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Adoption and Efficacy of Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) among Learners in Selected Private Primary Schools in Embu West Sub County, Kenya

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Abstract

Intelligence is an important component of a person's life. From the Spearman's two factor theory; *g* and *s*, *g* is universal and innate whereas *s* enables individuals to perform specific tasks. Cognitive tests are the commonest measure of intelligence. Globally, Wechsler Intelligence Scales are the most widely used intelligence tests. South Africa, unlike Kenya, is one country in Africa, which has embraced standardized intelligence testing. In Kenya, children's academic achievement, which in the layman's language shows the level of intelligence, is measured using formative evaluation; that is, teacher-made-tests, and summative evaluation; which is done through the Kenya Certificate of Primary Education (KCPE) examination. This was a descriptive study whose main objective was to assess the learners' full scale intelligence quotient (FSIQ) using Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V). Purposive sampling technique was used to select 2 out of 6 private mixed day and boarding schools in Embu West Sub County, Embu County. A sample of 83; 43 boys and 40 girls in Standard 6 and aged between 10 years 10 months and 13 years 6 months (M = 11.10, SD = 1.10), was selected using the single-stage cluster sampling method. It took the form of individual administration of WISC-V. Data were analyzed using SPSS version 22.0. The sample obtained an average composite score, M = 92.98, SD = 10.51. This was within the range of scores given in the standardization norms whose mean is 100 with a standard deviation of 15. This study will contribute to cross-cultural intelligence testing research using standardized tests from the West.

Keywords: FSIQ, intelligence, primary index scales, WISC-V

Introduction and background

Intelligence is an important factor to a person as he or she tries to maneuver the world around him or her. It enables one to think rationally and act responsibly within his or her environment. Globally, Wechsler Intelligence Scales are the most widely used intelligence measures, with South Africa being the greatest consumer in Africa (Cockcroft, Alloway, Copello, & Milligan, 2015; Shuttleworth-Edwards, & Van de Merwe, 2015).

The development of WISC-V was influenced by theories, neuro-developmental research, and clinical utility. It is modeled after contemporary structural intelligence theories, such as Cattell-Horn-Carroll (CHC); which can be utilized in the interpretation of WISC-V (Pearson, 2015). Among the many theories of intelligence, the CHC theory is the most widely accepted due to its empirical support and comprehensiveness. Construction of most intelligence tests is based on this theory (Schwehr, 2015). The Horn-Cattell theory proposes fluid and crystallized intelligence. Fluid intelligence is an indicator of ability, whereas, crystallized intelligence is said to be integrated through culture. Environmental factors such as culture and education therefore influence a person's intelligence (Cattell, 1967).

Cattell argued that fluid intelligence influences crystallized ability. This has been refuted due to the fact that fluid ability includes non-verbal reasoning and crystallized abilities consist of verbal-educational abilities (Kyllonen & Kell, 2017). The Spearman theory of intelligence is among the oldest theories. Spearman proposed a theory of intelligence comprising two factors; the general (g) factor and the specific (s) factor. The *g* factor represents the more general mental energy involved in the more complex mental operations such as ability, intensity, quickness and intellectual productivity (Flanagan, McGrew, & Ortiz, 2000).

Intelligence tests have been widely used to predict academic achievements of children in the West (Sternberg, Grigorenko, & Bundy, 2001). Low intelligence not only predicts consumer behavior and inability to learn a foreign language, but also delinquent behavior. Persons of low intelligence are more likely to engage in criminal activities due to their inability to understand the consequences of their actions or to delay gratification (Schneider & McGrew, 2013). Therefore, intelligence has been a topic of interest to governments, educationists,

psychologists, and individuals for different reasons (Weiss, Saklofske, Holdnack, & Prifitera, 2016).

David Wechsler, an American psychologist; utilized his clinical skills, experience in testing acquired during the First World War (WWI), and the statistical training he had received under Pearson and Spearman in England to develop the Wechsler psychological assessments tools. Wechsler intelligence scale for children (WISC) was modeled on the Army intelligence scales developed during the WW1. WISC have a sound theoretical base, and have influenced the development of and research in other tests. These scales have made a great impact in the field of intelligence and cognitive abilities testing (Corwin, 2002; Konald & Canivez, 2010).

Flanagan and his colleagues (2000) acknowledged that the Wechsler intelligence scales are unequalled in the field of cognitive ability testing. However, few critics have argued that the Wechsler scales have their flaws (Flanagan, McGrew, & Ortiz, 2000). However, the Wechsler intelligence scales for children continue to dominate the world of intelligence testing despite what critics say (Benson, 2003). These scales have evolved with more research and practice from the Wechsler Bellevue Scale (1939) to the current WISC-V (2014). The scales take the form of individual administration (Weiss et al, 2016).

WISC-V is a comprehensive clinical tool for assessing intelligence of children aged between 6:0 and 16:11 years. It comprises primary and secondary subtests which are set on a scaled score metric. It is a standardized test developed, normed, and standardized in the West. During standardization, it was normalized and assigned a mean of 100, with a standard deviation of 15 (PsychCorp, 2015). The standard scores for WISC-V form a bell curve and are subdivided into 7 categories of composite score ranges with each having a descriptive classification. Composite scores 130 and above are classified as extremely high, 120-129 are described as very high, 110-119 are referred to as high average, while 90-109 are termed as average. In the low average category are composite scores between 80 and 89. Very low category are scores from 70-79, which was referred to as borderline in WISC-IV. Lastly, scores from 69 and below are referred to as extremely low (Sandhu, 2014).

There is paucity of literature available for review in this study on testing of children using WISC-V because it is a relatively new area of research interest. However, studies that document testing using the older versions are available. WISC-IV was normalized and assigned a mean of 100 and a standard deviation of 15 (Bickel, 2015). WISC-IV was utilized to assess 36 grade 7 children aged between 12 and 13 years. The children were stratified according to the quality of education into three groups; English-speaking private schools, Xhosa-speaking private schools, and Department of Education and Training (DET) schools (Tonder, 2007).

Those from the English-speaking private schools were the best with an average score of 112.83; above average range. They were followed by the Xhosa-speaking private schools with an average score of 93.92 which is in the average range. Last were those from the Xhosa speaking in Department of Education and Training (DET) schools with a mean score of 77.08, which is in the borderline range. In 2015, Bickel conducted a study using WISC-IV to find out how Grade 3 Xhosa-speaking learners' scores from disadvantaged background compared with those of the UK population. She also wanted to compare performance of the Xhosa-speaking grade 3 and Xhosa-speaking grade 7 learners' scores reported by Tonder (2007). The research showed that the average FSIQ of Grade 3 Xhosa-speaking children was 78.95, while the UK group obtained a mean FSIQ score of 99.40 (Bickel, 2015).

WISC-V was utilized in individual testing of an 8 years 2 months old grade 4 multiracial girl named Laurie Jones. She was assessed on 6/1/2015. Her FSIQ score was 85, which is in the 16 percentile rank at 80-91 Confidence Interval (CI) compared to other children of her age. This was in the low average range. John Smith, the examiner noted that several factors influenced the WISC-V cognitive ability scores but may not be captured in the report. He therefore recommended that the scores be taken as representing a child's current functioning and a repeat be done after some time. He argued that the second testing scores may be slightly higher or lower than the first test scores (PsychCorp, 2015).

A parent reported that his child had obtained the following scores on WISC-V and wanted to know whether the child could be classified as gifted for placement into the gifted education

program; FSIQ: 118, working memory: 117, verbal comprehension: 116, fluid reasoning: 112, processing speed: 108, and visual spatial: 97. The response was that further testing was required before the child could conclusively be placed in the program because of a likely mismatch between ability and learning (Sandhu, 2014).

Several studies on intelligence in South Africa have in the past indicated that the blacks performed poorer than the Afrikaans, whose performance was lower than that of the whites (Bickel, 2015; Rushton & Jensen, 2005). This study agrees with this assertion because the few available intelligence test results involving non-white populations report scores that are lower than the standardization mean of 100. Those who use English as their first language outperform those whom English is not their first language. Cross cultural differences are reported among Chinese, Europeans and Canadians when compared to the USA standardization. Similarly, in Zimbabwe, a lowering of up to 30 IQ points has been reported for black children when compared with London children (Konald & Canivez, 2010).

Most intelligence tests are administered in Western countries where chidren's first and probably the only language is English. The sample in this study is multilingual. The children's first languages are their diverse mother tongues, then Kiswahili followed by English. There was also evidence of *Sheng,* the language spoken by Kenyan youth today. There was also a tendency to mix English, Kiswahili, and *Sheng*, and to switch languages during the assessment. This may not only have affected their VCI, but also their FSIQ scores. There were times when a word would slip through, and evidently, a learner would struggle to remember, but ultimately would not be able to articulate the answer. Proficiency in English affects scores in that if one speaks more than one language, there will be a split of resources between the two and that impacts their vocabulary and response during testing (Niolon, 2005).

Bickel (2015) asserted that language is the most influential factor that mediates performance in a test. When children are tested in a language they don't regularly use in all settings, the test language may deny them the advantage of use of the medium of communication through which they acquired most of the knowledge and experience. It will affect scores in both

verbal and non-verbal subtests. This study will not only contribute to data on cross cultural standardized intelligence testing by comparing the composite scores of the Kenyan children with the standardization norms, but also show that the results agree with the Spearman's two factor theory, *g* and *s,* and Cattell-Horn-Carroll's fluid and crystallized theory. Intelligence is universal and innate. Children in this study were able to solve problems they had not encountered before and applied previously learned material to solve new problems.

Methodology

Purposive sampling technique was employed to select 2 out of 6 private primary schools in Embu West Sub County. These schools possessed the characteristics that the researcher was interested in so as to collect data to answer the research question (Tongco, 2007). The schools were mixed day and boarding, they conduct parents' meetings every term, which enabled the researcher to obtain parental consent, and they administered the common Kenya Private Schools Association (KPSA) examinations to their learners. This helped control for extraneous variables when comparing their scores.

The study utilized a descriptive survey design with a quantitative approach to assess the Full Scale Intelligence Quotient (FSIQ) of children aged between 10 years 10 months and 13 years 6 months (M = 11.10, SD = 1.10) in 2 private schools in Embu West Sub County. It comprised 83 (N = 43 boys and N = 40 girls) out of the 87 sampled respondents all in Standard 6; that is, equivalent of grade 4, selected using the single stage cluster sampling method in which all the units in the cluster qualified for selection. Parents, head teachers, and respondents were informed about the study 5 months in advance.

Parents granted written consent while the children gave their assent for participation in the study. The head teachers, parents and participants were assured of confidentiality and privacy. Coding was done during data collection and publishing. Similar codes were run through each learner's documents including the Parental Consent Form, Record Form, and Response Booklet 1. This also helped to avoid any mix up of the data.

The United States International University-Africa (USIU-A) reviewed the proposal and through the Institutional Review Board (IRB) gave approval for the study. Authority to conduct the study in Kenya was granted by the National Commission for Science, Technology and Innovation (NACOSTI). The NACOSTI permit and letter were utilized to request for permission from the Deputy County Commissioner, Embu West and the County Director of Education, Embu. The two offices granted permission to conduct the study in the Sub County and the 2 schools respectively. The researcher planned to network with the schools to get as many parents consenting as possible.

Only the children who gave assent and whose parents or guardians granted written consent were considered for participation in the study. Five respondents did not participate due to withdrawal of assent and transfers out or in the school after parental consent had been granted. The ten subtests that constitute five WISC-V primary index scales were administered individually to each learner by the researcher following the test protocol outlined in the WISC-V *Administration and Scoring Manual.* The manual stipulates the environmental conditions required during the assessment, rapport building, starting point for each subtest according to the child's age, discontinue rule, and what to do when assessment is not completed in one session. Assessment was conducted during the evenings, weekends and at times early in the morning to avoid getting learners out of class during lessons.

Stimulus Book 1 contained some of the stimuli that were administered by the examiner namely, Block Design, Matrix Reasoning, Figure Weights, and Visual Puzzles. The only stimulus relevant to this study contained in Stimulus Book 2 was Picture Span. Response Booklet 1 contained the Coding and Symbol Search subtests. The rest were found in the manual. The ten subtests completed for this study were Block Design, Similarities, Matrix Reasoning, Digit Span, Coding, Vocabulary, Figure Weights, Visual Puzzles, Picture Span and Symbol Search. Seven out of these namely; Block Design, Similarities, Matrix

Reasoning, Digit Span, Coding, Vocabulary, and Figure Weights were used to derive the FSIQ. It took each learner approximately 1 hour 45 minutes to complete the test. Wechsler suggested 1 hour 15 minutes for completion of the ten subtests (Wechsler, 2014).

The WISC-V Record Form was used to record the names of each child and examiner, test date, birth date and test age of the child. The manual has given the formula for calculation of the test age (Wechsler, 2014). The researcher recorded the learner's responses verbatim for the Similarities and Vocabulary subtests. For other subtests the responses were recorded as given except for the Coding and Symbol Search subtests that were completed by the learner in the Response Booklet 1 and timed by the researcher. The researcher filled in each learner's raw scores at the end of the subtest in the spaces provided. The same scores were entered at summary page at the back of the Record Form. The Coding Key Template was used to score the coding subtest.

The *Administration and Scoring Manual* was utilized in obtaining the corresponding scaled scores for each subtest according to the age of the learner. The learner's final full scale score was also utilized to check his or her FSIQ score in the manual. These were then converted to composite scores and given the percentile rank at 90-95% Confidence Interval. Data were entered into the Data and Variable Views and analyzed using Statistical Package for Social Sciences (SPSS) version 22.0. Tables and histograms were generated. Both the Record Form and the Response Booklet 1 contained spaces for recoding behavior observation during testing. Though this was done, it was only used for recommendations to the parents on a few cases that required intervention.

Results

The respondents comprised 83 children; 43 boys and 40 girls. This translated to 52% boys and 48% girls. The boys' average age was 12 years while that of the girls was 11 years 3 months. The age range of the sample was 10 years 10 months and 13 years 6 months (M = 11.10, SD = 1.10). The study realized 95 % response rate; that is, 83 out of 87 sampled respondents participated.

Table 1: Scores on FSIQ, and WISC-V Primary Index Scales Scores

Code	FSIQ	VCI	VSI	FRI	WMI	PSI
FB1	87	21	18	17	21	14
FB2	104	22	24	15	27	13
FB3	92	21	13	15	25	11

FB4	105	25	15	22	28	10
FB5	95	23	16	20	20	11
FB6	101	23	22	17	25	14
FB7	97	22	23	21	19	12
FB8	101	19	16	17	20	28
FB9	93	19	16	15	24	16
FB10	89	18	12	15	31	13
FB11	99	22	17	20	23	11
FB12	82	20	12	15	13	17
FB13	104	17	17	22	25	16
FB14	87	15	16	19	14	16
FB15	107	19	18	23	29	18
FB16	75	12	9	12	19	12
FB17	94	17	14	19	13	18
FB18	118	28	24	26	25	16
FB19	81	20	13	12	15	11
FB20	87	17	14	14	18	23
FB21	101	22	13	22	22	14
FB22	80	12	11	16	22	18
FB23	95	20	15	18	21	15
FB24	79	12	15	17	17	10
FB25	88	17	11	20	24	14
FB26	88	16	14	20	20	15
FB27	79	13	14	13	15	9
FB28	76	12	14	16	17	8
FB29	83	19	14	9	25	12
FB30	91	10	21	24	16	23
FB31	97	23	17	22	14	12
FB32	85	16	13	13	22	14
FB33	89	18	17	20	22	14
FB34	88	14	18	21	28	13

FB35	96	15	13	20	30	21
FB36	91	23	16	17	22	8
FB37	97	19	17	21	21	18
FB38	84	14	12	15	25	14
FB39	107	18	16	22	24	16
FB40	99	16	15	19	21	25
FB41	89	21	10	15	19	13
FB42	87	18	20	16	19	14
FB43	95	18	10	14	26	23
FG1	99	22	18	21	23	17
FG2	108	24	17	23	30	24
FG3	98	21	18	16	21	22
FG4	95	21	13	17	30	15
FG5	97	24	22	15	21	17
FG6	98	18	15	25	24	12
FG7	103	21	15	18	29	20
FG8	92	23	12	18	20	17
FG9	102	18	18	23	20	21
FG10	86	18	7	17	20	14
FG11	111	22	18	19	34	28
FG12	85	14	12	9	21	18
FG13	98	13	19	19	28	21
FG14	88	15	11	16	20	14
FG15	85	21	13	14	18	12
FG16	97	13	12	18	24	19
FG17	80	13	12	15	23	17
FG18	88	13	15	13	24	13
FG19	84	15	18	12	19	19
FG20	93	18	17	20	22	13
FG21	95	17	17	16	23	16
FG22	92	12	17	18	15	28

FG23	74	8	13	14	15	14
FG24	108	22	13	21	21	23
FG25	104	25	12	22	24	21
FG26	110	24	18	21	32	12
FG27	72	10	5	10	17	9
FG28	105	20	16	30	23	8
FG29	86	12	16	20	18	17
FG30	76	11	13	11	16	13
FG31	118	23	25	23	28	24
FG32	115	27	19	22	21	23
FG33	95	23	14	12	20	13
FG34	103	19	16	20	29	16
FG35	103	22	13	22	20	20
FG36	99	19	14	23	21	19
FG37	85	14	16	10	27	18
FG38	92	20	13	18	25	11
FG39	70	14	10	10	16	5
FG40	77	13	18	13	20	8

Learners' scores on FSIQ, and WISC-V primary index scales scores were derived and represented in Table 1. The primary index scales are Verbal Comprehension Index (VCI), Visual Spatial Index (VSI), Fluid Reasoning Speed Index (FRI), Working Memory Index (WMI), and Processing Speed Index (PSI).

FSIQ scores were used to derive the histogram on FSIQ which is shown in Figure 1.

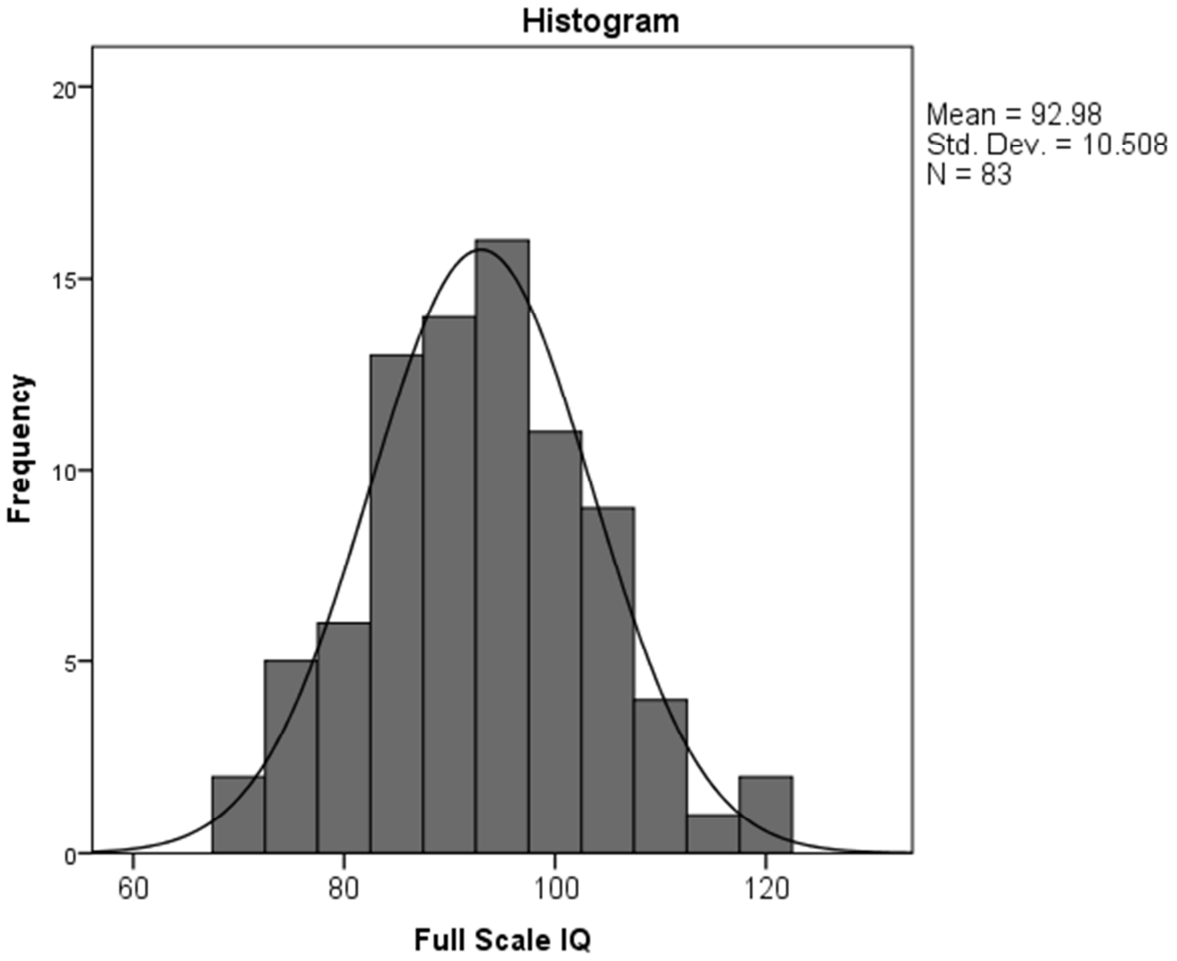

Figure 1: The Bell Curve on FSIQ Scores

The sample obtained an average mean (*M* = 92.98. *SD* =10.51).

The histogram shows a normal curve in which scores spread out in either direction from the mean. Most of the learners obtained scores that were between 90 and 109. These are within the WISC-V average range. Some, however, recorded scores from 70-79; very low, while others obtained 80-89, which is in the low average range. Statistics showed that five learners obtained scores between 110 and 119, which are rated high average. Some learners obtained scores within the two extremes, very low and high average. This agrees with WISC-V norms which place the standardization sample mean at 100 with a standard deviation of 15 (Wechsler, 2014).

Discussion

Learners in this study were assessed on the 10 primary subtests of WISC-V. Scaled scores of 7 of these are considered in deriving FSIQ. The learners obtained a mean FSIQ score of 92.98 with a standard deviation of 10.51, which is in the average range category of WISC-V. Their scores ranged from 70-118. The normed scores on WISC-V have a mean of 100 with a standard deviation of 15 (Wechsler, 2014). This means that scores between 85 and 115 are within this range. Nine learners obtained 70-79, which is in the very low range, 25 obtained 80-89, which is in the low average, 44 learners obtained 90-109, which is in the average range, and 5 obtained 110-119, which is in the high average. The composite scores for this study sample therefore forms a normal curve just like the normative sample scores (Sandhu, 2014). However, there were neither composite scores below 69, which is extremely low nor 120-129, which is high average, or 130 and above, which is extremely high.

The results showed that WISC-V is an appropriate tool for assessing cognitive functioning of the children in a culture that is different from where it was developed and normed. The time taken by the children in Kenya to complete the 10 subtests was almost the same as that taken by the standardization norms. This research did not control for socio-economic variables, parental level of education and genetic influences on intelligence. It was assumed that the children came from more or less similar socio-economic backgrounds because they were in high cost schools in the sub-County. However, it would not be wrong to assume that the schools may have poached and sponsored bright children from poor backgrounds to boost their mean scores.

WISC-V makes provision for use of Ancillary subtests for clinical diagnoses of giftedness or learning difficulties. Children with the very low scores would have benefitted from the administration of these subtests to find out the exact area of difficulty. However, this was not captured in the main objective, which was the adoption and assessment of learners' FSIQ on WISC-V. Future studies may consider diagnoses of the children with scores in the extreme categories.

Conclusion

Intelligence is an essential component in every person's life. It is measured by the means of cognitive ability tests. In the West, there are varieties of standardized intelligence tests, including, WISC-V. In this study, learners obtained FSIQ scores, which were in the average range (M = 92.98, SD = 10.51). The composite scores formed a normal curve. These compare appropriately with the standardization norms whose mean is 100 with a standard deviation of 15 (Wechsler, 2014).

Future studies should consider controlling for extraneous variables such as the socio-economic status, among others. Other studies reported excluding children with very low scores. Since some of the children with extremely low scores in this study were repeating class six, consideration of whether to include their scores in the final tally or not should be made in future.

The schools in Kenya may consider adopting standardized tests, such as WISC-V to place learners early enough, especially now that there is change towards Competency Based Curriculum (CBC). CBC aims at identifying learners' talents well in advance so as to avoid wastage and frustration caused by making children to repeat classes only for them to end up scoring very low marks at the end of the primary school cycle.

References

Bickel, A. (2015). *WISC-IV test performance of Grade 3 Xhosa- speaking children*. University of Fort Hare.

Cattell, R. B. (1967). The theory of fluid and crystallized general intelligence checked at the 5-6 year-old level. *British Journal of Educational Psychology*, *37*(2), 209–224. http://doi.org/10.1111/j.2044-8279.1967.tb01930.x

Corwin, B. (2002). From the Binet-Simon to the Wechsler–Bellevue: Tracing the history of intelligence testing. *Journal of Clinical and Experimental Neuropsychology*, *24*(3), 383–405. Retrieved from http://www.tandfonline.com/doi/pdf/10.1076/jcen.24.3.383.981

Flanagan, D.P., McGrew, K.S., & Ortiz, S. O. (2000). *The Wechsler intelligence scales and Gf-Gc theory: A contemporary approach to interpretation*. (B. Pascal, Ed.). Boston: Allyan and Bacon.

Konald, T. R., & Canivez, G. L. (2010). Differential relationships between WISC-IV and WIAT-II Scales: An evaluation of potentially moderating child demographics. *Educational and Psychological Measurement*, *70*(4), 613–627. http://doi.org/DOI: 10.1177/0013164409355686

Kyllonen, P., & Kell, H. (2017). What is fluid intelligence? Can it be improved? In M. Rosén (Ed.), *Cognitive Abilities and Educational Outcomes, Methodology of Educational Measurement and Assessment.* (pp. 15–37). Princeton: Springer International Publishing. http://doi.org/10.1007/978-3-319-43473-5_2

Niolon, R. (2005). How does culture effect IQ scores? Retrieved from http://www.psychpage.com/learning/library/intell/biased2.html

Pearson. (2015). WISC®-V Canadian frequently asked questions. Retrieved from https://www.pearsonclinical.ca/content/dam/school/global/clinical/canada/programs/wisc5/wisc-v-cdn-faqs.pdf

PsychCorp. (2015). *WISC-V interpretive report: WISC-V interpretive considerations for Laurie Jones (6/1/2015)*. New York. Retrieved from http://images.pearsonclinical.com/images/assets/wisc-v/WISC-VInterpretiveReportSample-1.pdf

Rushton, J. P., & Jensen, A. R. (2005). Thirty years of research on race differences in cognitive ability. *Psychology, Public Policy, and Law*, *11*(2), 235–294. http://doi.org/10.1037/1076-8971.11.2.235

Sandhu, I. K. (2014). Descriptive classification of the WISC V. Retrieved from http://www.brainy-child.com/experts/classification-of-WISC-V.shtml

Schneider, J. & McGrew, K. (2013). The Cattell-Horn-Carroll (CHC) model of intelligence v2.2: A visual tour and summary. In D. & H. P. Flanagan (Ed.), *Contemporary Intellectual Assessment: Theories, Tests, and Issues* (3rd ed., pp. 99–144). New York: Guilford. Retrieved from http://www.iapsych.com/chcv2.pdf

Schwehr, E. (2015). IQ: What is it and what does it mean? In *2015-2016 Seminar Series* (pp. 1–40). Groves Academy.

Shuttleworth-Edwards A. B. S., & V. de-M. (2015). WAIS-III and WISC-IV South African cross-cultural normative data stratified for quality education. In F. R. Ferraro (Ed.), *Minority and cross-cultural aspects of neuropsychological assessment: enduring and emerging trends* (pp. 72–75). Amazon: Psychological Press.

Sternberg, R.J, Grigorenko, E. L. & Bundy, D. A. (2001). The Predictive value of IQ.

Merrill-Palmer Quarterly 47.1, *47*(1), 1–41.
Tonder, P. V. (2007). *WISC-IV performance of South African Grade 7 English and Xhosa speaking children with advantaged versus disadvantaged education.* Rhodes University, Grahamstown, South Africa.
Wechsler, D. (2014). *Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V)* (Fifth). Bloomington: Pearson Education, Inc.
Weiss, G. L., Saklofske, D. H., Holdnack, J. A. & Prifitera, A. (2016). *WISC-V assessment and interpretation: scientist-practitioner perspectives*. New York: Academic Press, Elsevier.