MEASUREMENT OF INTELLIGENCE (IQ)

ASSUMPTION 1

The psychometric measurement of verbal ability with students who live in a bilingual environment is not possible using traditional psychometric technique.

One reason for the difficulty is the absence of a normative sample which can be used as a peer group. The peer group will be very difficult to find, because each student's language history varies, and so does the opportunity to acquire a given language. A related problem is that the bilingual student experiences a change in the method of processing information when the second language is learned subsequent to the first. As they experience a prolonged period of not understanding the details of language, they begin to process information (both verbal and nonverbal) by getting the gist or gestalt of the information. Details are no longer something to which they attend, both verbally and nonverbally.

If it were possible to measure the verbal ability, one could consider this a partial measurement of "g". "g" is understood to be the innate ability of an individual. This concept was developed to predict academic success in the general population, and has been used in order to predict vocational success. An average "g" would be 100 (Standard Deviation is assumed to be 15), with a mentally deficient measure of "g" having an upper limit at 69 and a gifted measure of "g" begins at 130 and goes up. "g" is usually expressed in this numeric way, and is commonly thought of as being equivalent to an IQ score. On the most widely accepted IQ tests, Verbal ability is included as a major factor in the measurement of "g".

School Psychologists have been assigned the duty of finding this number, and we take this responsibility very seriously. Unfortunately, we have begun to believe that we really can find "g", that it is accurately measured by Weehslers, Binets, and Kaufmans. We frequently have taken the mistaken position that educational disadvantage does not exist, that lower socio-economic populations have lower "g" than middle to upper socio-economic groups because the IQ test results say so. We translate IQ tests from one language to another because we believe that responses to certain key questions or tasks will permit us to know "g". Some of us have begun to believe that the IQ test score really is "g", even though "g" can not be measured directly. This mistaken notion of "g" has resulted in a wide variety of educational errors, which typically "blame" the child for educational deficits. These errors also include programming which is directed at accepting the deficits, tending to perpetuate the learning problems. For example, the child who has a Verbal IQ score of 75 and a performance IQ of 100 is said to learn better visually, so all instruction should include visual materials. The material used by teachers with which to teach continues to include that which the student cannot learn due to the absence of prerequisite skills, and the student's relative educational status amongst peers (verbal IQ) continues to fall. If this kind of intervention fails, educators are justified in placing the child in Special Education. In these classes, all too frequently the academic oral (or manual) language that the student needs to learn is even more difficult to encounter.

Instead of this "Visual Learner" mentality, it would be preferable to adjust the material to that which the student is ready to learn, and to provide more opportunities for discussion. It is verbal interaction and discussion that will raise the student's verbal IQ (relative academic status amongst peers), not passive visual reception of information. As the Oral language facility with academic language increases (Verbal IQ), the student's reading ability increases, and the reading skills can improve.

Most commonly, IQ scores are obtained from the results of Intelligence tests which purport to use a normative sample that is representative of the population evaluated. **Typically, normative samples of the tests which attempt to measure "g" include only monolingual speakers of the language sampled**, or fluent speakers if the language sampled is different from the native language of the individual considered in the sample. This is done in an effort to control for factors which don't relate to intelligence, including limited language training and major cultural variations.

For example, a student whose native language is Spanish and who is not fluent in English, would not be included in the normative sample of an IQ test in English. Also, a mentally handicapped student who is a monolingual speaker of the language sampled could be included in the sample. Since Mentally handicapped students are not fluent speakers, no mentally handicapped students who have a native language other than English are included in the normative samples of IQ tests standardized in English. This means that normative statistics are skewed too high when considering second language students. **It is clear that "g" in bilingual students is not possible to measure with existing tests**, so procedures to approximate "g" may be essential. Two reasons for this are:

1) that Verbal abilities are not measured by verbal tests due to the omission of these students in the normative samples, and the different way of processing the information preferred by this population. Additionally, these students have not had the same opportunity to learn a given language like monolingual speakers, and they should not be compared to monolinguals for this specific reason. They are educationally disadvantaged during the early years of introduction of a second language, and this symptom can only be overcome by hard work on the part of the individual.

2) that neither Verbal abilities nor skills are assessed by nonverbal tests, and to predict academic success, measurement of verbal skill is essential (some of the most important prerequisites for reading include verbal skills).

ASSUMPTION 2

Elementary students who live in a bilingual world have an average Verbal Ability Score which is depressed by some quantity. It is assumed that this quantity is one standard deviation.

As mentioned elsewhere, peer groups of second language students are varied, so that no one group should be used as a basis for normative data. It has been observed that second language students seem to have verbal ability scores about one standard deviation below the monolingual mean, and so it is assumed that this guideline is adequate when considering the verbal ability part of "g" in the second language student. Therefore, a second language student who scores 85 on verbal ability tests is considered to have a verbal "g" score of 100. Further, a verbal score of 61 is equivalent to a verbal "g" score of 70, and a score of 111 is considered to be equal to a verbal "g" score of 130. **For those who may be offended by the relative status of these scores, it should be clear that the Second Language Student would show "g" verbal measurements in their native language at a level far superior to their dominant language monolingual peers in that same native language. However, compared to monolingual speakers of the native language, these children would compare similarly as they do to their peers in English. Even in their native tongue, they are generally one standard deviation below monolingual native speaking peers**. Again, "g" is impossible to measure in these students, but can be estimated based on monolingual performance.

To infer the "innate" verbal ability of a bilingual student, use actual standard score measurements on verbal (or Oral language) tests in the following way:

- 60-down is Intellectually Deficient (69 -down is listed in the WISC-III manuals)
- 61-68 is Borderline (70 - 79 is listed in the manuals)
- 69-76 is Low Average (80 -89 is listed in the manuals)
- 77-94 is Average (90- 109 is listed)
- 95-102 is Above Average (110 - 119 is listed)
- 103-110 is Superior (120 - 129 is listed)
- 111-up is Very Superior (gifted) (130 - up is listed)

(Wechsler, 1991)

BILINGUAL IQ CONVERSION CHART

The following chart may be used to compute a student's "Bilingual Score" from a given Standard score (or conversely): _____

Listed Score:	57	61	65	69	73	77	81	85	89	94	98	102	107	111
Bilingual Score:	65	70	75	80	85	90	95	100	105	110	115	120	125	130

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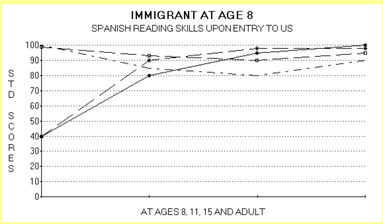
Interpolate any other scores (Listed score of 75 = Bilingual score of about 88), and continue the table up or down by using the guide of up (or down) 4 in a listed score is the same as up (or down) 5 in a bilingual score.

Example: José has a measured score of 85 on the Bateria oral language cluster. His ability to function in a bilingual academic world would be 100. Therefore, his K-ABC Simultaneous Processing Scale (similar to the WISC-III Performance Scale) score of 100 would be thought of as being equivalent. In fact, a pre-converted Bateria score of 100 would be thought of as being at the same level as a K-ABC Simultaneous Processing score of 118, unless this student has only recently (within the last 2 years if primary or intermediate level) immigrated from a monolingual Spanish area. This leads to the conclusion that a student who scores 100 on the Bateria and 100 on the K-ABC Simultaneous Processing scale shows a strength in the Oral Language area. This isn't obvious until converted scores are used.

Elementary Students who live in a bilingual world are not subjected to opportunities to expand their language skills in any one language like those who live in monolingual worlds. Therefore, students that are from environments which tend to be monolingual should be expected to be compared to other monolinguals (mean = 100), and those who have histories somewhat similar to Bilingual students should be compared to other bilingual students (mean = 85). Use the conversion chart above for more general guidance, adjustments would need to be made for the disadvantaged. Typically, students that have lived in the United States for two years or more (one year or more at Kindergarten or First grade) should be compared to bilingual students due to the impact of the dominant (English) language in the child's environment. Limited availability of books and electronic media, the absence of Spanish language instruction, and the subtle messages from society which imply that English is better than Spanish contribute to this problem.

Fortunately, verbal ability can be inferred, based on typical environmental histories seen in bilingual students paired with oral language proficiency measurements. A familiarity with the student's language and educational histories is necessary. For example, a student who was raised in México until age 8 has had written language training in Spanish. This student should be compared to monolingual Spanish language speakers at age 8 when estimating verbal "g" (mean = 100) because he has not been raised in a bilingual environment. However, he should be compared to bilingual students (mean = 85) at age 11 (assuming the student remains in the United States) because he would have exceeded the two years of being raised in a bilingual environment. When this student moved to the United States, measured verbal ability levels would be different from those of an eight year old student who was raised in the United States in a home where the family speaks Spanish and is educated in a classroom in English. In the **latter** case, the student should be compared to other bilingually affected students at age eight, when estimating verbal "g" (mean = 85). As this student first had to learn fluent English before learning written language, overall measured verbal ability in Spanish would decline compared to peers, but rise compared to English speaking peers (see graph).

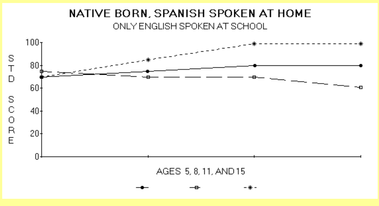
1. Exposure to English at an early age does allow such students to more rapidly acquire informal English in School. At age 11, both students would be compared to bilingual peers, and the native would exceed the immigrant in informal English. Given equal innate ability, the immigrant would probably appear to have more verbal ability on formal tests of ability, even though the native had been around English since birth.



▫ = **SPANISH**, Ŷ = **ENGLISH**, * = **ORAL ENGLISH** _ __ = **ORAL SPANISH**

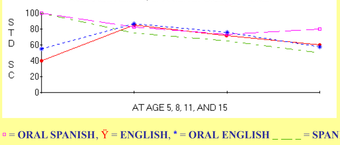
PARENTAL ASSISTANCE AVAILABLE IN SPANISH

The following graph assumes limited parental assistance available, with lower socio-economic status of the family, "Oral Spanish" is a combination of BICS & CALP (no written language), "English BICS" does not include CALP, but "English" includes both written and oral language, both BICS & CALP. Note that "Spanish BICS" is not graphed, it is assumed to be constant at 100 from age 5 up in this example.



ENGLISH COMPOSITE ORAL SPANISH ENGLISH BICS

Even a student who was raised in Mexico until age 5 is different from the previously mentioned students, though this one would appear to be more similar to the one raised in the United States than Mexico after first grade. By age 11 and with equal innate ability, this student may appear to have the lowest ability of the examples listed, due to inopportune timing of language changes and the absence of acculturation during initial experiences in school. This individual would not have the advantage of formal instruction in Spanish, but most likely would be placed in an English language training environment even though this person has no English language skills. With no experience in written language, the student may believe that it is due to some personal defect that reading English is so difficult, instead of the more likely cause of limited proficiency. On the other hand, if the quality of Spanish was good at age 5, this person could have the opportunity to acquire English without accent and become acculturated more easily than the other immigrant example.



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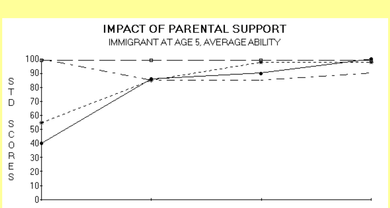
LIMITED PARENTAL ASSISTANCE AVAILABLE, LOWER SOCIO-ECONOMIC STATUS OF FAMILY, ONLY SPANISH SPOKEN AT HOME, ENGLISH AT SCHOOL.

The above Immigrant at age 5 graphic, which is a "worst case scenario", illustrates the gradual decline of apparent verbal ability in both languages. This ultimately could result in the mistaken notion that this student may be mentally handicapped. This process of decline is in large measure due to educational programming where the student has no opportunities to develop academic language (CALP). When ready to acquire academic language, the student was switched into English. When ready in English, the material was too difficult. This scenario is disappearing as we are giving more appropriate educational interventions in elementary school now.

The following graphic (better case scenario) shows the result of more appropriate interventions that take advantage of the student's Spanish language skills in order to learn English. Again, this model assumes English language immersion, but uses ESL programming with peer group placement and home support.



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ORAL ENGLISH ORAL SPANISH ENGLISH SPANISH

WITH PARENTAL ASSISTANCE AVAILABLE IN SPANISH

This "better case scenario" assumes that the parents will have some problems finding materials appropriate for their child, but as the child gets older, they will find a network of Spanish language support services (e. g. library, bookstore, magazine service, friends) which would allow the student to continue progressing in the CALP (Cognitive Academic Language Processing) area. As in other cases, the immigrant begins school with an average verbal ability and average Spanish Academic language. After an initial period of falling scores due to lack of stimulation, environmental circumstances and time spent learning English, this student begins to increase CALP in both languages, while maintaining average informal skills (BICS) in Spanish and significantly increasing them in English. The provision of a good quality ESL program insured that the Spanish language resources the student brought to class were used to learn the same concepts in English, and new concepts were explained at a level the student could understand. The student's history was thought of as adding to the class, rather than subtracting from it and the student's self-concept was not negatively affected. By age 11, the student's English BICS were equal with Spanish, and the CALP scores surpassed Spanish. This typically happens before age 11 in the general case, due to lack of materials and opportunities to learn in Spanish. There are few (if any) Spanish language textbooks available, and without parental assistance, the acquisition of CALP in Spanish essentially ceases.

During the Middle School years, the Second Language student has an opportunity to surpass the monolingual peers, as the school curriculum tends to reflect the student interest in each other, as opposed to academic pursuits. The graphic shows that the student used these years to "catch up" and by High School, was equal to the average monolingual peer in English, and only slightly behind his monolingual Spanish speaking peer in Spanish. The chart does not show the probable continued growth in CALP relative to monolingual English language peers due to continued hard work, study patterns, the availability of Spanish language classes and family. This student would be a good candidate for advanced study in spite of the misleading "average" numbers. The student would be above average at graduation.

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