

## Ten Principles of Grammatical Intervention: An Evidence-Based Examination

Marc E. Fey, Ph.D.  
University of Kansas Medical Center  
Intercampus Program in Communicative Disorders  
Email: [mfey@kumc.edu](mailto:mfey@kumc.edu)

Oregon Speech-Language & Hearing Association Convention  
Eugene, Oregon  
October 14, 2005

## Why Focus Intervention on Grammar at All?

- Acquisition of grammar (especially grammatical morphology) is the most common and consistent symptom of language disorder.
- Grammatical errors make a child sound immature, at best.
- The language of literacy requires a strong lexicon and control over complex grammar. \*

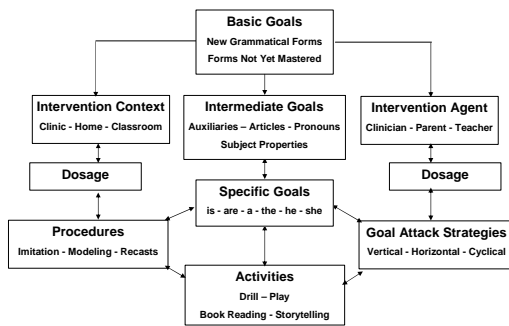
## Three Propositions of Evidence-Based Practice (Dollaghan, 2004)

- "Proposition 1. The opinions of expert authorities, singly or in groups such as consensus panels, should be viewed with skepticism and discounted entirely when they contradict evidence from rigorous scientific studies" (p. 392).
- "Proposition 2. Not all research is relevant to decisions about clinical practice" (p. 393).
- "Proposition 3. Being judgmental about evidence quality is a goal, not a character flaw" (p. 393).

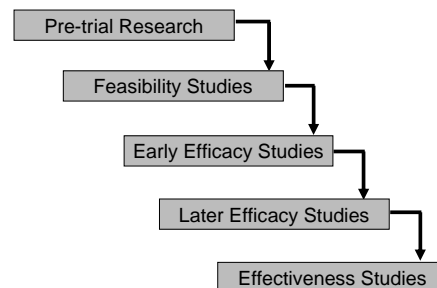
## Some Things That EBP Principles Do and Do NOT Do

- EBP principles do *not* limit us to the use of clinical practices that have shown to be efficacious and effective.
- They *do* require us to examine our practices to determine what types and what amounts of evidence support our practices.
- They *do* require us to be skeptical about the use of all of our clinical practices.
  - This is especially true when we do not have a strong body of evidentiary support.
  - This is *most* especially true when there is less support for our approach than for an alternative.

## The Multi-Dimensionality of Intervention Focused on Grammar



## What Type and Quality of Evidence May Support a Clinical Decision?



### Pre-trial Research

- (Clinical) hypothesis-generating studies
  - What factors are associated with faster language development?
- These are *not* clinical trials because the investigator does not exert control over hypothesized intervention mechanisms.
- May involve children with typical language

### Feasibility Studies

- Earliest hypothesis-testing studies, designed to evaluate the clinical viability of an untested intervention component or package
  - Do the hypothesized intervention mechanisms *appear* to have the predicted effects?
  - Can clinicians carry out the intervention efficiently with children with language impairments in clinical contexts under planned time constraints?
  - What outcome measures (or endpoints) are most useful clinically and/or most sensitive to the intervention?

### Feasibility Studies

- Often, will not involve a control group.
- Experiment-wise error may be high.
- Designs will be pre-post with small groups or even case studies.

### Early Efficacy Studies

- Hypothesis testing: Although these studies may lack power and generalizability, their designs are at least quasi-experimental and the central question is efficacy of the intervention.
  - Is there a cause-effect relationship between the treatment variable and the target outcome?
- Experiments may use group or single-subject designs.
- Probably focus on a single or a small set of intervention components.
- Intermediate endpoints (e.g., use of a target form in response to pictures) may be used.

### Later Efficacy Studies

- Hypothesis testing: These group studies should be fully powered, randomized controlled trials.
- May or may not compare treatments
  - Strongest designs compare a new treatment with a standard practice.
- Focus on a coherent set of intervention components that have been successfully tested in earlier efficacy studies.
- Endpoints may focus on child behavior but should be more meaningful than early studies; not just standardized tests or contrived probes.

### Effectiveness Studies

- Hypothesis testing *and* generating:
  - Are effects similar to those found in later efficacy studies but observed in less ideal, more clinical contexts?
    - with different (sub)populations?
    - using different service delivery options?
    - with variations in the protocol, such as with less intensity, less parent cooperation, more child absences?
    - when other interventions are added?
    - using different and more functional outcome measures?
  - What are the differences in costs of programs?
  - Are the benefits worth the costs?

### Four Principles of Grammar Facilitation for Children with SLI: Goals (Fey, Long, & Finestack, 2003)

1. The *basic goal* of all grammar interventions should be to help the child achieve greater facility in the comprehension and use of grammar *in the service of conversation, narration, exposition, and other textual genres in written and oral modalities.*

### An Explanation of Principle 1

- EBP requires us to ensure that the evidence we apply to practice is based on *clinically*, not just *statistically* significant outcomes.
- Principle 1 holds that helping children to *acquire* grammatical form is a necessary but insufficient ultimate objective.
- Before intervention success can be claimed, progress must be shown on grammatical form in social (e.g., conversation) and academic (e.g., reading and writing) contexts.

### Principle 1 and EBP

- The *need* for Principle 1 is well documented (Spradlin & Siegel, 1982).
- We cannot test the effects of following Principle 1; it is a primitive assumption of language intervention.

### Four Principles of Grammar Facilitation for Children with SLI: Goals

2. Grammatical form should rarely, if ever, be the only aspect of language and communication that is targeted in a language intervention program.

### An Explanation of Principle 2

- Even the most specifically grammatically impaired children tend to have related problems in other domains of language or cognition (Miller et al., 2001).
- Treating only the grammatical component is not likely to address all of the adjunct needs of children with language learning problems.
  - This is a contentious assumption.

### Effects of Language Intervention on Children's Phonologies

- Several studies indicate that interventions that effectively change a child's grammatical performance also affect the child's phonological skills.
  - Feasibility studies
    - e.g., Norris et al. (1990); Wilcox & Morris (1995).
  - Early efficacy studies
    - e.g., Matheny & Panagos (1978)
  - Later efficacy studies
    - Tyler et al. (2002; 2003)

### Effects of Language Intervention on Children's Phonologies

- A few studies have shown no effects of grammatical interventions on phonological production.
  - Feasibility studies
    - Tyler and Watterson (1991) and Tyler & Sandoval (1994).
  - One later efficacy study
    - Fey et al. (1994)
    - Most methodologically rigorous of studies
    - Children were randomly assigned to tx and control groups
    - Coders were blind to the child's group assignment

### Evaluating the Evidence

- Results of many studies are not consistent.
- Results of the strongest study offering the highest level of evidence indicate no effects of grammatical intervention on phonology.

### Evaluating the Evidence

- The intervention of Fey et al. involved focused stimulation and little or no requesting for child productions, i.e., no feedback on speech production.
- The efficacy studies by Matheny and Panagos (1978) and Tyler et al. (2002; 2003) all required children to imitate and practice production of morphosyntactic goals, such as suffixes.

### Evaluating the Evidence

- If grammatical intervention is provided for a child with a phonological disorder, gains in phonology should be anticipated only when speech problems are relatively mild or when the intervention provides production practice on suffixes or other phonologically complex forms.
- Even then, alternating the two types of approaches may be best, providing direct attention to each (Tyler et al., 2003).

### Principle 2: EBP Conclusion

Based on evidence from early and later efficacy studies of the effects of grammatical intervention on phonology,

2. Grammatical form should rarely, if ever, be the only aspect of language and communication that is targeted in a language intervention program.
  - Neglect of the children's problems in phonology, social, conversational, and narrative skills, and literacy will result in a failure to reach Basic Goal 1.

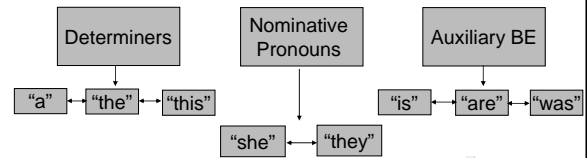
### Four Principles of Grammar Facilitation for Children with SLI: Goals

3. Select *intermediate goals* in an effort to stimulate the child's language acquisition processes rather than to teach specific language forms.

### An Explanation of Principle 3

- Principle 3 asserts that one way of stimulating learning beyond what is taught directly may be to select intermediate goals reflecting broad grammatical principles, categories, or operations.
- Tx that focuses on all or some subset of representative exemplars of an intermediate category or operation should be better than one that merely identifies specific grammatical constructions or morphemic targets.

### The Relationship Between Intermediate and Specific Goals



### Principle 3 and EBP

- No studies have compared the effects of treating specific language targets that are related to intermediate goals vs. the effects of just treating one or more relatively unrelated specific forms.

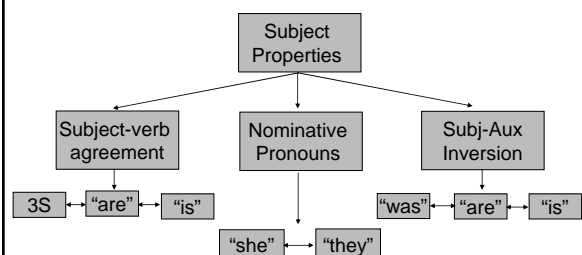
### Principle 3 and EBP

- Fey et al (1993), Tyler et al. (2002; 2003) selected intermediate goals for grammar and targeted specific exemplars for each.
  - In all studies, children made significant gains in grammar.
  - It's not possible to determine the effect of intermediate goal selection from these studies.

### Principle 3 and EBP

- There *is* evidence that selecting and targeting sets of related specific goals can yield generalization to a larger set of specific forms in the intermediate category (e.g., Connell, 1986; Leonard et al., 2004).

### An Example of a Broad Intermediate Goal (Connell, 1986)



### Connell (1986) (cont.)

- In this early efficacy study with 4 children, Connell trained children to distinguish between nominative and accusative case pronouns in 20-70 30 min sessions.
  - *Him, he* is walking.
- After tx, children increased their use of related subject forms with no additional intervention.
- Would the children have performed better if more than one specific form had been trained?

### Evaluating the Evidence

- In sum, there is *no* evidence that Principle 3, the selection of intermediate goals, enhances the efficacy of grammar interventions.
- There is *feasibility* evidence that interventions that follow Principle 3 can be efficacious.
- There is *no* evidence that following the principle does harm.
- There is *no* evidence that another approach would be more effective.

### Principle 3: EBP Conclusion

Based primarily on feasibility evidence and theoretically based hypotheses,

3. Select intermediate goals in an effort to stimulate the child's language acquisition processes rather than to teach specific language forms.

### Four Principles of Grammar Facilitation for Children with SLI: Goals

4. The *specific goals* of grammatical intervention must be based on the child's "functional readiness" and need for the targeted forms.

### Implications of Principle 4

- Specific goals most appropriate for targeting in language intervention are:
  - forms the child sometimes uses correctly, but often omits or uses incorrectly.
  - forms for which the child creates obligatory or highly probable contexts but still fails to use or use correctly.

### Principle 4 and EBP

- Clinicians may facilitate use of forms for which the child demonstrates no cognitive, social, or linguistic readiness or personal need.
  - This was commonly done prior to the "pragmatics revolution" in the 1970s (Spradlin & Siegel, 1982).
  - It can be the result of following a "developmental" model.
  - *However*, forms taught in this manner generally have been shown not to generalize to meaningful contexts, which violates Principle 1.

### Principle 4 and EBP

- Forms for which the child is ready may be taught in constructions that are too complex.
  - In a later efficacy study, Fey & Loeb (2002) attempted to facilitate acquisition of auxiliaries by recasting child sentences with “is” and “will.”
    - Child: Me get that.
    - Adult: Will you get that?
  - Groups of children that received the recast intervention made no more progress on specific or intermediate goals than groups that received no recasts at all.
    - Their gains were non-significantly smaller than controls.

### Evaluating the Evidence

- Many early efficacy studies and clinical experience document poor generalization when specific goals are not developmentally and personally appropriate for the child and family.
- The later efficacy study of Fey & Loeb (2002) illustrates problems in teaching new specific/intermediate forms (e.g., *is*, *will*) within new grammatical constructions (i.e., yes-no interrogatives).

### Principle 4: EBP Conclusion

Therefore, although developmental norms can be used as guidelines, early and later efficacy studies strongly suggest that:

4. The *specific goals* of grammatical intervention should be based on the child’s “functional readiness” and need for the targeted forms.

### Two Principles of Grammar Facilitation for Children with SLI: Activities

5. Create more frequent opportunities for grammatical targets by manipulating the social, physical, and linguistic context.
6. Create more frequent opportunities for grammatical targets by exploiting different genres and writing.

### An Explanation of Principles 5 and 6

- It is assumed that children with SLI need more exposures to and practice with grammatical targets than do children with typical language.
- Some forms will be more difficult to teach than others because of the limited frequency with which they occur.

### An Explanation of Principles 5 and 6

- Some forms occur more frequently in certain genres or modalities than others.
  - 3S is rare in conversation and stories but common in “event casts” and expository texts.
  - Past tense is more common in stories than conversation.
  - Passives and appositives are more common in written than oral texts.
- Why limit grammar facilitation to conversation even for toddlers?

### Ways to Manipulate Context to Achieve Principle 5

- Select activities that naturally require (or at least allow) frequent use of target forms.
  - Play is good for *-ing*, but not for *-ed*.
  - Hiding games are good for “*Where/What*” questions, but “*When*” requires other activities.
- Establish routines and have kids describe what will happen before, during, and after they take place.
  - Descriptions *before* the activity will require the use of future modality (e.g., *will, gonna*).
  - *After* descriptions will require the use of past tense.

### Ways to Manipulate Context to Achieve Principle 5

- Have more than one of the characters and props to copy the child’s acts.
  - Child: My man jump.
  - Adult: Your man *can* jump. Mine *can’t*.
- Mislabel some of the objects or describe them in ways that are inconsistent with the facts.
  - Adult: My man is jumping, too (He’s really not).
  - Child: Him not jump.
  - Adult: He *can’t* jump.

### Exploiting Narrative and Written Texts, Following Principle 6

- Examine “Diving for Courage.”
  - Note how awkward the text is when told in past progressive or present 3S.
  - Contrast this with the style used in broadcasting sports or telling jokes, in which 3S is commonly the most appropriate choice.

### Principles 5 and 6 and EBP

- Early and later efficacy studies have demonstrated that grammatical constructions can be taught in interventions that increase frequency of exposures to specific forms.
  - Fey et al. (1993; 1997), Gibbard (1994), Lee et al., (1975); Nelson et al. (1996)
  - Problem: In most cases, the frequency of exposures is completely confounded with other factors.
    - e.g., use of recasts or prompts for child productions

### Principles 5 and 6 and EBP

- Evidence is building that just increasing the number of exposures of grammatical targets may not be sufficient.
  - It appears from pre-trial (Proctor-Williams et al., 2001; Saxton, 2000) and even early efficacy studies (Proctor-Williams, in progress; Saxton, 1998) that frequency of *models* of target forms is less related to development than frequency of *recasts*.

### Principles 5 and 6: EBP Conclusions

Although it is probably not enough *only* to increase frequency of exposures to grammatical targets, feasibility evidence indicates that activities should be selected that:

5. Create more frequent opportunities for grammatical targets by manipulating the social, physical, and linguistic context.
6. Create more frequent opportunities for grammatical targets by exploiting different genres and writing.

### Four Principles of Grammar Facilitation for Children with SLI: Procedures

7. Wherever possible, manipulate the discourse so that targeted grammatical features are rendered more salient in pragmatically felicitous contexts.

### An Explanation of Principle 7

- Many language forms can be made more perceptually salient with prosodic stress.
- With careful discourse manipulation, this stress can be pragmatically appropriate. ▀

### Principle 7 and EBP

- No studies have isolated the effects of these stress manipulations (harmful or positive) on grammar facilitation.
- The effects of stress on *word* learning among children with SLI in early efficacy studies have been either non-significant or positive (Ellis Weismer & Hesketh, 1993; 1998).
  - Greatest effects on production

### Principle 7 and EBP

- Early and later efficacy studies showing positive effects on grammar facilitation have included this feature (Fey et al., 1993; 1997)
  - This is only feasibility evidence, though, because effects of stress are confounded with other features, like frequency of exposure and recasting.
- Some pre-trial evidence indicates that problems with grammatical morphology may be related to production of weakly stressed morphemes (cf. Gerken & McGregor, 1998).
  - Increasing perceptual salience may have little or no positive effect in these cases.

### Principle 7: EBP Conclusion

It is insufficient *only* to increase frequency and to add prosodic stress to target grammatical forms, but there is feasibility and pre-trial evidence suggesting that there is no harm and may be benefit if,

7. wherever possible, (we) manipulate the discourse so that targeted grammatical features are rendered more salient in pragmatically felicitous contexts.

### Four Principles of Grammar Facilitation for Children with SLI: Procedures

8. Systematically contrast forms used by the child with more mature forms from the adult grammar, using sentence recasts.

### What are Recasts?

- must be the first utterance following the child's platform utterance
- must copy at least one word from a lexical category from the child's platform utterance
- must make reference to the same event as and share meaning with the platform utterance

### Some Examples of Sentence Recasts from Our Samples

#### Simple Recasts

C: He need it.  
A: He **needs** it.

C: It his teeth.  
A: **It's** his teeth.

C: This him hat.  
A: **His** hat?

#### Complex Recasts

C: James running.  
A: **Is** James running?

C: Fit in there.  
A: **It fits** in there?

C: Fall down there.  
A: **She has to** fall down there? ■

### Principle 8 and EBP

- Recasts were a major part of the interventions in the Fey et al. (1993; 1997) later and early efficacy studies.
  - Parents were trained to increase use of recasts in an intervention that led to strong effects on children's grammatical production.
- There are several early (and possibly later) efficacy studies indicating that the use of high rates of recasts facilitates the use of not-currently-used specific grammatical goals (Camarata et al, 1992; 1994; Nelson et al., 1996), although N's were small.

### Principle 8 and EBP

- The later efficacy study of Fey & Loeb (2002) found no effects and a trend towards a *negative* effect.
  - The interrogative recasts of child declarative sentences did not correct the child's utterances.
  - They may have been too complex, making it difficult for children to compare the recast with their own utterance.
  - They may have provided positive evidence for the child's immature grammar. ■

### Evaluating the Evidence

- In sum, there is early (and possibly later) efficacy evidence that recasts facilitate use of new grammatical forms.
  - Rates in these studies are substantially higher than those found in the speech of even parents of typical children (~1 specific target per minute).
- There is very weak evidence that recasts that are too complex for the child could diminish learning.
- There is *no* evidence that any another approach used in naturalistic contexts is more effective.

### Principle 8: EBP Conclusion

There is early (and possibly, later) efficacy evidence supporting the principle that clinicians should:

8. Systematically contrast forms used by the child with more mature forms from the adult grammar, using sentence recasts.
  - Making sure that recasts are relatively simple as they relate to the child utterance to which they relate.

### Four Principles of Grammar Facilitation for Children with SLI: Procedures

- 9. Avoid telegraphic speech, always presenting grammatical models in well-formed phrases and sentences.

### An Explanation of Principle 9

- It is common for clinicians to provide models for and to prompt children for productions stripped of grammatical functors.
  - Adult: "Baby laughing? That's funny. Baby laugh. Say, baby laugh.
  - Alternative adult: "Is the baby laughing? That's funny. Say, "The baby is laughing."
- By Principle 9, clauses do not need to be complete, but phrases do.

### Four Reasons to Follow Principle 9

- If comprehension skills exceed production, telegraphic models could impede development (violation of Principles 5, 6, and 7).
- There is pre-trial evidence that even children with LI process grammatical morphemes in the speech stream they do not yet use (Duchan & Erickson, 1976).
  - Children responded more reliably to well-formed sentences than to sentences with nonsense syllables replacing grammatical functors.

### Four Reasons to Follow Principle 9

- It is well documented in pre-trial studies that grammatical features that are sparsely or optionally available pose the greatest learning difficulties, even for children with TL.
  - Telegraphic speech makes obligatory patterns seem optional.
- Grammatical functors are used by children as cues to grammatical class.
  - Example: *That klopch is blooging* or *a klopch bloog*.
  - Compare: *klopch bloog*.

### Principle 9 and EBP

- There are *many* examples of successful interventions, including milieu teaching, which take place under "naturalistic" conditions, in which telegraphic models and prompts are used (Kaiser, Yoder, & Keetz, 1992).
- There are no efficacy studies that have contrasted complete vs. telegraphic approaches.

### Evaluating the Evidence

- In sum, the pre-trial evidence on *potential* harmful effects of telegraphic speech on children's learning weighs against its use in the clinic.
- There are many studies that have demonstrated positive effects of interventions that include telegraphic speech.
  - Would the same or stronger effects have been observed if grammatically complete models had been used?

### Evaluating the Evidence

- Other studies have had positive effects on grammatical production when only complete models and recasts have been provided (Fey et al., 1993; 1997).
  - Would the same or stronger effects have been observed if grammatically *incomplete* models had been used?
- No efficacy studies have been attempted to compare directly the short and long term effects of complete and telegraphic models.

### Principle 9: EBP Conclusion

Clinicians must determine, based on their own experiences, theoretical perspectives, and evaluation of pre-trial and feasibility evidence whether they should:

9. Avoid telegraphic speech, always presenting grammatical models in well-formed phrases and sentences.

### Four Principles of Grammar Facilitation for Children with SLI: Procedures

10. Use elicited imitation to make target forms more salient and to give the child practice with phonological patterns that are difficult to access or produce.

### An Explanation of Principle 10

- I do not assume that imitation is a primary learning mechanism (e.g., stimulus-response).
- Imitation forces children who may have perceptual limitations to attend to the specific goal.
- Imitation requires *production* in children who often have difficulty producing weakly stressed grammatical functors or accessing the form of grammatical morphemes during rapid speech processing.

### Principle 10 and EBP

- Many early efficacy studies have demonstrated positive effects of discrete imitative tasks (e.g., Connell, 1986a; 1986b, 1987).
- To be most efficacious, imitative exercises may need to illustrate the target grammatical pattern in contrast with other forms or patterns.
  - It may also be best to provide imitative stimuli that cohere as natural text.

### Principle 10 and EBP

- Several early efficacy studies have shown non-imitative modeling tasks or recasting to be more efficacious than discrete imitation tasks (Courtright and Courtright, 1976; 1979; Nelson et al., 1996).
  - None of these studies provided sets of thematically related sentences for imitation.
  - None of these studies presented imitative targets in contrast with a grammatical alternative.

### Principle 10 and EBP

- The successful treatment in Fey et al. (1993) included a 10-min contrastive imitation exercise at the beginning of each individual session.
  - This *may* have sensitized the children to recasts and other models of the target that followed in less structured therapy tasks.

### Evaluating the Evidence

- In sum, early efficacy evidence on discrete imitation tasks has been equivocal.
- Studies demonstrating strong (and even superior) effects have systematically contrasted one specific goal with another.
- Studies demonstrating weaker or non-effects of imitation have provided neither grammatical contrast nor thematic structure across stimuli.

### Principle 10: EBP Conclusion

Although exclusive use of discrete elicited imitation tasks would violate numerous other principles and the results of early efficacy trials are somewhat inconclusive, the best comparative studies suggest that:

10. imitation tasks that contrast grammatical targets should be used to make target forms more salient and to give the child practice with phonological patterns that are difficult to access or produce.