

Early Identification of Speech/Language/Communication Disorders in Children: Effective Utilization of a Preschool Screener

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LANGUAGE DISORDERS

- Mostly use of nouns to label things
- Limited use of articles/connector words
- May use echolalic (repeating) speech
- Speech may be difficult to understand
- Difficulty sequencing events while telling a story
- May talk out of context

AUTISM SPECTRUM DISORDER (ASD)

- Difficulty with interactions
- Does not point
- Fleeting eye contact
- Echolalia speech
- Uneven motor skills
- Difficulty expressing needs
- Tantrums for no apparent reason
- Inconsistent response to teaching methods

PURPOSE OF SCREENER

- Identify child who needs further evaluation (Early Identification)
- Does not diagnose
- Helps family to engage in early assessment and intervention services
- Offers support to teachers thru referral
- Educates teachers & parents re: community resources

AREAS SCREENED

- Articulation: speech sounds
- Receptive Language: understanding
- Expressive Language: talking
- Comprehending questions
- Answering open ended questions
- Oral Motor: mouth, lips, tongue
- Voice & Fluency of Speech
- Other: behavioral observations

SPEECH SCREENING

- Hodson Assessment of Phonological Patterns
 - Preschool Phonological Screening
 - HAPP-3
 - Child is shown an object to name
 - Sound difficulties
 - Word problems

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LANGUAGE SCREENING

- Receptive Targets
 - Adapted from: PLS-4
- Expressive Targets
 - Adapted from: PLS-4
- Pragmatic Observation
- Voice/fluency
- Oral Motor Observation

OTHER AREAS

- Overall behavior
- Attention/distractibility
- Visual aspects
- Auditory aspects
- Gross and Fine Motor aspects

SCORING/REFERRALS

- 50 points total available
 - 42 to 50 points: Within Normal Limits
 - 85% or higher
 - 40 points or less: Refer for Further Eval
 - 80% or lower
 - Rescreen: Borderline or errors in one area
 - Splinter skills

May need to refer to another professional due to behavioral observations observed during screening, i.e., OT, behavioral, PT, audiology, psychology

EFFECTIVENESS OF SCREENER

- Multicultural/bilingual considerations
- Screener training - all day workshop
- Statistical significance when compared to standardized language test
- Collaboration with classroom teachers and school directors
- Teacher training re: Symptoms Sp/Lang
- Parent - Results and Recommendations
- Cost reduction

ANALYSIS APPROACH

- 20 minute screening performed and compared to a full one hour plus evaluation for early id of children with communication disorders.
- 31 of 33 children provided a small sample.
- Small sample results in some expected values in Chi-squared table to be less than 4.
- Regression using binary indicator variables applied.

SCREENING OUTCOMES

- Speech (Articulation) and Language within Normal Levels (WNL) with some developmental articulation and language errors.
- Full evaluation recommended for articulation and language.
- Other possible problems observed for further evaluation.

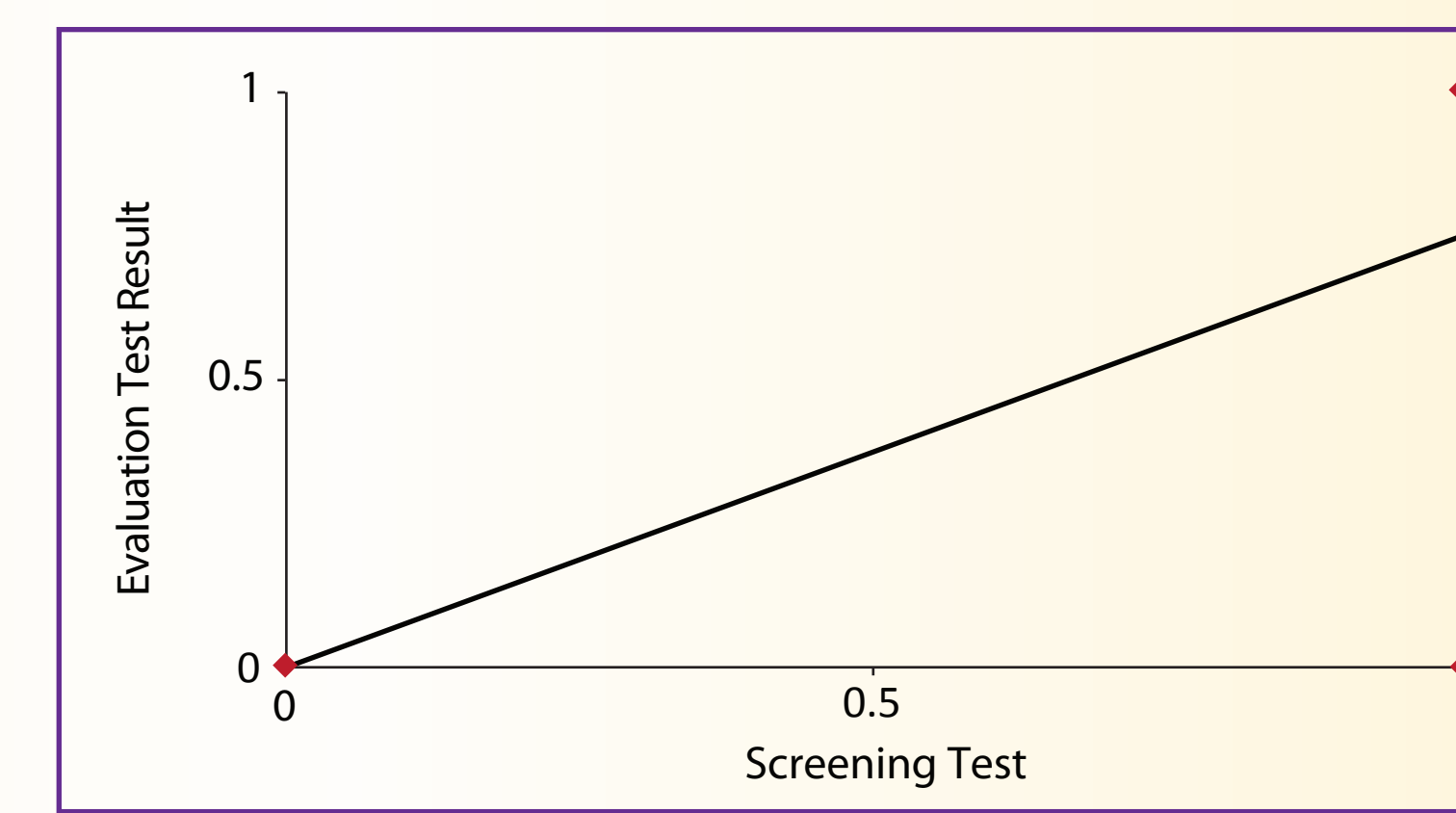
FULL EVALUATION OUTCOMES

- Speech (Articulation) and Language within Normal Levels (WNL) with some developmental articulation and language errors.
- Therapy recommended for articulation and language.
- Other possible problems observed for further evaluation.
- Oral and Facial Exam omitted for comparison.

OPTION A ANALYSIS

- Screening WNL and recommendation for Full Evaluation compared with results for Full Evaluation for WNL and Therapy.

OPTION A ANALYSIS PLOT



Note: Data points overlap at (0,0), (1,0) and (1,1) which masks the plotted data points.

OPTION A STATISTICS

SUMMARY OUTPUT - OPTION A

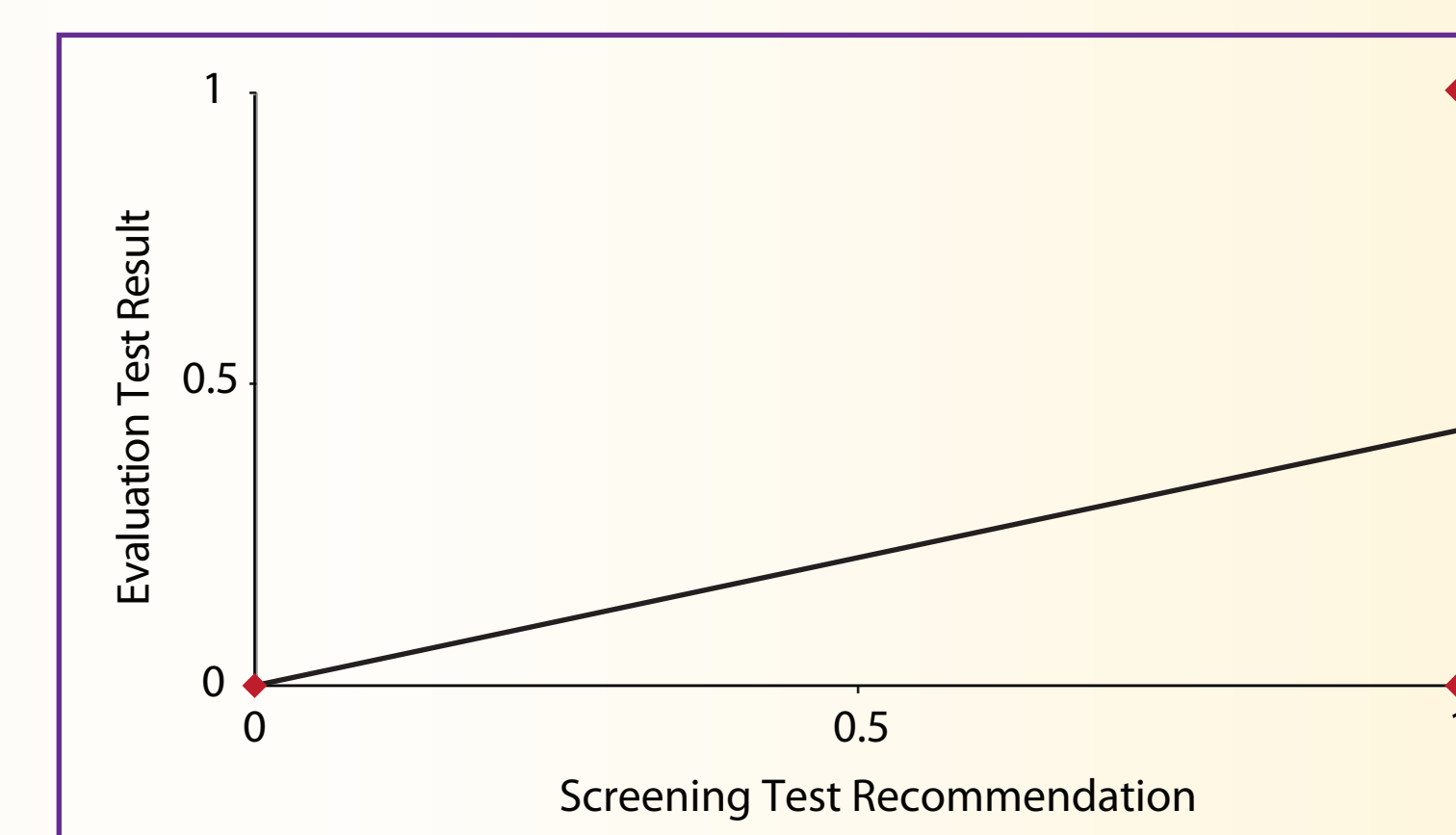
Regression Statistics		Coefficients				
Multiple R	0.850420064	Intercept	6.93889E-17	0.030949223	2.24203E-15	1
R Square	0.723214286	X Variable 1	0.75	0.086158991	8.704837365	1.39069E-09
Adjusted R Square	0.713669951					
Standard Error	0.16081688					
Observations	31					

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.959677419	1.959677419	75.77419355	1.39069E-09
Residual	29	0.75	0.025862069		
Total	30	2.709677419			

OPTION B ANALYSIS

- Screening WNL and recommendation for Full Evaluation compared with results for Evaluation for WNL and Therapy.
- Comparison of other possible problems observed and identified for further evaluation included in analysis.

OPTION B ANALYSIS PLOT



Note: Data points overlap at (0,0), (1,0) and (1,1) which masks the plotted data points

OPTION B STATISTICS

SUMMARY OUTPUT - OPTION B

Regression Statistics		Coefficients				
Multiple R	0.606091527	Intercept	-6.93889E-17	0.049629167	-1.39815E-15	1
R Square	0.367346939	X Variable 1	0.428571429	0.104440468	4.103499687	0.000301838
Adjusted R Square	0.345531316					
Standard Error	0.24313227					
Observations	31					

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.995391705	0.995391705	16.83870968	0.000301838
Residual	29	1.714285714	0.0591133		
Total	30	2.709677419			

CONCLUSION

The hypothesis that the screening predicts the outcomes of the full evaluation test holds at a very high level of significance ($p < .001$).

Notes

1. Sample 4 has multiple screening results. Rule applied to reduce to *Eval*.
2. Screening value recommending *DNE* (Do Not Evaluate) is 0, and *Eval* (Evaluate) is 1.
3. Evaluation Test assesses true state with *N/D* (Normal or developmental problems within normal limits) as 0.
4. Evaluation Test assesses true state with *Tx* (Problem requiring therapy) or *O* (Other action required as part of Option B) as 1.

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REFERENCES

- Davies, O. L. (1963). The Design of Screening Tests. *Technometrics*, Vol. 5, No. 4, pp. 481-489.
- Hodson, B. (2004). *HAPP-3*. Austin, TX: PRO-Ed.
- Moore, D. S. and G. P. McCabe. (1993). *Introduction to the Practice of Statistics*, (2nd ed). New York, NY: W. H. Freeman.
- Neter, J., W. Wasserman, M. H. Kutner. (1989). *Applied Linear Regression Models*, (2nd ed). Boston, MA: Richard D. Irwin, Inc. ISBN: 0-256-07068-7.
- Sutts, D. B. (1957). Use of Dummy Variables in Regression Equations. *Journal of the American Statistical Association*, p. 596.
- Zimmerman, I., Steiner, B., Pond, R. (2007). *PLS-4*. San Antonio, TX: Pearson.



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