the normal pattern in this regard, but one that is accentuated.

Information, which Wechsler considered a relatively stable

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[1] Behrens, Herman D., and Royal F. Nestor, "Intellectual Changes during Maturity and Old Age", Review of Educational Research, 20: 361-366, 1950.

[2] Corsini, Raymond J. and Katherine Fassett, "Intelligence and Aging", Journal of Genetic Psychology, 83: 249-264, 1953.

subtest, showed no significant change with age in the experimental group. In noting the group means and the percentage contributed to the total weighted score it is seen that actual performance showed less decline with age than did most subtests, and Information may be classed with the tests which hold up well with age in the experimental group.

Comprehension is another subtest which is classified in the stable group by Wechsler.[3] The differences between the groups in this study are very low and this is one of the few subtests in which changes in percentage contributed to total score do not show some indication of trend. In the experimental group Comprehension appears to hold its relative position in Groups A, B, and C, not contributing increasing amounts to total weighted scores as do Information and Vocabulary. It shows some actual, but not proportional decline with age.

None of the differences between groups on the Digit Span subtest are great enough to be significant. This subtest contributes less than the expected amount (10%) to total weighted scores for any age group, and holds up well with age. This is in contrast to Wechsler's finding that in normals the test is one that shows decline with age.

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[3] Wechsler, David, Measurement of Adult Intelligence, 3rd Edition, Baltimore, Williams and Wilkins, 1944, P. 64.

As stated in Chapter IV, the Arithmetic subtest mean was much lower than any other. It was the test most consistently failed by all age groups in the study. There were 89 weighted scores of 0 by this group of 45 subjects on the 11 subtests, and 39 of these were in Arithmetic. It would appear that this test is inappropriate for this group as the base is too high. Arithmetic is considered by Wechsler to be one of the tests which do not hold with age. No significant differences between age groups were found for this test, probably because it does not discriminate at the intellectual level of these subjects.

Similarities is another subtest considered by Wechsler to fall in the group of tests which do not hold with age. In the percentage which it contributes to the total weighted scores in normals it shows an increase with age, which in general characterizes the "hold" tests. The amount, however, is not as great as in the case of Information and Object Assembly, other "hold" tests. In the experimental group a difference at the .05 level of confidence was shown between Groups A and C, although none was indicated between Groups A and B, nor between Groups B and C. The percentage contributed to total weighted scores shows only slight increase with age. Results appear to be inconclusive in the case of this subtest.

The results of Vocabulary measures were discussed to some extent in Chapter IV. This subtest, which in most studies has been

found relatively stable, showed a significant difference between Groups A and C, although not between A and B nor between B and C.

This subtest showed the least variance of any. It showed the greatest gain with age in percentage contributed to total weighted scores of any subtest, and the least actual loss with age in weighted score points, thus indicating some stability in actual performance.

The difference between Groups A and C, which is significant at the .01 level of confidence cannot be ignored, but it is the opinion of the writer that Vocabulary is relatively stable. The drop in mean from Group A to Group C is only .6 weighted points, the smallest drop in any subtest except Arithmetic which in no group exceeded a weighted score of .34. The standard deviation for Vocabulary is small and therefore raises the t. The evidence for a significant loss does not appear strong enough to refute completely other evidences of stability.

The examiners became aware of a certain "institutional" vocabulary while administering this test. It was evidenced in the marked similarity of definitions given. "Cedar", the 12th word on the Vocabulary test marked the last successful attempt of 28 of the 45 subjects. Eleven were not able to define this word and had no successes past it, and six of the group did succeed past this point. It is the opinion of the writer that this test is relatively stable in this group, not only because vocabulary is an ability that

holds up with age, but because similarities in environment of the group studied have resulted in an "institutional" vocabulary.

Picture Arrangement is listed by Wechsler with the tests which do not hold up with age, and the study of mental defectives[4] also suggested a marked drop with age in this subtest. In the comparison of Groups A and C we find a significant difference at the .05 level of confidence. An artifact in scoring may affect the results, as a raw score of 1 is impossible, since this is given only for an inadequate solution of problems 5 or 6, and standard procedure is to discontinue the subtest after three successive failures. This tends to increase the variance within the group and therefore to decrease the t which otherwise might have been larger. Other measures, however, are not suggestive of any marked loss with age, so it appears that in the experimental group the results are inconclusive.

One of the most consistent patterns of loss with age is found in the Picture Completion subtest as a significant difference is found between Groups A and C at the .001 level of confidence and between Groups B and C and the .05 level. In the experimental group the loss in percentage contributed to total weighted score shows a steady decrease with age. The "normal" pattern differs from

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[4] Wechsler, David, and Hyman Israel and Benjamin Balinsky, "A Study of the Sub-Tests of the Bellevue Intelligence Scale in Borderline and Mental Defective Subjects", American Journal of Mental Deficiency, XLV: 553-558, April 1941.

this in that it is considered by Wechsler to be one of the "hold" tests, and the percentage it contributes to total weighted score is practically constant with age.

The Object Assembly subtest shows a differing pattern in the experimental and standardization groups. Wechsler considers this a "hold" test, and the difference in percentage contributed to the total weighted scores is very small between A' and B' groups and between B' and C' groups. Between Groups A and C the differences is significant at the .01 level, and the percentage contributed to the total weighted scores shows marked loss with age.

The group of mental defectives studied showed significant losses with age on the Block Design subtest, the difference between Groups A and C being significant at the .001 level of confidence. This test is listed by Wechsler with the "do not hold" group, and the percentage it contributes to total score shows a drop with age in the standardization group. The experimental group also shows a decline with age in the percentage contributed to the total score, but the proportional drop is greater in the standardization group.

Digit Symbol, the test in which speed is most important, showed the greatest loss of all subtests. It is the only one which gave significant differences between both Groups A and B and between Groups B and C. These are significant at the .05 level and the difference between Groups A and C is significant at the .001 level of confidence. The drop in percentage contributed to the total also points to marked loss with age. In normal groups Digit Symbol also

shows the largest decline with age. Probably much of this decline in the mental defective group comes from the "slowing down" process of age, and thus reflects a physiological differences rather than a purely intellectual one. Intellectual factors may be more important in this group than in the average group, however, as one third of Group C failed to comprehend the task and thus scores were lowered for some other reason than speed of response.

In view of some of the marked drops in test scores between Groups A and C, the lack of significant differences between Groups A and B and between Groups B and C is worthy of attention. The decline in total weighted scores is linear, and most of the subtests show trends as measured by changes in percentage contributed to the total weighted score. A possible reason for this may be found in the large standard deviations of Group B in Total and Performance scores. It may be that the absence of more significant differences between adjacent groups comes from the distribution of scores in the intermediate group.

The data did not give any reliable indication of differences or similarities in the pattern of decline with age as found in this group of institutionalized mental defectives and "average" individuals from the standardization group. Table VI on page 33, while showing differences in increment of decline with age in subtest scores, does not show these to be statistically significant at the .05 level of confidence. Such differences may be present, and possibly they are obscured by the marked variability in Groups A, B, and C. On

the basis of this study, it can only be said that differences in pattern of decline between the experimental and standardization groups were not found. There were significant differences with age found in certain subtest which Wechsler considered stable with age.

Throughout the testing, the difference between weighted scores required for adolescents and older adults to obtain I. Q. scores in the range selected was apparent. The tables showing that a person of 17 must earn over six times as many weighted score points as an individual of 40 to obtain an I. Q. score of 50, simply states this statistically. It was found that in order to secure subjects in Group C whose I. Q. scores on the Wechsler-Bellevue Scale were in the range of 50 - 70, it was necessary to use individuals whose Binet I. Q. scores from previous testings were in the 30's and 40's. It is difficult, and probably impossible, to demonstrate that the subjects in Group C represent a lower level of intellectual ability than do subjects in Groups A and B. There are a number of reasons this difference cannot be shown. Previous testing had been done by a number of examiners; both the 1916 and Terman-Merrill Revisions of the Binet scale had been used; marked differences in time between testings were found; correlations between previous testing and results of this study were low, and range from r=46 for the entire group to r=78 for Group B.

Other information, however, gives rise to the question as to whether these groups were actually equated on the intelligence level. The mean for Group A on the Wechsler-Bellevue Scale was lower than the Binet mean (previous testing) by 4 points. In Group B the Wechsler-Bellevue mean exceeded the Binet mean by 8 points, and in Group C the Wechsler-Bellevue mean exceeded the Binet mean by 15 points. Thirty cases were tested for Group C, and all had Wechsler-Bellevue I. Q. scores above the previous Binet I. Q. scores.

A number of factors may be responsible for this differences, but the question must be raised as to whether the loss with age as shown on the standardization data comes from faulty sampling. The fact that the new Wechsler Adult Intelligence Scale does not show this marked drop adds support to the impression that the original Wechsler sampling may have been biased in this particular intellectual range in the upper age levels.

CHAPTER VI

SUMMARY

The problem investigated is the nature of the decline in mental efficiency which takes place in institutionalized mental defectives. Other studies indicate that this begins earlier, is greater, and proceeds more rapidly than in average individuals.

The Wechsler-Bellevue Intelligence Scale, Form I, was selected as the instrument because of the subtest arrangement and its standardization at various levels of adolescence and adulthood. As a longitudinal study was not possible, three groups of subjects from the Montana State Training School, Boulder, Montana, were used. These groups were equated as far as possible except for age. There were 15 subjects in each group, with Group A including subjects 15-19 years of age, Group B those of 25-34 years of age, and Group C those of 40-49 years of age.

Group A had a mean I. Q. score of 57.07, standard deviation of 7, range of 50-70; Group B had a mean I. Q. score of 57.9, standard deviation of 10.49, and a range of 50-69; Group C had a mean of 58.7, standard deviation of 5.84, and a range of 50-67.

Differences between groups were analyzed by the use of Student's *t*'s in regard to Total, Verbal and Performance weighted scores and raw scores for all subtests. The percentage which each subtest contributed to total weighted score was reported for the experimental and standardization groups.

The first hypothesis that some decline would take place with age in all subtest scores and that the loss with age would vary in each subtest was upheld by the data.

The results were inconclusive concerning Hypothesis II that Vocabulary is a stable test and shows little or no decline with age.

Hypothesis III that the drop with age in Performance scores would be greatly in excess of the drop in Verbal scores was supported by the data.

The subtests which showed the most marked drop with age in the experimental group were different to some extent from those hypothesized. Picture Completion, Object Assembly and Digit Symbol showed the most consistent loss with age in this group. Block Design showed some indications of loss and results on Picture Arrangement were not conclusive.

Attempts to compare the loss in the group studied with that shown in Wechsler's standardization group showed no statistically significant differences. The small number of subjects and the wide variance in groups may have obscured "real" differences.

The groups used in this study were small, although they included practically all the population of the Montana State Training School that satisfied criteria of selection as to age, type of defect and I. Q. score. Results of this study can apply only to this population, but they suggest some differences in pattern of

decline which are associated with mental deficiency.

Some results of the study raise the question as to possible bias in Wechsler's sampling of his standardization group. A study similar to this, with a larger number of subjects and using the new Wechsler Adult Intelligence Scale with its improved standardization, would be of value.

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APPENDIX

TABLE VII

PERTINENT DATA REGARDING SUBJECTS

No.	Sex	Birth Date	Admission Date	Date of Test	Examiner
1A	M	8/3/39	7/27/48	1/23/55	AB
2A	M	4/28/36	6/11/46	1/29/55	AB
3A	M	2/21/38	5/29/49	1/29/55	BW
4A	F	9/8/36	9/9/50	1/29/55	AB
5A	M	3/24/36	11/11/46	1/29/55	AB
6A	M	3/29/35	12/28/44	1/29/55	BW
7A	F	11/9/39	5/4/50	1/29/55	AB
8A	M	12/23/35	5/25/45	1/29/55	BW
9A	M	2/12/37	9/8/50	1/30/55	AB
10A	M	7/9/37	9/11/51	2/12/55	BW
11A	F	2/27/36	5/26/49	2/12/55	AB
12A	F	6/21/36	8/31/50	2/12/55	BW
13A	F	3/14/36	9/3/48	2/12/55	AB
14A	M	7/28/38	12/21/42	2/12/55	AB
15A	M	5/30/37	5/20/46	2/19/55	AB
1B	F	1/17/21	11/20/37	1/23/55	AB
2B	F	12/19/27	6/12/48	1/29/55	BW
3B	M	12/20/27	11/ 2/37	1/29/55	AB
4B	M	12/15/22	8/8/47	1/30/55	AB
5B	M	5/15/26	10/5/47	1/30/55	AB
6B	F	10/14/28	10/24/36	1/30/55	BW
7B	M	9/17/23	4/23/31	2/12/55	BW
8B	M	12/15/29	10/26/36	2/13/55	BW
9B	F	9/27/28	8/28/45	2/12/55	AB
10B	F	8/7/28	10/26/37	2/12/55	AB
11B	M	5/27/24	10/13/34	2/13/55	BW
12B	F	4/2/22	12/7/41	2/13/55	BW
13B	M	4/10/27	5/7/49	2/19/55	AB
14B	F	7/23/23	4/29/43	2/19/55	AB
15B	F	2/8/22	3/23/45	2/19/55	AB

TABLE VII (Continued)

No.	Sex	Birth Date	Admission Date	Date of Test	Examiner
1C	M	2/26/11	2/25/24	2/21/55	BW
2C	M	3/15/14	7/24/25	2/20/55	BW
3C	F	5/7/08	1921	2/12/55	BW
4C	F	10/3/14	7/16/32	2/12/55	BW
5C	F	8/11/11	9/24	2/12/55	AB
6C	F	7/22/09	12/1/25	2/12/55	AB
7C	M	8/8/10	8/18/30	2/12/55	BW
8C	F	1/20/06	8/12/24	2/13/55	AB
9C	F	11/27/08	6/5/25	2/19/55	AB
10C	M	7/6/05	7/10/24	2/19/55	AB
11C	M	4/30/08	9/27/15	2/19/55	AB
12C	M	7/29/13	1/6/25	2/20/55	AB
13C	M	8/29/07	1/26/24	2/20/55	AB
14C	M	8/8/12	4/21/26	2/20/55	BW
15C	M	7/9/05	9/7/23	2/20/55	AB

TABLE VIII

I. Q. SCORES AND FULL, VERBAL AND PERFORMANCE WEIGHTED SCORES FOR INDIVIDUAL SUBJECTS

No.	W. B. Full I.Q.	Verbal I.Q.	Perf. I.Q.	Verbal Wt.	Perf. Wt.	Full Wt.
1A	54	61	57	14	23	37
2A	51	52	63	9	25	34
3A	70	62	86	17	41	58
4A	55	57	64	13	26	39
5A	60	62	67	17	28	45
6A	50	63	47	18	14	32
7A	65	57	80	14	36	50
8A	51	54	58	11	22	33
9A	54	55	63	12	25	37
10A	53	57	60	13	23	36
11A	67	63	78	18	36	54
12A	64	68	67	22	28	50
13A	61	62	70	17	30	47
14A	59	63	65	18	26	44
15A	57	52	74	9	33	42
1B	66	59	78	12	28	40
2B	65	61	74	14	29	43
3B	63	57	76	11	30	41
4B	69	64	78	16	28	44
5B	55	60	57	13	16	29
6B	63	60	72	13	27	40
7B	61	59	69	12	21	33
8B	50	54	53	8	13	21
9B	50	57	50	11	11	22
10B	57	61	60	14	18	32
11B	50	58	48	11	5	16
12B	50	54	51	8	7	15
13B	54	61	54	14	14	28
14B	51	54	55	8	10	18
15B	68	60	80	13	30	43

TABLE VIII (Continued)

No.	W. B. Full I.Q.	Verbal I.Q.	Perf. I.Q.	Verbal Wt.	Perf. Wt.	Full Wt.
1C	50	-	-	3	2	5
2C	51	-	-	3	4	7
3C	62	61	72	7	13	20
4C	64	69	65	17	10	27
5C	55	62	-	10	2	12
6C	65	65	72	12	13	25
7C	53	58	-	7	2	9
8C	64	68	68	14	9	23
9C	60	62	67	8	8	16
10C	67	59	82	6	21	27
11C	56	58	63	5	5	10
12C	57	59	62	8	8	16
13C	59	62	65	8	7	15
14C	56	62	-	10	4	14
15C	63	62	72	8	13	21

TABLE IX

RAW SUBTEST SCORES FOR INDIVIDUAL SUBJECTS

No.	Inf.	Com.	D.S.	Arith.	Sim.	Voc.	P.A.	P.C.	B.D.	O.A.	D.Sy.
1A	2	3	6	0	5	8	2	8	0	13	24
2A	2	3	3	0	2	5	2	7	11	12	23
3A	1	2	9	1	5	10	9	6	20	20	29
4A	3	4	6	2	2	9	5	6	6	16	22
5A	2	6	7	2	4	9	4	7	13	13	23
6A	1	6	10	1	3	9	0	6	12	8	6
7A	2	4	7	0	3	8	7	6	11	12	25
8A	3	2	7	0	0	9	6	6	3	12	17
9A	2	2	7	1	2	9	2	7	13	13	15
10A	2	2	7	0	4	8	0	6	9	16	22
11A	6	6	5	2	6	11	2	6	17	23	31
12A	4	6	9	0	7	10	2	7	9	16	25
13A	2	5	6	2	6	9	4	6	3	17	42
14A	2	5	7	2	5	11	6	9	4	9	28
15A	5	1	4	0	1	8	6	8	7	18	24
1B	1	0	9	0	2	8	6	6	15	13	20
2B	1	5	7	1	3	8	2	7	10	17	27
3B	0	3	7	0	2	8	4	7	6	18	27
4B	6	5	5	1	4	11	6	7	9	15	17
5B	4	3	5	1	6	12	0	4	3	13	19
6B	1	2	9	0	0	8	0	8	6	19	18
7B	4	3	6	0	0	8	4	7	9	12	4
8B	2	3	3	0	0	5	0	4	3	13	5
9B	2	2	6	1	1	9	4	5	0	3	14
10B	3	4	5	0	8	6	2	5	4	12	17
11B	2	2	6	1	2	7	0	4	0	5	5
12B	0	0	6	0	5	4	0	2	0	4	22
13B	6	4	3	0	6	6	4	6	3	5	12
14B	2	2	0	0	1	6	0	4	3	10	0
15B	2	5	7	1	0	9	2	4	16	19	28

TABLE IX (Continued)

No.	Inf.	Com.	D.S.	Arith.	Sim.	Voc.	P.A.	P.C.	B.D.	O.A.	D.Sy.
1C	0	0	2	0	0	4	0	2	0	2	0
2C	0	0	2	0	0	3	0	3	0	7	2
3C	0	0	5	2	1	7	2	5	0	13	3
4C	1	4	8	1	7	7	0	1	3	6	26
5C	2	4	5	0	1	5	0	2	0	1	0
6C	2	4	6	1	2	7	0	0	6	9	22
7C	1	0	6	0	0	7	0	0	0	1	1
8C	3	4	6	1	3	10	2	3	0	11	0
9C	2	2	3	0	0	7	0	4	3	5	8
10C	2	0	4	1	0	6	0	5	9	18	10
11C	0	0	3	0	2	5	0	3	3	6	0
12C	0	2	6	0	0	7	2	2	0	10	0
13C	1	0	7	0	0	9	0	6	0	6	7
14C	3	1	6	1	1	7	0	4	0	2	3
15C	1	0	6	1	0	8	2	2	0	13	14

TABLE X

WEIGHTED SUBTEST SCORES FOR INDIVIDUAL SUBJECTS

No.	Inf.	Com.	D.S.	Arith.	Sim.	Voc.	P.A.	P.C.	B.D.	O.A.	D.Sy.
1A	3	3	2	0	5	4	3	7	1	6	6
2A	3	3	0	0	2	3	3	6	6	5	5
3A	2	2	6	0	5	5	8	4	10	12	7
4A	3	4	2	1	2	4	5	4	4	8	5
5A	3	5	3	1	4	4	4	6	7	6	5
6A	2	5	7	0	3	4	1	4	6	2	1
7A	3	4	3	0	3	4	7	4	6	13	6
8A	3	2	3	0	1	4	6	4	3	5	4
9A	3	2	3	0	2	4	3	6	7	6	3
10A	3	2	3	0	4	4	1	4	5	8	5
11A	5	5	0	1	5	5	3	4	8	14	7
12A	4	5	6	0	6	5	3	6	5	8	6
13A	3	5	2	1	5	4	4	4	3	9	10
14A	3	5	3	1	5	5	6	8	3	3	6
15A	4	1	0	0	2	4	6	7	4	10	6
1B	2	0	6	0	2	4	6	4	7	6	5
2B	2	5	3	0	3	4	3	6	5	9	6
3B	1	3	3	0	2	4	4	6	4	10	6
4B	5	5	0	0	4	5	6	6	5	7	4
5B	4	3	0	0	5	6	1	2	3	6	4
6B	2	2	6	0	1	4	1	7	4	11	4
7B	4	3	2	0	1	4	4	6	5	5	1
8B	3	3	0	0	1	3	1	2	3	6	1
9B	3	2	2	0	2	4	4	3	1	0	3
10B	3	4	0	0	7	3	3	3	3	5	4
11B	3	2	2	0	2	4	1	2	1	0	1
12B	1	0	2	0	5	2	1	0	1	0	5
13B	5	4	0	0	5	3	4	4	3	0	3
14B	3	2	0	0	2	3	1	2	3	4	0
15B	3	5	3	0	1	4	3	2	8	11	6

TABLE X (Continued)

No.	Inf.	Com.	D.S.	Arith.	Sim.	Voc.	P.A.	P.C.	B.D.	O.A.	D.Sy.
1C	1	0	0	0	1	2	1	0	1	0	0
2C	1	0	0	0	1	2	1	1	1	1	0
3C	1	0	0	1	2	4	3	3	1	6	0
4C	2	4	4	0	6	4	1	0	3	0	6
5C	3	4	0	0	2	3	1	0	1	0	0
6C	3	4	2	0	2	4	1	0	4	3	5
7C	2	0	2	0	0	4	1	0	1	0	0
8C	3	4	2	0	3	5	3	1	1	4	0
9C	3	2	0	0	1	4	1	2	3	0	2
10C	3	0	0	0	1	3	1	3	5	10	2
11C	1	0	0	0	2	3	1	1	3	0	0
12C	1	2	2	0	1	4	3	0	1	4	0
13C	2	0	3	0	1	4	1	4	1	0	1
14C	3	1	2	0	2	4	1	2	1	0	0
15C	2	0	2	0	1	4	3	0	1	6	3