A Validation of the Ski Hi Language Development Scale

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In order to determine who will need and who will benefit from what type of early language training a wide variety of language assessment instruments has been developed in the last ten to fifteen years. However, few of these instruments emphasize the assessment of infant language skills, and even fewer can be utilized to assess correctly the language of hearing impaired children. The reasons for this include both a lack of standardization of the instruments on a hearing impaired population and the inclusion of auditory skills on the few instruments that attempt to measure pre-language skills. For these reasons, current language assessment instruments are impractical for the hearing impaired population.

In an effort to overcome the problems inherent in existing language scales, the Ski Hi Language Development Scale (Ski Hi LDS) was developed. As with a number of other scales, the Ski Hi Language Development Scale lists the expressive language and the receptive language skills that a child of a particular age would demonstrate normally. Unlike the other scales, the Ski Hi LDS does not emphasize auditory items. As far as possible, auditory items have been eliminated from the receptive scale. In addition, children who use total communication are not penalized on this scale as they are on many other language development scales. On the Ski Hi LDS, a child is given credit for his understanding and use of signs. In addition, credit is given to the hearing impaired child for correct, but misarticulated, verbal responses. Therefore, on the Ski Hi Language Development Scale, hearing impaired children are not penalized for their disability. Also, the Ski Hi LDS is administered by parents while they are observing their hearing impaired child.

The importance of the early identification of a language disability and

the necessity for early language intervention for hearing impaired children is well documented in the literature (Ewing, 1958; Harris, 1971; Irwin and Marge, 1972; Clark and Watkins, 1978). Research also indicates that a hearing loss can have a tremendous effect on a child's education (Goetzinger, Harrison, and Baer, 1964; Furth, 1966 and 1971; Harris, 1971). Therefore, early identification of the disability and prompt intervention are necessary if a child is to maximize his potential.

The preceding discussion summarizes the reasons for the construction of the Ski Hi Language Development Scale. This scale, in brief, was constructed in order to address the language needs of children with hearing impairments. However, since the Ski Hi LDS is newly developed, its reliability and validity have never been assessed.

The purpose of this study was to assess systematically the reliability and the validity of the Ski Hi Language Development Scale. In order to achieve this purpose, both the receptive language scale and the expressive language scale of this instrument were studied.

Methods

Three different procedures were utilized to estimate the reliability of the Ski Hi Language Development Scale. Each of the three procedures was completed first on the receptive language scale of the instrument and then on the expressive language scale of the instrument. The first method through which an estimate of the reliability of the Ski Hi LDS was obtained was to determine the percentage of agreement among a number of raters who observed the same children manifesting the same language behaviors via a videotape process. The second procedure utilized to estimate the reliability of the Ski Hi Language Development Scale was to determine the correlation between each rater's scoring of the LDS on two separate occasions, while observing the same videotape of children manifesting

receptive and expressive language behaviors. Third, an estimate of the internal consistency of the Ski Hi Language Development Scale was determined by utilizing the Kuder-Richardson 20 technique.

In order to estimate the validity of the Ski Hi Language Development Scale, two procedures were utilized. First, an estimation of the concurrent validity of the Ski Hi Language Development Scale was obtained by correlating a child's score on the LDS with the same child's score on the Receptive-Expressive Emergent Language Scale (REEL) (Bzoch & League, 1974). Then, an estimation of the construct validity of the Ski Hi LDS was obtained through the use of the Guttman Scaling Technique. This procedure was a major focus of this research study and provided information concerning the developmental nature of language. Again, for the procedures utilized to estimate the validity of the Ski Hi Language Development Scale, just as for the procedures utilized to estimate the reliability of the Ski Hi LDS, the receptive language scale and the expressive language scale were analyzed separately.

Description of the Ski Hi Language Development Scale

The Ski Hi Language Development Scale lists the expressive and receptive language behaviors that a child of a particular age would demonstrate normally. For both the expressive language scale and the receptive language scale, the LDS contains lists of infant (0-2) language skills in two month intervals. For two to four year old children, the skills are listed in four month intervals. The skills are listed in six month intervals for the four to five year old children. Each age interval is represented by enough observable language skills so that a good profile of a child's language ability, both expressive and receptive can be developed. In the following discussion, "units" refer to groups of behaviors within the aforementioned time intervals.

Results

The inter-rater reliability estimate for the units of the receptive language scale indicated a mean percentage of rater agreement of 82%. The mean percentage of agreement among raters for the expressive language scale units was 68%.

The results of the test/retest rater reliability indicated a mean percentage of rater agreement over time of 70% for the units of the receptive language scale and 76% for the units of the expressive language scale. Correlating rater's responses from observation one and observation two provided correlation coefficients of .86 for the receptive scale units and .92 for the expressive scale units.

The reliability coefficients used to estimate the internal consistency of both the receptive language scale and the expressive language scale of the Ski Hi LDS were uniformly high (see Table 1). The reliability coefficient for the receptive language scale units was .93. For the expressive language scale units, the reliability coefficient was .94.

INSERT TABLE 1 HERE

Results of the procedures utilized to estimate the validity of the Ski Hi Language Development Scale suggest that the LDS is a valid instrument when utilized with a population of hearing impaired children. To estimate the concurrent validity of the Ski Hi LDS, it was correlated with the REEL. Correlation coefficients were determined for the receptive language scales and the expressive language scales. A coefficient of .78 was obtained for the receptive language scales and a coefficient of .79 was obtained for the expressive language scales. Both of these correlation coefficients were significant at $p \leq .001$. Correlated t-tests also were completed on the respective means of

the two instruments. The results of this procedure indicated a significant difference between the means for both the receptive and the expressive language scales ($p \leq .01$).

INSERT TABLES 2 AND 3 HERE

With regard to the estimation of the construct validity of the Ski Hi Language Development Scale, the coefficients of reproducibility as determined by the Guttman scaling technique were uniformly high. With minimal changes, the units of the receptive language scale can be sequenced so that a .99 coefficient of reproducibility is obtained. For the units of the expressive language scale the units now are sequenced as to provide a .99 coefficient of reproducibility.

Discussion

The results of this research study suggest that the Ski Hi Language Development Scale is a valid and reliable instrument for determining the receptive language level and the expressive language level of hearing impaired children from birth to five years of age and can be a viable alternative to language development scales presently in use. A summary of the data which suggests this conclusion will now be presented.

With regard to both inter-rater reliability and test/retest rater reliability the Ski Hi Language Development Scale appears to be a reliable instrument. Even though the samples for both of these procedures were graduate students enrolled in a university instrument construction class, the percentages of agreement among raters, for the receptive and the expressive language scale units, was high. It may be argued that these university students, by virtue of being enrolled in an instrument construction class, were more knowledgeable than parents of hearing impaired children would be.

The test/retest rater reliability, although a small component of this study, also proved to be satisfactory for both receptive language scale units and expressive language scale units. Mean percentages of rater agreement over time for overall correlation for the receptive language scale was .86 and the overall correlation for the expressive language scale was .92. These correlations were completed on data recorded during the first observation and the second observation of the videotaped children. The observations were of such a duration (2 hours) and separated by a length of time (2 weeks) so as to minimize the impact of memory on this procedure.

Considering that the samples for these procedures were observing a videotape of children manifesting language behaviors, these results provide strong evidence that the reliability of the Ski Hi Language Development Scale, when administered properly, will be quite good.

The internal consistency of units of the Ski Hi Language Development Scale suggests that for this population, the Ski Hi LDS is a reliable instrument. For both the receptive and expressive language scales, the internal consistency reliability estimates are above .90. With regard to the specific units of the Ski Hi LDS, the results indicate that the beginning and end units are less reliable than those in the middle of the scale. This is true for the receptive and the expressive language scales. However, this is not an unusual finding. Many instruments designed to assess infants and young children are less reliable at the ends than they are in the middle. Given the reliability coefficients of the two scales and the reliability coefficients of items within the units which compose the scales, the evidence suggests that the Ski Hi LDS is a reliable tool for the selected population.

The validity of the Ski Hi Language Development Scale, like the reliability of the LDS, cannot be assessed directly. However, estimations of the concurrent

validity and of the construct validity of the scale have been determined. In order to address the problem of concurrent validity, the receptive and the expressive language scales of the Ski Hi LDS were correlated with the respective scales of the REEL. These correlations, which approached .80, indicated that a hearing impaired child who scored high on the REEL also scored high on the LDS. However, upon further analysis, the mean scores of the children on the two instruments for both the receptive and expressive language scales proved to be significantly different. The hearing impaired children on both receptive and expressive language scales scored higher on the Ski Hi LDS than they did on the REEL. These results, when combined, suggest that there is congruence between what the REEL is measuring and what the Ski Hi Language Development Scale is measuring. Although the correlation between the two instruments is high, the mean differences suggest that the population is simply maintaining their places along a language development continuum, rather than scoring equally on the two instruments. It appears, given the significance and direction of the mean differences for the receptive and expressive language scales, that the hearing impaired children are being penalized for their disability when assessed by the REEL. If this be the case, a language development scale, such as the Ski Hi LDS, designed specifically for hearing impaired children is a necessity.

In concluding this section, ramifications of the results of the Guttman scaling technique will be discussed. It must be remembered that a scale, according to Guttman (1944), is both unidimensional and cumulative. Both of these attributes have significant implications toward estimating the construct validity of the Ski Hi LDS. First, the implications of unidimensionality will be discussed. Then, implications of a cumulative scale will be presented.

Language development, as cited previously, is thought to consist of two components. One component is language perception or receptive language. The

other component is language production or expressive language. If the Ski Hi LDS is congruent with language development theory, the receptive language scale and expressive language scale both must be unidimensional. The high coefficients of reproducibility obtained on the two scales as a whole, as well as on items within the units of the scales, suggest that these scales are, in fact, unidimensional. This provides evidence suggestive of good construct validity of the Ski Hi LDS.

In addition to the preceding evidence which supports the construct validity of the LDS, the fact that the units within each scale can be sequenced to obtain high coefficients of reproducibility provide further evidence of the construct validity of the LDS. The items and units of the Ski Hi LDS have been taken from other scales which purportedly follow a developmental sequence of behaviors for hearing children. The high coefficients of reproducibility obtained when the LDS was analyzed with the Guttman scaling technique support the conclusion that language development is similar for hearing impaired children and hearing children. The process appears to be developmental with the sequence of behavior manifestations closely approximating one another. For these reasons, the Ski Hi Language Development Scale appears to have excellent construct validity.

One recommendation that is suggested by the results of this research study is that additional research should be conducted in order to determine how effective the REEL is with a hearing impaired population. Presently, the REEL is being utilized across the country in order to determine the receptive and expressive language levels of hearing impaired children. These data would suggest that the use of the REEL with hearing impaired children is inappropriate. It appears that the REEL penalizes hearing impaired children for their disability.

Another area of research that would provide support for the use of the Ski Hi Language Development Scale is that of parent assessment. The Ski Hi LDS

is based upon the premise that parents can correctly assess the language development level of their hearing impaired children. Presently, there is little data to either support or negate this assumption.

In conclusion, the results of this research study have provided evidence which suggests that the Ski Hi Language Development Scale is a valid and a reliable instrument when utilized to assess the language development level of hearing impaired children from birth to five years. Also, the results of this study suggest that the language development process for hearing impaired children follows a developmental sequence similar to that of hearing children. These results not only can be useful immediately with regard to correctly assessing the language development level of hearing impaired children, but it also is hoped that this study will stimulate additional research in this area.

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Table 1

Internal Consistency Reliability Analysis of

The Ski Hi Language Development Scale

Receptive and Expressive Language Scales - Scale Analysis

	Reliability Coefficient	Mean	Standard Deviation	Standard Error of Measurement
Receptive Language Scale	.93	10.74	5.17	1.37
Expressive Language Scale	.94	10.06	5.54	1.36

Note: Each scale consisted of 20 units.
$n = 116$

Table 2

t-Test Results of the Receptive Language Scales

of the Ski Hi LDS and the REEL

	Mean	Standard Deviation	Standard Error of the Mean	t Value	Degrees of Freedom	Significant
Ski Hi LDS	19.30	10.55	2.03			
				5.63	26	.01
REEL	12.17	9.71	1.87			
n = 27						

Table 3

t-Test Results of the Expressive Language Scales

of the Ski Hi LDS and the REEL

	Mean	Standard Deviation	Standard Error of the Mean	t Value	Degrees of Freedom	Significant
Ski Hi LDS	16.62	9.55	1.84	3.29	26	.01
REEL	12.50	10.18	1.96			
n = 27						