

## Evidence-Based Language Intervention for Preschool Children

Storkel, Adlof, Hoover, Lee, Maekawa

Speech-Language-Hearing & Child Language Doctoral Program

University of Kansas

KSHA 2007

### Principles of Evidence Based Practice (Storkel)

1. Evidence includes non-treatment research, treatment research, and clinical experience
2. There is a continuum of research beginning with non-treatment research, continuing to exploratory treatment research, and ending with efficacy treatment research
3. This presentation will focus on how to evaluate treatment research and each following presentation will show an example
4. Reading a treatment research article: Step 1
  - a. Read the abstract to get an overview of the article
  - b. Is this article relevant to your client?
  - c. What is the design of the study?
  - d. Are there any terms you don't understand? Look for them in the introduction
5. Step 2
  - a. Read the paragraph before methods section to determine purpose, research questions, and/or hypotheses
  - b. Does this fit your goals in reading this article?
  - c. Are there any terms you don't understand? Look for them in the introduction
6. Step 3
  - a. Read the participants section
  - b. Determine how similar the participants are to your client(s). Consider age, diagnosis/specific deficits, severity, etc.
  - c. Quality: Score 1 point if description is detailed enough for research replication and clinical application
7. Step 4
  - a. Determine the independent variable (what was manipulated or systematically varied)
  - b. Often not set apart in a separate section
  - c. Within Subjects (i.e., 1 group), Manipulate treatment
    - i. Examples = treatment 1 vs. treatment 2; +component vs. -component; target 1 vs. target 2
    - ii. Quality = Order of conditions is varied & Targets randomly assigned to conditions
    - iii. Quality = Participants comparable at baseline on treatment targets
  - d. Between Subjects (i.e., 2 groups), Manipulate treatment
    - i. Examples = treatment 1 vs. treatment 2; +component vs. -component; target 1 vs. target 2
    - ii. Quality = Participants randomly assigned to conditions/groups
    - iii. Quality = Participants comparable at baseline (age, severity, tx targets, etc.)
  - e. Between Subjects (i.e., 2 groups), Manipulate participant characteristic
    - i. Examples = younger vs. older; more severe vs. less severe; disorder 1 vs. disorder 2
    - ii. Quality = Randomly sample participants
    - iii. Quality = Participants comparable at baseline except on manipulated characteristic (age, severity, tx targets, etc.)
8. Step 5
  - a. Determine dependent variable (what outcome was measured)
  - b. Found in methods section and often specifically labeled as materials, outcome measures, etc.
  - c. Typical dependent variables: speech or language measures administered prior to, during, and/or after treatment; number of sessions needed to meet criterion; client/parent satisfaction
  - d. Quality: Score 1 point if dependent variable is valid and reliable (reliability may be reported in separate section)
  - e. Quality: Score 1 point if the person collecting/computing the dependent variable was unaware of the assignment of each participant (i.e., blind)

9. Step 6
  - a. Describe the treatment (e.g., treatment targets, activities, intensity, and context)
  - b. Usually labeled as a treatment or procedures
  - c. Quality: Score 1 point if description is detailed enough for research replication and clinical application
  - d. Quality: Score 1 point if fidelity of treatment is reported and is high
10. Step 7
  - a. Determine the results (e.g., statistical significance, reliable difference, impact)
  - b. Found in results section
  - c. Quality: Score 1 point if result is statistically significant and/or reliably different
  - d. Quality: Score 1 point if difference is clinically important
11. Compute total score (max of 9)
12. Summarize multiple studies in table

Quality Score	Non-treatment Research	Treatment Research		
		Case	Single-Subject	Group/Trial
9 = Highest				
8				
7				
6				
5				
4				
3				
2				
1 = Lowest				

13. References:

*The State of the Evidence*, ASHA Leader, March 6, 2007: <http://www.asha.org/about/publications/leader-online/archives/2007/070306/f070306b.htm>

*Making Evidence-Based Decisions*, LSHSS, October, 2006: <http://lshss.asha.org/cgi/reprint/37/4/304> (Only available to ASHA members)

*5-Phase Model for Research*, J of Comm Dis, Sept-Oct, 2004: <http://www.medscape.com/medline/abstract/15231420> (just a link to the abstract, not the full article)

## **Vocabulary Treatment for Bilingual Children** (Maekawa)

1. Kiernan & Swisher (1990)
  - a. A single-subject treatment study that examined learning of new words in L2 English by L1 Spanish/Navajo children (4:11-6:3) comparing bilingual vs. monolingual training conditions.
  - b. Search terms: bilingual vocabulary, preschool age, second language acquisition, word learning, L1, L2, language intervention
2. Step 1: Read the Abstract
  - c. Are your clients bilingual/L2 learners? Are you teaching vocabulary?
  - d. Design of the study: single-subject alternating treatment
3. Step 2: Purpose of the Research
  - a. Purpose/questions:  
To compare the effectiveness of a bilingual training condition (L1-L2) and a monolingual training condition (L2 only) in receptive learning of L2 novel words, utilizing the presentation and stimuli from previous works
  - b. Hypothesis:  
“L2 words would be learned in fewer trials under a bilingual condition...than under a monolingual condition...”
4. Step 3: Participants (Experiment1)
  - a. 3 boys and 1 girl, ages 4:11-5:3
  - b. All met selection criteria
  - c. Quality Score (1/1) = Description is detailed enough for replication including the selection criteria and how they were measured
5. Step 4: Independent Variable
  - a. Component of the treatment (L1) was manipulated (bilingual condition with L1 vs. monolingual condition without L1)
  - b. Quality Score (1/1) = Order of conditions is varied & targets randomly assigned to conditions
  - c. Quality Score (1/1) = Participants comparable at baseline on treatment targets (i.e., nonwords were used)
6. Step 5: Dependent Variable
  - a. Number of trials needed to meet criterion
  - b. Quality: Score (1/1) = High interscorer reliability is reported
  - c. Quality Score (0/1) = Examiner was not unaware of the assignment
7. Step 6: Treatment
  - a. Training targets: learning of L2 novel words
  - b. Training activities: Naming puzzle figures, providing feedback
  - c. Intensity of training: 15 minutes/day, 3-10 days
  - d. Context of training: Individual
  - e. Quality Score (1/1) = Treatment description is detailed enough for replication and clinical application
  - f. Quality Score (0/1) = Fidelity is not reported
8. Step 7: Results
  - a. Reported in a figure that indicates the number of trials to learning criterion for each participant, comparing between bilingual and monolingual conditions
  - b. Quality Score (1/1) = Results are reliably different as observed in the same pattern across participants
  - c. Quality Score (1/1) = Results are clinically important because the effect is robust
9. Compute total score = 7/9

10. Summarize multiple studies in table

Quality Score	Non-treatment Research	Treatment Research		
		Case	Single-Subject	Group/Trial
9 = Highest				
8				
7			Kiernan & Swisher Ex1 & Ex2 (1990) Perozzi (1985)	
6				Perozzi & Sanchez (1992)
5		Thordardottir, et al. (1997)		
4				
3				
2				
1 = Lowest				

11. References:

Kiernan, B. & Swisher, L. (1990). The initial learning of novel English words: Two single subject experiments with minority language children. *Journal of Speech and hearing Research*, 33, 707-716.

Perozzi, J. A. (1985). A pilot study of language facilitation for bilingual, language-handicapped children: Theoretical and intervention implications. *Journal of Speech and hearing disorders*, 50, 403-406.

Perozzi, J. A. & Sanchez, M. L. C (1992). The effect of instruction in L1 on receptive acquisition of L2 for bilingual children with language delay. *Language, Speech, and Hearing Services in Schools*, 23, 348-352.

Thordardottir, E., Ellis Weismer, S., & Smith M. (1997) Vocabulary learning in bilingual and monolingual clinical intervention. *Child Language Teaching and Therapy*, 13, 215-227.

## Evaluation of Phonological Treatment (Lee)

Gierut, J. A. (1991). Homonymy in phonological change. *Clinical Linguistics & Phonetics*, 5(2), 119-137.

### 1. Overview:

- a. Treatment procedures that contrast sounds
  - i. **Traditional minimal pair** – unknown target paired with known substitute (e.g. unknown target /r/ and known substitute /w/)
  - ii. **Alternatives** – unknown target paired with known sound that is not substitute (e.g., unknown target /r/ and known non-substitute /t/) OR unknown target paired with unknown target (e.g., unknown target /r/ and unknown target /θ/)

### 2. Research Continuum: Stage 2 = Exploratory treatment research

### 3. Step 1: Read the abstract

- a. Purpose of the study: to evaluate two treatment structures (Traditional minimal pair vs. Alternative treatment of the unknown set)
- b. Result of the study: Alternative treatment resulted in greater accuracies of treated sounds and in more new untreated sounds being added to the phonological system.
- c. Implication: the status of homonymy in phonological change and the structure of phonological treatment

### 4. Step 2: Purpose of the research

- a. To evaluate the relative effectiveness of two different contrast treatments in improving the production of treated and untreated errored sounds measured on probes.
- b. Hypothesis: if homonymy is the key factor in phonological change, greater improvements in new and related sounds would be expected from the conventional minimal pair approach to treatment.

### 5. Step 3: Participants

- a. Two 5-year-old boys and one 4-year-old girl
- b. Characteristics of the participants: Functional phonological disorders
  - i. normal hearing
  - ii. normal language
  - iii. 0% accuracy for at least six sounds
  - iv. monolingual English-speaking family. – 1 point

### 6. Step 4: Independent variables

- a. Within-subject research design: manipulating treatments (traditional minimal pair vs. alternative treatment) – each child is treated with both.
- b. Counterbalancing the order of presentation. – 1 point
- a. Participants are comparable at baseline on treatment targets. – 1 point

### 7. Step 5: Dependent variables

- a. Measurement: Relative changes in treated and untreated sounds excluded from a child's pretreatment inventory.
- b. 89% agreement on interjudge reliability. – 1 point

### 8. Step 6: Treatment

- a. What was trained (i.e., training targets) - Learning of 16 nonsense word (NSW) pairs (8 pairs for each treatment)
- b. How it was trained (i.e., training activities) - Sorting, matching, informal story-telling, disambiguation of word pairs

- c. Intensity of training (i.e., how often, how long) - 60 minutes, three times per week (1st treatment → 10 min non-speech-related activity → 2nd treatment)
  - d. Context of training (i.e., individual vs. group) - Individual
- 1 point

**9. Step 7: Results**

- a. Statistical significance (if applicable) - N/A
- b. Reliable difference (i.e., the pattern of what is best is the same across participants) - YES
  - i. Greater accuracies of treated sounds in alternative treatment.
  - ii. More new untreated sounds being added to the inventory in alternative treatment.
- c. Impact (Is a difference of this magnitude clinically important?) – YES
  - i. The preliminary findings suggest clinical applications with alternative treatment over traditional minimal pair approach.

-1 point

**10. Step 8: Summarize Quality**

- a. Total Score (max = 9) = 7

**11. Conclusion:** This research provides high quality evidence that phonological intervention with alternative treatment is more effective than with traditional minimal pair approach.

**12. Summary**

Quality Score	Non-treatment Research	Treatment Research		
		Case	Single-Subject	Group/Trial
9 = Highest				
8				
7			Gierut (1991); Gierut (1990); Gierut (1992); Gierut & Neumann (1992).	
6				
5		Gierut (1989)		
4				
3				
2				
1 = Lowest				

**References**

- Gierut, J. A. (1989). Maximal opposition approach to phonological treatment. *Journal of Speech and Hearing Disorders*, 54, 9-19.
- Gierut, J. A. (1990). Differential learning of phonological oppositions. *Journal of Speech and Hearing Research*, 33, 540-549.
- Gierut, J. A. (1991). Homonymy in phonological change. *Clinical Linguistics and Phonetics*, 5, 119-137.
- Gierut, J. A. (1992). The conditions and course of clinically induced phonological change. *Journal of Speech and Hearing Research*, 35, 1049-1063.
- Gierut, J. A. & Neumann, H. J. (1992). Teaching and learning /ə/: A nonconfound. *Clinical Linguistics and Phonetics*, 6, 191-200.

## **Grammatical/Syntactic Impairments** (Hoover)

### 14. Read: Camarata, Nelson, & Camarata (1994): Step 1

- a. **Is this article relevant to your client?** Treatment of grammar/syntax for children with SLI
- b. **What is the design of the study?** Within Subjects (1 group receives both treatments)
- c. **New terminology?** Conversational Recasting, Imitative Treatment

### 15. Step 2

- a. **Purpose:** Compare conversational recasting to imitative procedures in order to determine the most effective way to elicit spontaneous production of grammar/syntax

### 16. Step 3

- a. Read the participants section
  - i. Ages 4;0-6;10
  - ii. Delayed expressive language
  - iii. Normal hearing
  - iv. Normal cognition
  - v. No history of neurological trauma or impairment, psychological disorders, emotional disturbance
- b. Quality Score = 1

### 17. Step 4

- a. **Independent variable:** Treatment technique (conversational recasting vs. imitative training)
- b. Within Subjects (i.e., 1 group), Manipulate treatment
  - i. Order of conditions is varied & targets randomly assigned to conditions: Quality Score = 1
  - ii. Participants comparable at baseline on treatment targets: Quality Score = 1
  - iii. Total points = 2

### 18. Step 5

- a. **Dependent variable 1:** Number of treatment sessions to elicited production and spontaneous use of target
- b. **Dependent variable 2:** Number of elicited and spontaneous productions overall
- c. Dependent variable is valid and reliable: Quality Score = 1 (92% agreement for identifying treatment targets; 89% agreement for child productions of target)
- d. Person collecting/computing the dependent variable was blind: Quality Score = 0 (not specified)

### 19. Step 6

- a. **Treatment Procedures:**
  - i. Two grammar/syntax goals treated per child
  - ii. One goal treated using Imitative Training; one goal treated using Conversational Recasting
  - iii. Two 50-minute treatment sessions/week for 12 weeks (24 total sessions)
  - iv. Context of treatment not specified (group vs. individual)
- b. Is description detailed enough for research replication and clinical application? Quality Score = 1
- c. Is fidelity of treatment reported and high? Quality Score = 1

### 20. Step 7

- a. **Results:**
  - i. Transition from elicited to spontaneous production of treatment targets was faster when using conversational recasting. Imitative treatment was more effective in generating elicited productions than conversational recasting. However, conversational training was more effective in generating spontaneous productions than imitative training.
- b. Are results statistically significant and/or reliably different? Yes. Quality Score = 1
- c. Is the difference clinically important? You may want to use your clinical judgment to determine the answer to this question. Even though the results were statistically significant, the difference between the number of treatment sessions required to achieve spontaneous production is modest (~2 sessions). Quality Score = 0

21. Compute total score 7 (9 max)

22. Conclusions:

- a. Imitative training may be better for achieving a short-term goal, like elicited production of grammar/syntax structure in treatment.
- b. Conversational recasting may be better for achieving long-term generalization, or spontaneous use of grammatical/syntactic structures.

23. Summarize multiple studies in table

Quality Score	Non-treatment Research	Treatment Research		
		Case	Single-Subject	Group/Trial
9 = Highest				
8				
7				Camarata et al. (1994) Nelson et al. (1996)
6				
5				
4				
3				
2				
1 = Lowest				

24. References:

- Camarata, S.M., Nelson, K.E., & Camarata, M.N. (1994). Comparison of conversational recasting and imitative procedures for training grammatical structures in children with Specific Language Impairment. *Journal of Speech and Hearing Research, 37*, 1414-1423.
- Nelson, K.E., Camarata, S.M., Welsh, J., Butkovsky, L., & Camarata, M. (1996). Effects of imitative and conversational recasting treatment on the acquisition of grammar in children with Specific Language Impairment and younger language-normal children. *Journal of Speech and Hearing Research, 39*, 850-859.
- Fey, M.E., Cleave, P.L., Long, S.H. & Hughes, D.L. (1993). Two approaches to the facilitation of grammar in children with language impairment: An experimental evaluation. *Journal of Speech and Hearing Research, 36*, 141-157.
- Fey., M.E., Cleave, P.L., & Long, S.H. (1997). Two models of grammar facilitation in children with language impairments: Phase 2. *Journal of Speech, Language, and Hearing Research, 40*, 5-19.
- Leonard, L.B., Camarata, S.M., Pawlowska, M., Brown, B., & Camarata, M.N. (2006). Tense and agreement morphemes in the speech of children with Specific Language Impairment during intervention: Phase 2. *Journal of Speech, Language, and Hearing Research, 49*, 749-770.



## **Storybook Reading as an Intervention for Children with Low Vocabulary Knowledge** (Adlof)

1. Many correlational (non-treatment) studies have shown that there is a relationship between vocabulary size and the amount and types of shared storybook reading experiences that children participate in
  - a. See Bus et al. (1995) for a meta-analysis that includes many of these studies as well as other early treatment studies
2. In this review, the goal was to evaluate the evidence for using shared storybook reading activities as an intervention for children who have or are at risk for vocabulary deficits
  - a. Search Terms: vocabulary, joint book reading, storybook reading, shared book reading
  - b. Identified treatment studies involving
    - i. Children with identified language impairments
    - ii. Children with below-average vocabulary
    - iii. Children from low-SES backgrounds
    - iv. Children who are English language learners
3. Reviewed studies using the ASHA Levels of Evidence Framework. This research is in the efficacy/effectiveness phase. General findings:
  - a. Moderate-to-high evidence that shared storybook reading activities are beneficial for increasing the vocabulary knowledge of populations included in this review
  - b. Vocabulary growth appears to be greater when elaborations or explanations of word definitions are included in the storybook reading activity, as opposed to "incidental" exposure
  - c. It does not appear that shared reading activities alone are enough to close the vocabulary gap between at-risk and typically developing children (except, possibly ELLs)
    - i. According to some studies, the learning rate of children with language impairments and/or below -average vocabulary is slower than that of typically developing children
    - ii. At least one study has shown that ELLs learn new words faster than native English children from low SES backgrounds (although they start out at a lower level, they catch up by the end of treatment)
  - d. Joint book reading can be considered a supplement to explicit vocabulary instruction

Summary of Multiple Studies

Quality Score	Non-treatment Research	Treatment Research		
		Case	Single-Subject	Group/Trial
9 = Highest	Not Included in this review			
8				
7			Crowe et al., 2004	Justice et al., 2005
6				Horohov & Oetting, 2004 Penno, et al., 2002 Robbins & Ehri, 1994 Silverman, 2007 Van Kleeck et al., 2006
5				Hargrave & Senechal, 2000 Senechal et al., 1995, Exp.1
4				Senechal et al., 1995, Exp.2
3				Ewers & Brownson, 1999 Elley, 1989, Exp. 2
2				
1 = Lowest				

## **References**

- Bus, A., van Ijzendoorn, M., & Pellegrini, A. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*, 1–21.
- Crowe, L.K., Norris, J.A., & Hoffman, P.R. (2004). Training caregivers to facilitate communicative participation of children with language impairment during storybook reading. *Journal of Communication Disorders, 37*, 177-196.
- Elley, W. B. (1989). Vocabulary acquisition from listening to stories. *Reading Research Quarterly, 24*, 174–187.
- Ewers, C.A., & Brownson, S.M. (1999). Kindergarteners' vocabulary acquisition as a function of active vs. passive storybook reading, prior vocabulary, and working memory. *Reading Psychology, 20*, 11-20.
- Hargrave, A.C., & Senechal, M. (2000). A book reading intervention with preschool children who have limited vocabularies: The benefits of regular reading and dialogic reading. *Early Childhood Research Quarterly, 15*, 75-90.
- Horohov, J.E., & Oetting, J.B. (2004). Effects of input manipulations on the word learning abilities of children with and without specific language impairment. *Applied Psycholinguistics, 25*, 43-65.
- Justice, L.M., Meier, J., & Walpole, S. (2005). Learning new words from storybooks: An efficacy study with at-risk kindergarteners. *Language Speech and Hearing Services in Schools, 36*, 17-32.
- Penno, J.F., Wilkinson, I.A.G., & Moore, D.W. (2002). Vocabulary acquisition from teacher explanation and repeated listening to stories: Do they overcome the Matthew effect? *Journal of Educational Psychology, 94*, 23-33.
- Robbins, C., & Ehri, L. C. (1994). Reading storybooks to kindergarteners helps them learn new vocabulary words. *Journal of Educational Psychology, 86*, 54-64.
- Senechal, M., Thomas, E., & Monker, J. A. (1995). Individual differences in 4-year-old children's acquisition of vocabulary during storybook reading. *87*, 218-229.
- Silverman, R. D. (2007). Vocabulary development of English-language and English-only learners in kindergarten. *107*, 365-383.
- van Kleeck, A., Vander Woude, J., & Hammett, L. (2006). Fostering literal and inferential language skills in head start preschoolers with language impairment using scripted book-sharing discussions. *15*, 85-95.