The background of the slide features a soft-focus landscape. In the upper half, there are rolling mountains under a pale sky. In the lower right corner, a willow tree with long, drooping branches and small, dark leaves is visible. The overall color palette is muted, consisting of earthy greens, browns, and greys.

# *Practice-Based Evidence: Strategies for Generating Your Own Evidence*

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November 17, 2011

ASHA: San Diego, CA

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# *No Conflict(s) of Interest*

The authors have no conflicts of interest to declare.

# *Learning Objectives*

Upon successful completion of this course, learners will be able to:

1. define and discriminate between evidence-based practice (EBP) and practice-based evidence (PBE).
2. identify resources to locate the “best, current” research evidence.
3. describe procedures to generate clinical data to support rational clinical decisions in your own practice.

# *Think-Pair-Share...*

Are you an Evidence-Based Practitioner?

- ◆ What would I see you doing?
- ◆ What are your barriers to EBP?

# *We appreciate your tenacity!*

The news that motivates us:

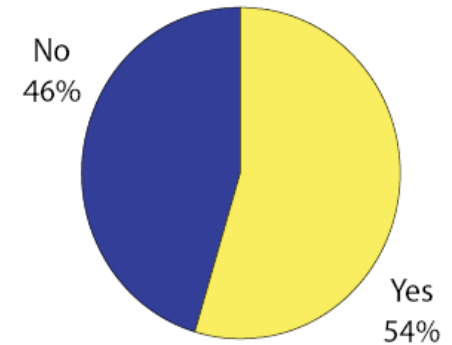
- ❖ Most professionals rely on traditional sources of information (e.g., peer opinion, experience) to guide clinical decision
- ❖ Most SLPs feel they do not have enough time to pursue EBP
- ❖ Exposure to research during graduate training and CFY are significant predictors for using research & clinical practice guidelines in professional practice

# *We're REALLY Glad You're Here...*

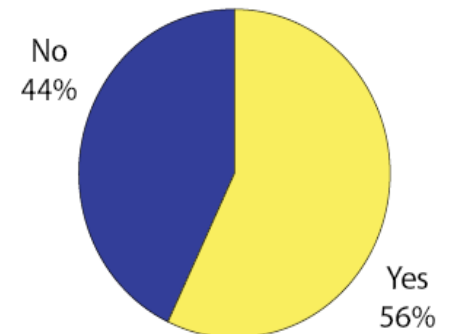
- ❖ In Cognitive Rehabilitation...
  - Only 1/3 of medical SLPs reported following an evidence-based instructional approach!
  - Nearly half of medical SLPs reported tallying data in their heads and making clinical decisions based on intuition and experience, rather than data!

*Lemoncello & Sohlberg (2005)*

Use Data for Clinical  
Decision Making



Record Written Data



# *We're REALLY Glad You're Here...*

- ❖ In Autism Intervention...
  - 1/3 of SLPs reported implementation of *Auditory Integration Training*
  - ASHA (2004): “AIT does not meet scientific standards for efficacy that would justify its practice by SLPs”
- ❖ “It is our responsibility to research treatments and educate clients to make informed decisions about their care”

*McCarthy & Schaffer (2007)*



# *We're REALLY Glad You're Here...*

Have things changed recently?

## ❖Lemoncello & Chabon (2009)

- Confirmed Zipoli & Kennedy (2005) findings among recent graduates from Portland State University – grad school and CF both matter for learning and using EBP (need practical experience & modeling)

## ❖Chabon & Lemoncello (2010)

- School-based SLPs reported similar barriers to practicing EBP (limited resources, limited time, limited knowledge)
- Also: logistical barriers exist (SLPs reported preference for “social” versus “independent” continuing education) & need for administrative support and oversight to endorse EBP

## ❖Grey & Lemoncello (2011)

- SLPs working in Cognitive Rehabilitation reported use of more informal assessment measures for diagnosis despite evidence-based guidelines for assessment (Turkstra et al., 2005)
- Reported barriers: resources, cost, knowledge



## *WHY Evidence-Based Practice?*

- ❖ Assertion → Evidence based practice
- ❖ Explicit rationales to support decisions
- ❖ Help bridge research to practice
  - “Scale-up” clinically relevant research
  - Encourage clinical scientists
- ❖ Increase accountability
- ❖ Increase quality of clinical care & QOL for our clients

## *Words from the Wise*

- ❖ “Treatments that are unsupported by research are often used by clinicians while those with good support are not” (Pring, 2004)
- ❖ “The implementation of EBP is a matter of degree. Individual clinicians even with less extensive effort can accomplish some degree of EBP” (Schlosser, 2004)

The background features a soft, muted landscape with a range of mountains in the distance. In the foreground on the right, a branch of a willow tree hangs down, adorned with small, dark, round buds. The overall color palette is a mix of light beige, tan, and muted green.

# *Evidence-Based Practice (EBP)*

Who, What, When, Where, Why, How?



# *Key Questions*

## *Show Me the Data!*

- ❖ Do I have *evidence* to show that treatments are effective with my clients?
- ❖ Do I have *evidence* to show that assessment are sensitive and specific to diagnose my clients?



# *Why EBP?*

- ❖ ASHA Code of Ethics
  - I. Hold welfare of persons served paramount
  - II. Achieve/maintain highest professional competence and performance
- ❖ Lifelong learning & expired knowledge
- ❖ Avoid “best practices recommended by traditions, lore, and consensus” (Malec, 2009)
- ❖ Clinicians must be ethical, scientific, and professional (Cornett & Chabon, 1988)

# Who should engage in EBP?

- ❖ All SLPs and SLP-As!
- ❖ Kenn Apel (1999) reminded us that we are all “clinical scientists”
- ❖ Chabon, Morris, & Lemoncello (in press) summarize pillars of ethics and *professionalism*
  - Acquire specialized skills through advanced training
  - Able to explain specialized skills (how and why) to others
  - Use skills to serve others
- ❖ Ylvisaker and colleagues (2002) remind us of the importance of *rational* decision-making when approaching clinical decisions for the benefit of our clients



# *So, what is EBP, really?*

- ❖ Integration of best research evidence with clinical expertise and patient values

*(Sackett, Straus, Richardson, Rosenberg & Haynes, 2000)*

- ❖ Thoughtful and purposeful consideration of evidence that supports *specific* clinical activities; just *one part* of the clinical decision making process

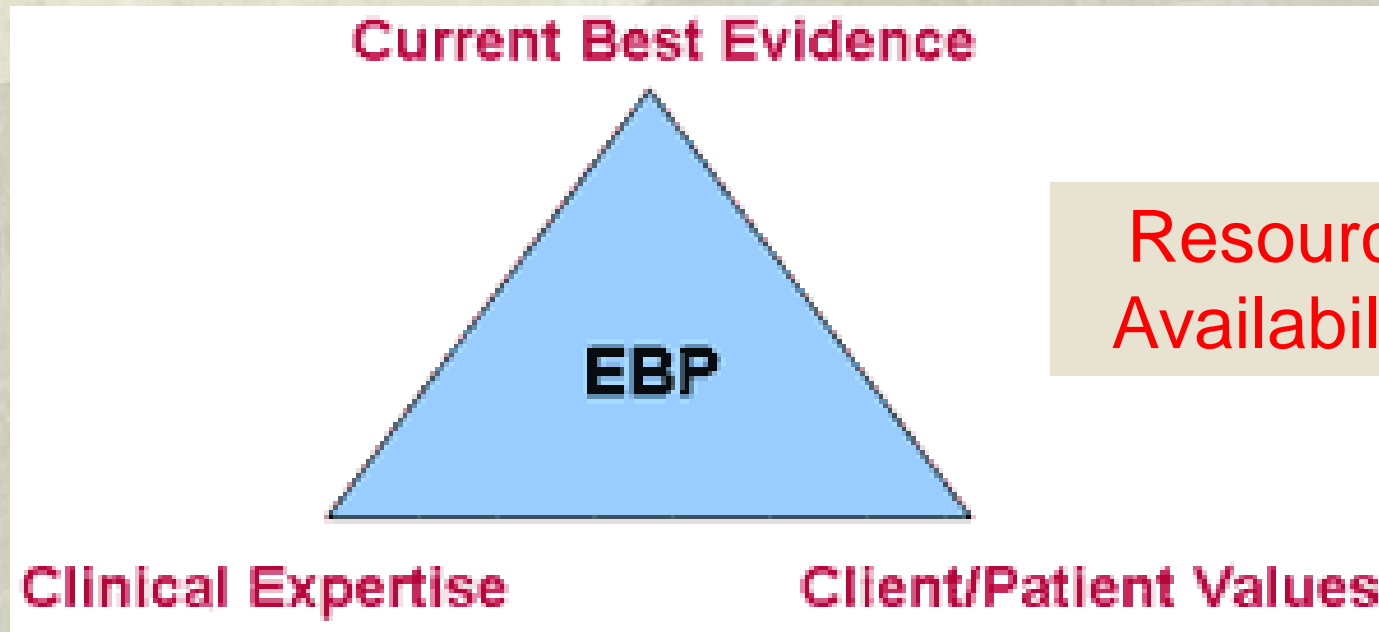
*(Apel & Scudder, 2005)*

- ❖ EBP shifts the focus from judgment- to *data-driven* care

*(Frattali & Worrall, 2001)*



# *A Model of EBP*

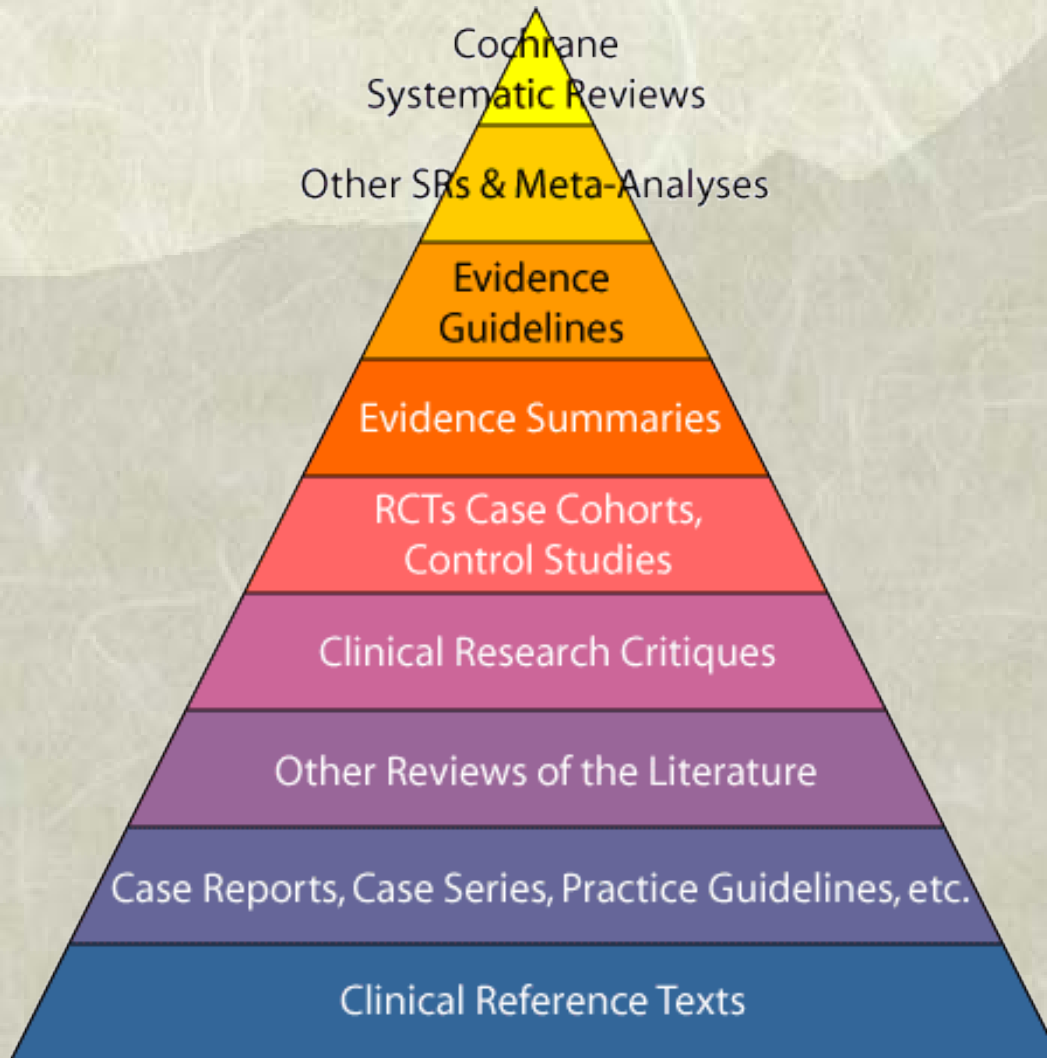


[www.asha.org](http://www.asha.org)

# *Types of Evidence*

- ❖ Evidence to Support/Refute Treatments
  - Controlled evaluation of a *specified treatment* with a *specified population*, on *specified measures*
  - *Efficacy*: Is the treatment responsible for observed outcomes (and not some other factor)?
  - *Effectiveness*: Are the outcomes robust in the real-world?
  - *Efficiency*: Is this the best option treatment for this patient/population?

# *A Word about “Evidence”*



([healthlinks.washington.edu/ebp/](http://healthlinks.washington.edu/ebp/))

# *Types of Evidence*

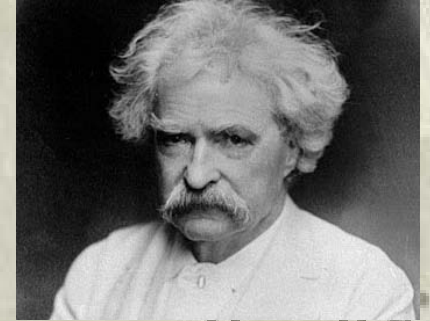
## ❖ Theoretical Evidence

- Basic science studies (describe the disorder, track typical performance, etc.)
- Related population evidence (Is your client similar enough?)
- Clinical expertise/experience (What do your assessment results tell you? What has helped for this problem with similar clients before?)
- Expert opinion, textbooks, editorials
- Non-systematic literature reviews

# *Limitations of “Gold Standard” RCTs*

“There are three kinds of lies:  
lies, damned lies, and statistics.”

(-Mark Twain; as cited by Wilson, 2010)



## ❖ Limitations (Malec, 2009):

- Not all treatments are appropriate for RCT
- Limited generalizability of findings
- Inattention to individual differences
- Inattention to individual preferences
- Dismissal of placebo or non-specific effects

# *When do I engage in EBP?*

- ❖ Three types of treatment that need more evidence:
  - ◆ Your most common therapies?
  - ◆ New therapies (or combinations)
  - ◆ Controversial therapies

# *Known Barriers to Implementing EBP*

- ❖ Similar to your brainstorming ideas?
  - ◆ Paucity of valid, empirical evidence
  - ◆ Lack of EBP efficacy studies
  - ◆ Lack of time
  - ◆ Inadequate resources  
(time, supplies, Internet, \$)
  - ◆ Lack of Knowledge & Skills



# *The EBP Process*

(A Quick Review)





# *The 7-Steps of EBP*

1. Identify clinical information gaps
2. **Ask** a specific, searchable question
3. **Search** for research evidence
4. **Critically appraise** the evidence
5. Integrate the evidence into your clinical decision
6. Track outcomes & monitor changes
7. Share your findings with others!

*(See Handout: Evidence-Based Practice Flowchart)*

## 2. *Asking Searchable Questions*

- ❖ Client-centered; practice-centered
- ❖ Contain 2 critical components:
  - ◆ Patient/Population (who is your client?)
  - ◆ Treatment Technique OR Assessment Tool
- ❖ Examples:
  - ◆ Is there evidence to support using electrical stimulation to treat a 92 yo man s/p medullary CVA in an acute care setting to improve swallow force?
  - ◆ What is the diagnostic accuracy of the Kaufman Speech Praxis Test for diagnosing preschool children with suspected CAS?

### *3. Search for Research Evidence*

- ❖ The problem...
  - ◆ SLPs primarily rely on clinical experience, colleagues, and textbooks to support clinical decisions (*Nail-Chiwetalu & Ratner, 2004; Zipoli & Kennedy, 2005*)
  
- ❖ Information literacy skills are essential to EBP and lifelong learning (*Nail-Chiwetalu, 2005*)

*(See Handout: Searching Web Resources)*

## 4. *Critically Appraise Evidence*

- ❖ No study is perfect!
- ❖ Being judgmental about evidence quality is a goal, not a character flaw *(Dollaghan, 2004)*
- ❖ Onus is on **researchers** to translate evidence for clinicians!
  - ◆ Peer-review process
  - ◆ Structured abstracts
  - ◆ Evidence “grading” systems
- ❖ NEW EBP Journals emerging... *(EBP Briefs)*

# *Critical Appraisal: 2 Factors*

- ❖ Strength of the study (*internal validity*)
  - ◆ Can I be confident in the findings?
  - ◆ Are there other factors that could have affected the outcomes?
  - ◆ \*Rely on researchers for this.
- ❖ Relevance to my client(s) (*external validity*)
  - ◆ Are the results generalizable to the types of clients I see?
  - ◆ \*You can do this.

# *Critical Appraisal:*

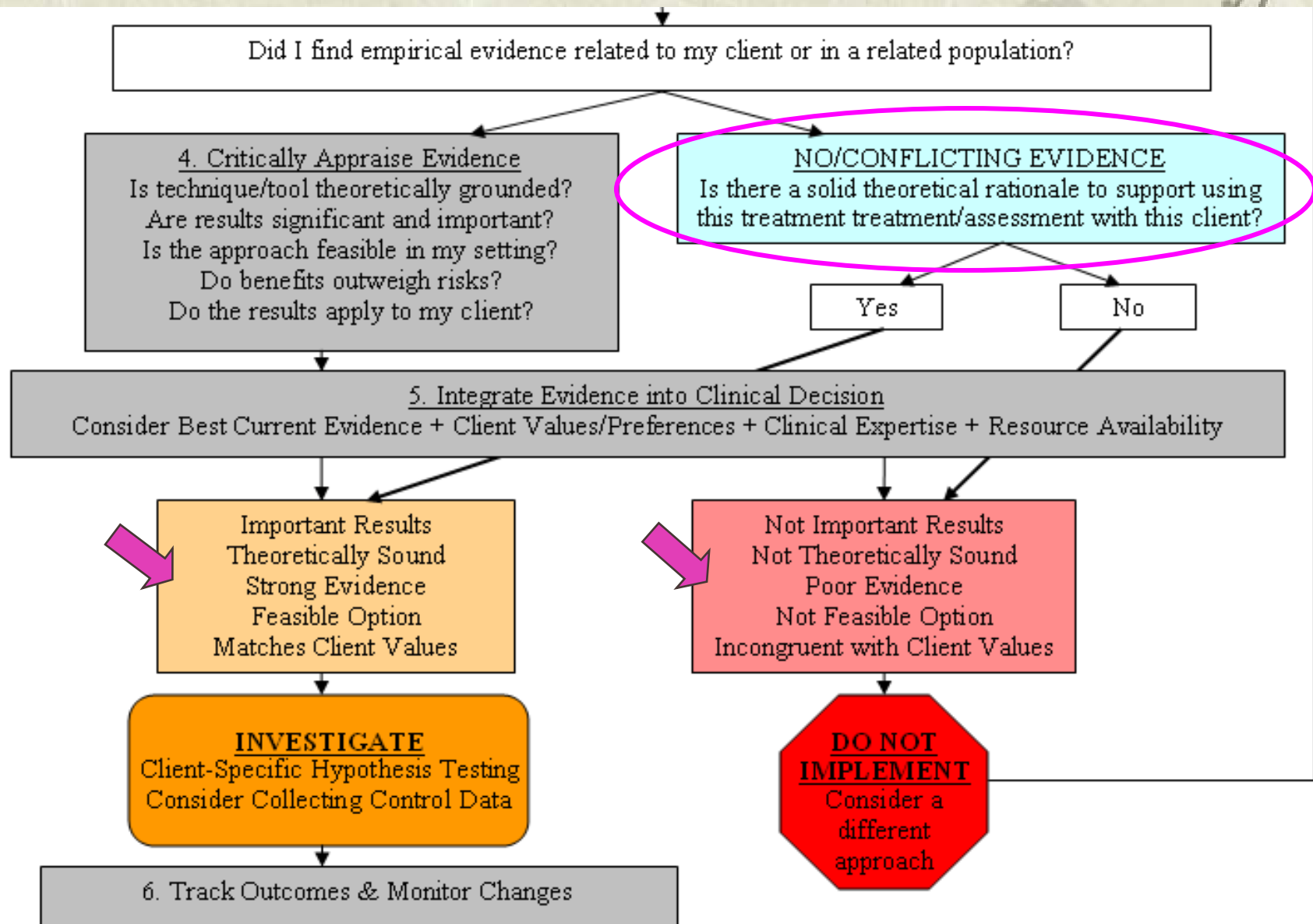
## *Which Articles Answer My Question?*

### **Read the article & ask yourself:**

- ❖ Is there a solid theoretical rationale?
- ❖ Are results significant and important?
  - ◆ Do the results justify my current treatment approach?
  - ◆ Am I likely to change my practice as a result of these findings?
- ❖ Are the results relevant to my client?
- ❖ Is the treatment feasible in my setting?
- ❖ Do benefits outweigh risks/harms/costs?

*(See Handout: Critical Appraisal Worksheet)*

# Critical Appraisal: 2 Potential Outcomes



# *PROBE acronym for Conference!*

Population	To which patient populations and under which circumstances might this approach be relevant?
Results	How does the presenter/author measure results/outcomes? Is there a theoretical rationale for how/why these might change?
Objectivity	Does the presenter/author acknowledge any drawbacks or limitations to recommendations? Did the research design account for other possible explanations?
Bias	Does the presenter have any potential bias or conflict of interest? Does s/he have anything to gain by convincing you to do (or not do) something? Who funded the research?
Evidence	Are data presented to support what the presenter/author is saying?



# *What?! EBP didn't work?!*

- ❖ Did you find “evidence”?
  - ◆ No evidence
  - ◆ Irrelevant evidence
  - ◆ Conflicting evidence
- ❖ But I want something Tried & True!
  - ◆ No tried evidence, no true evidence!
- ❖ You need to shift into your **new mantra**:
  - ◆ “I’ll show **YOU** the data!”
  - ◆ “I’m a clinical scientist. I was made for this!”

# *Practice-Based Evidence* (*PBE*)

EBP: Show Me the Data!

PBE: I'll Show YOU the Data!

# *Practice-Based Evidence*

- ❖ Inspired by Julie Wambaugh (2007)
- ❖ “A procedure for gathering good-quality data from routine practice.” (*Margison et al., 2000*)
- ❖ “A systematic collection of data about client progress, generated during treatment, to enhance the quality & outcome of care.” (*Burlingame, 2007*)
- ❖ High-quality scientific evidence that is developed, refined, & implemented first in a variety of real-world settings (*Duke University Health Sciences, 2007*)
- ❖ Clinicians become active scientists who pose questions and collect data (*Apel, 1999*)

# *EBP & PBE*

- ❖ PBE is not a competitor to EBP!
- ❖ PBE is subcomponent of EBP
  - You started with a relevant clinical question about a client in your practice...
  - You searched for “evidence” but came up short...
- ❖ PBE complements the EBP approach to science & intervention
  - Still maintain a *rational, theory-driven approach*...
  - Still concerned about client welfare...

# *EBP & PBE : At-A-Glance*

## ❖ EBP

- ◆ Ask clinical question
- ◆ Search for evidence
- ◆ Critically appraise evidence
- ◆ Implement Tx plan
- ◆ Track outcomes, share findings



## ❖ PBE

- ◆ Ask clinical question
- ◆ **Carefully Define Tx plan** → *you will generate The Data*  
Plan for data collection → *you need data with high integrity*
- ◆ Implement Tx plan
- ◆ **Critically Analyze outcomes** → *you need to be sure of your data*  
Tweak as needed
- ◆ Track outcomes, share findings

# *EBP & PBE: Side-by-Side*

## EBP

- ❖ Ask a question
- ❖ Search for evidence
- ❖ Appraise evidence



- ❖ Implement therapy
- ❖ Track outcomes
- ❖ Share findings

## PBE

- ❖ Define/Formulate therapy
  - ◆ Target
  - ◆ Goals & Objectives
  - ◆ Select Intervention
  - ◆ Plan Outcome Measures
- ❖ Implement therapy
- ❖ Evaluate outcomes
- ❖ Share findings



# *EBP & PBE*

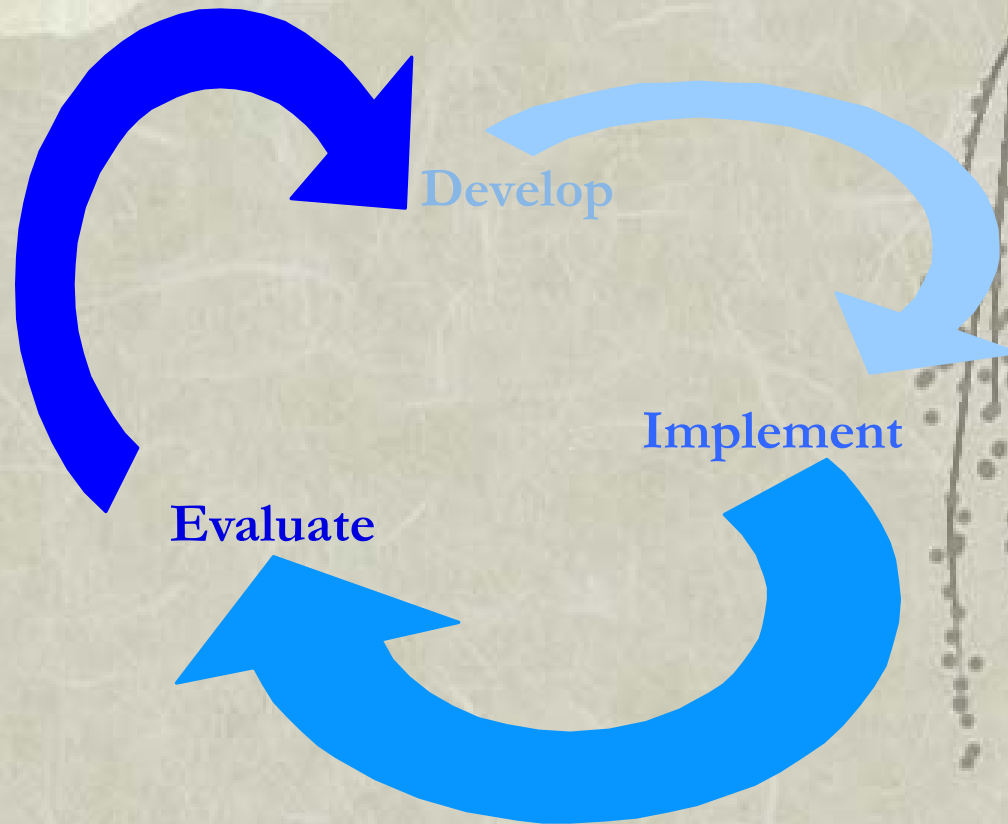


- ❖ A new issue in student education...
  - EBP is not cookie-cutter practice!
  - Be creative! (Is there a place for “the gut”?)
  - Are you theoretically grounded?
  - Generate & test some hypotheses!
  
- ❖ A caveat of too much emphasis on EBP?

# *A Model for PBE*

## ❖ PBE 1-2-3 Model

- ◆ Develop
- ◆ Implement
- ◆ Evaluate





# *The PBE 1-2-3 Model*

## 1. Develop / Formulate

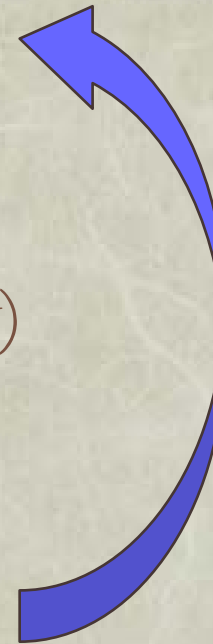
- ◆ Clinical question
- ◆ LTG, STO
- ◆ Data Collection Plan

## 2. Implement

- ◆ Collect data (daily, weekly, biweekly)

## 3. Evaluate

- ◆ Progress?
- ◆ Changes necessary?
- ◆ Answer clinical question?



# *So, is PBE tricky?*

- ❖ We purport the following:
  - ◆ Everything you require is already a part of you.
  - ◆ As clinical scientists, we were made for PBE!
- ❖ If we have the tools already...
  - ◆ What might need a little polishing?
  - ◆ Which portions of PBE 1-2-3 have been de-emphasized in the past?
- ❖ PBE Manta: *I'll Show YOU the Data!*



# *Mantras:*

## ❖ EBP

- ◆ “Show me the data!” *(Johnson, 2006)*

## ❖ PBE

- ◆ “I’ll show **YOU** the data!”

*(Fanning & Lemoncello @ OSHA 2008)*

# *Think-Pair-Share*

- ❖ What information will you need to collect in order to provide **evidence** that your client is improving in your therapy?



# *PBE 1-2-3 Model Details*

## 1. Develop / Formulate

- ◆ Define target, clinical question  
Functional? Measurable?
- ◆ Formulate LTG, STO → *contributes to data integrity!*  
At least 5 components
- ◆ Select & Define Tx (your approach)
- ◆ Data Collection Plan → *contributes to data integrity!*  
This may be the de-emphasized element in your past Tx plans....  
Consider data types  
Consider data collection methods  
This is what may need some polishing...

# *Logic Models applied to PBE*

- ❖ Logic Models useful in program evaluation to demonstrate rationale between program goals, objectives, and activities (Fitzpatrick, Sanders, & Worthen, 2004)
- ❖ Provide meaningful way to define a program and evaluate outcomes

Inputs → activities → outputs (immediate/long-term outcomes)

# *Logic Models applied to PBE*

*(Chabon, Morris, & Lemoncello, In Press)*

Inputs → activities → outputs (immediate/long-term outcomes)

<b>Background</b>	<b>Tx Approach</b>	<b>STO</b>	<b>LTG</b>
Client with mod-severe AOS will improve verbal expression.	Integral stimulation with Rosenbek's 8-step continuum approach (Rosenbek et al., 1973); build in distributed, variable practice with delayed KR feedback (Maas et al., 2008) for functional words	Client will independently verbalize 5 new, functional words in role play scenarios	Client will use functional words in everyday communication opportunities to improve environmental control and QOL

# *Small Group Task #1*

- ❖ Agree on one target behavior your group would like to address in therapy.
  - Who is the patient/population?
  - What is the problem?
  - What are your specific, functional, measurable goals?
  - How will you treat this?





# *PBE: 1. Develop/Formulate*

- ◆ Define target & formulate objectives
  - ◆ Be specific, functional, measurable
  - ◆ Use “best current evidence” (theoretical) to guide decisions!
- ◆ Select & Define Therapy (your approach to reach the goals)
  - ◆ Do you have a solid (logical) rationale?
- ◆ Data Collection Plan (Measurement!)
  - Consider data types
  - Consider data collection methods

# *Data Types*

*(adapted from Olswang & Bain, 1994)*

*See Data Summary Handout*

- ❖ Quantitative vs. Qualitative data
- ❖ Continuous vs. Probe data
- ❖ Categories of data for decision-making:
  - Session data (“treatment data”)
    - Is the client behavior changing in therapy?
  - Generalization data probes
    - Is there significant/important change?
  - Control data probes
    - Is the treatment responsible for the change?
  - Mastery/Maintenance data probes
    - Should I continue to target this behavior?

# *Data Types*

*(adapted from Olswang & Bain, 1994)*

*See Data Summary Handout*

## ❖ Data Collection Methods may vary by target:

### – Response-Based Data:

- Event/Frequency Data (+/- ; % occurrence/accuracy)
- Descriptive Data about Errors (self-corrected, delayed, cued, vague, paraphasia, unintelligible, frank error, no response)
- Qualitative Data about effort, awareness, motivation, strategy

### – Time-Based Data:

- Duration Data
- Interval Data

# *Developing a Data Collection Plan*

- ❖ What will I measure?
- ❖ How will I measure this behavior/info?
- ❖ When will I measure?
- ❖ How will these data inform my PBE decisions?

# *Small Group Task #2*

❖ For *one* formulated goal, develop a measurement plan to answer each question:

- How will I know if the client improves?
  - What will I measure? Which type of data will best inform me?  
When should I collect these data?
- How will I know if there is meaningful change?
  - What will I measure? Which type of data will best inform me?  
When should I collect these data?
- How will I know if the change is due to the intervention (and not some other factor)?
  - What will I measure? Which type of data will best inform me?  
When should I collect these data?
- When should I discharge this client?
  - What will I measure? Which type of data will best inform me?  
When should I collect these data?

# *PBE 1-2-3 Model Details*

## 2. Implement your logical, rationally planned intervention approach

- ◆ Based on “best, current evidence” that is theoretically and rationally-grounded and creatively adapted to your individual client
- ◆ Collect data based on data collection plan
  - ◆ What will I measure? Which type of data will best inform me?  
When should I collect these data?
- ◆ This is what you are already doing... but now you may have some polished tools that will boost your the quality of your Tx & your data

# *Data Collection Examples*

❖ (Jessica to fill in with videos)

# *PBE 1-2-3 Model Details*

## 3. Evaluate

- ◆ Progress as expected? Why or why not?
- ◆ Changes necessary, any tweaks?

List of questions, problems, or missing information

What about the treatment can you change?

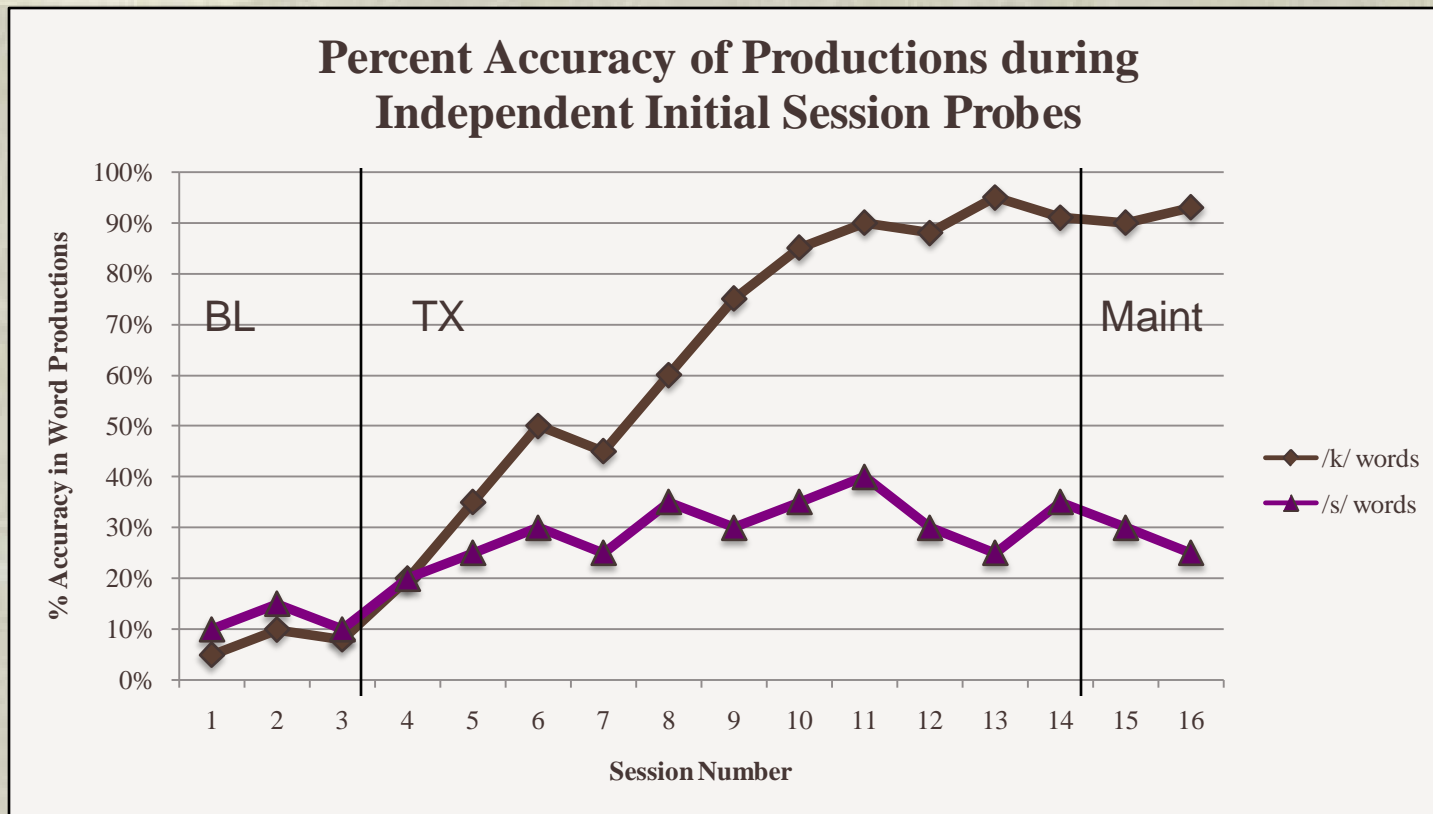
What about the environment can you change?

- ◆ Are you able to answer your original clinical questions? Have you generated data to support your clinical assertions about client change?



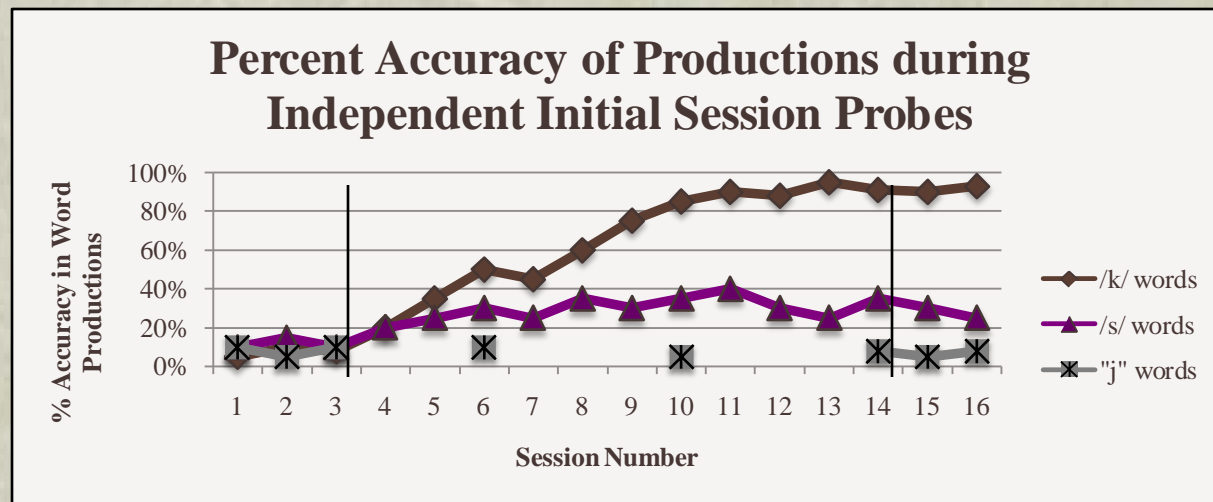
# Some Sample Data for PBE Decision-Making

- ❖ Sound Production Treatment for acquired AOS (treatment for /k/ & /s/)



# *Some Sample Data for PBE Decision-Making*

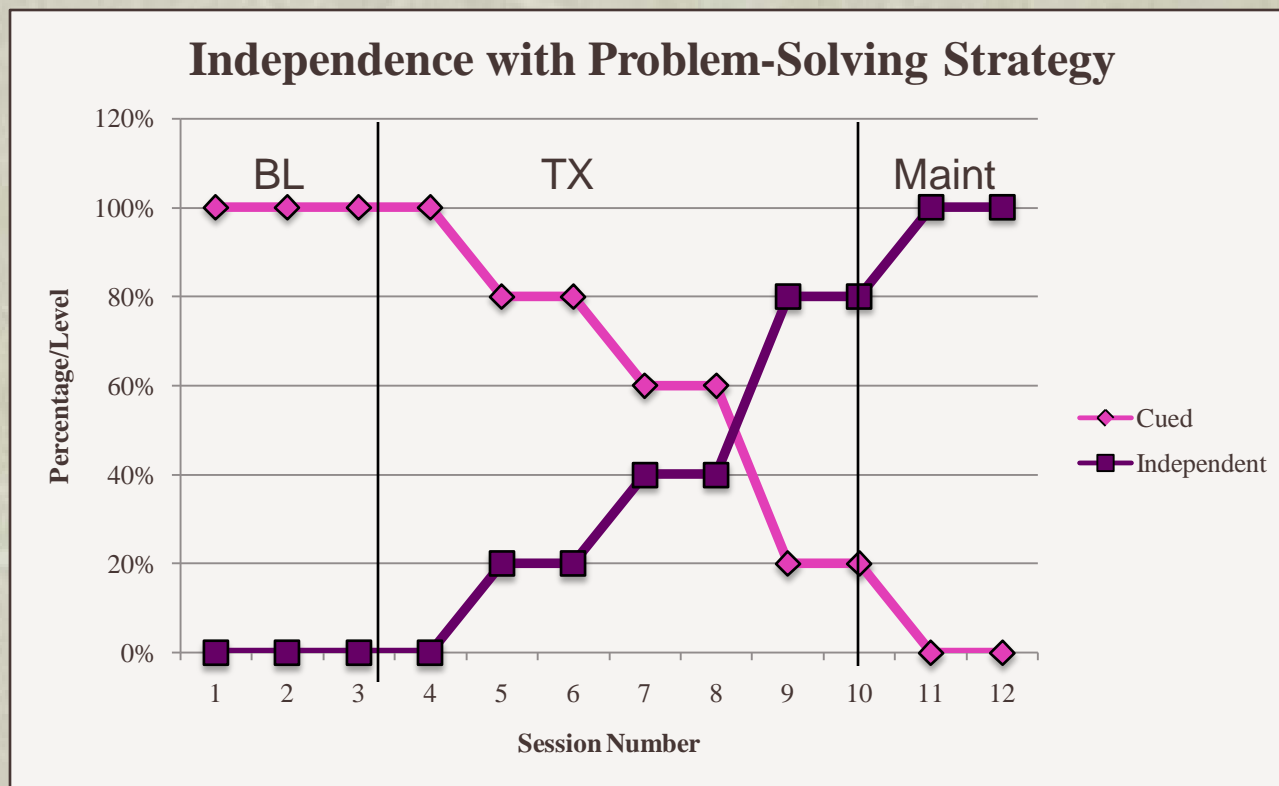
- ❖ Sound Production Treatment for acquired AOS (treatment for /k/ & /s/)



- ❖ Spouse reports client saying “okay” and “coffee” in functional settings with new people; still struggles with “sing” and “soap”

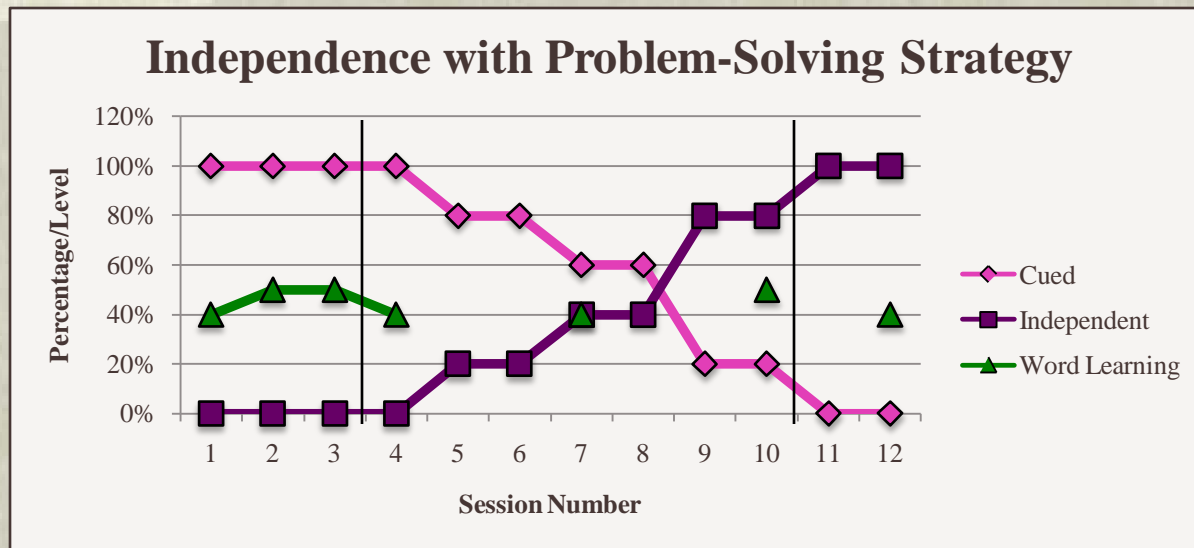
# Some Sample Data for PBE Decision-Making

- ❖ Problem-Solving Intervention to improve meta-cognitive strategy for novel problems



# *Some Sample Data for PBE Decision-Making*

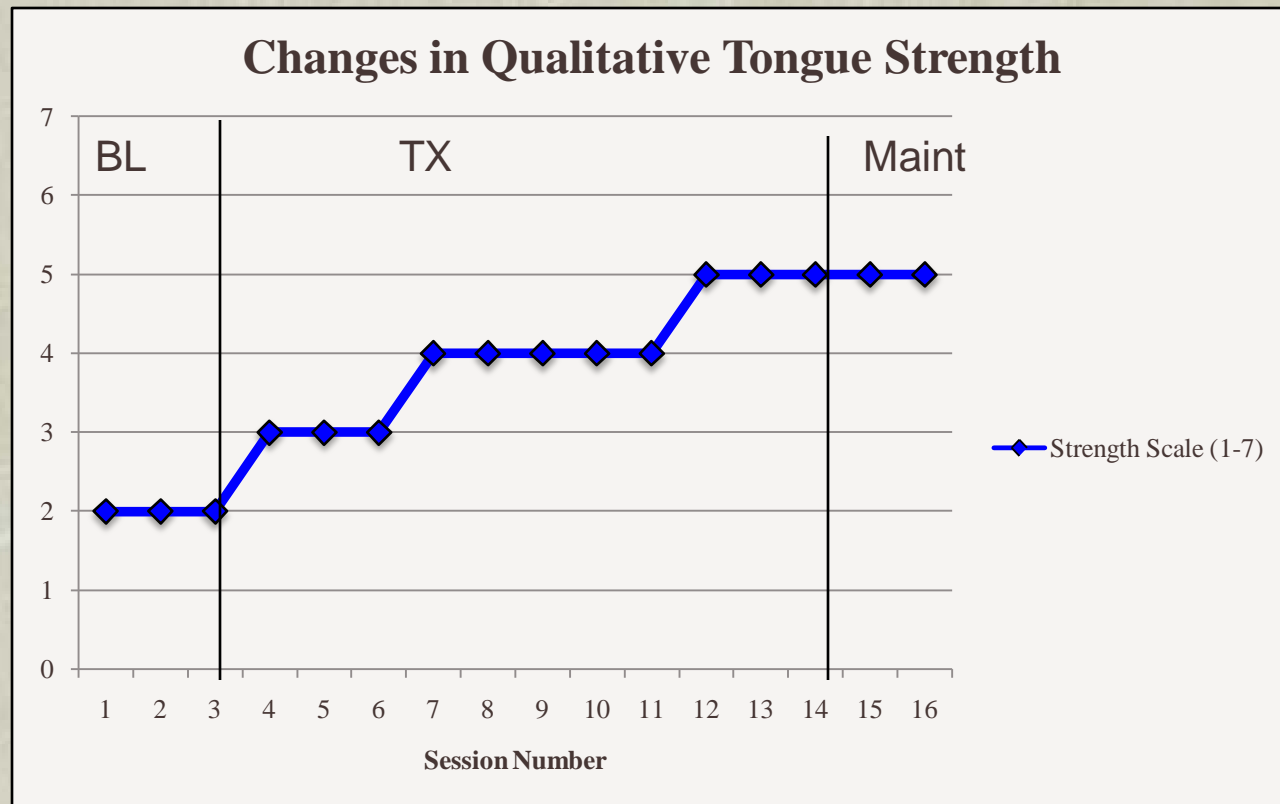
- ❖ Problem-Solving Intervention to improve meta-cognitive strategy for novel problems



- ❖ OT reports client verbalized possible solutions for approaching transportation after d/c
- ❖ Nurses report client less concrete about d/c plans

# *Some Sample Data for PBE Decision-Making*

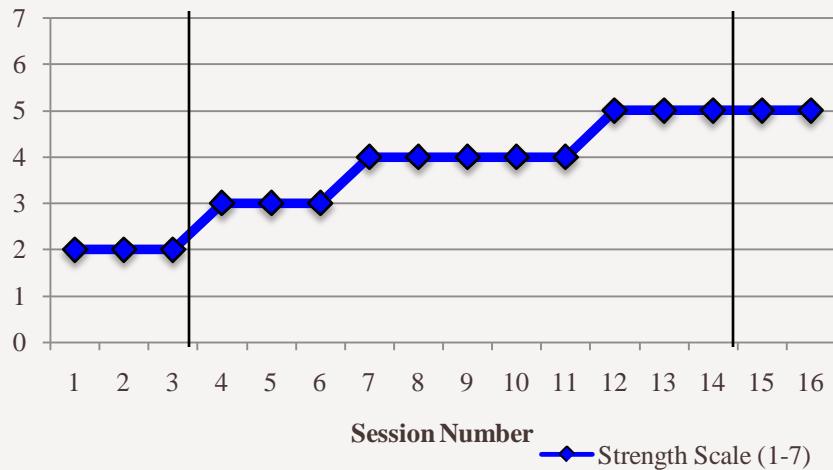
- ❖ Tongue Strengthening program in acute care following R frontal CVA



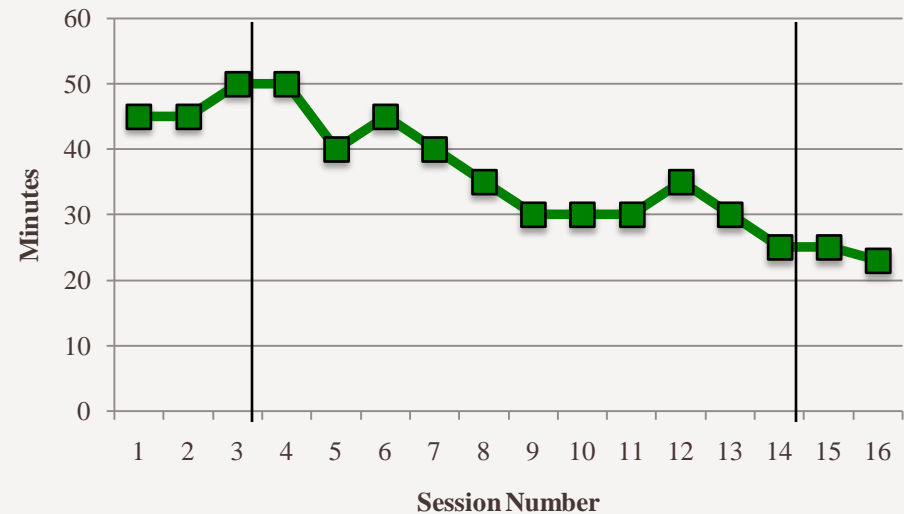
# Some Sample Data for PBE Decision-Making

- ❖ Tongue Strengthening program in acute care following R frontal CVA

### Changes in Qualitative Tongue Strength



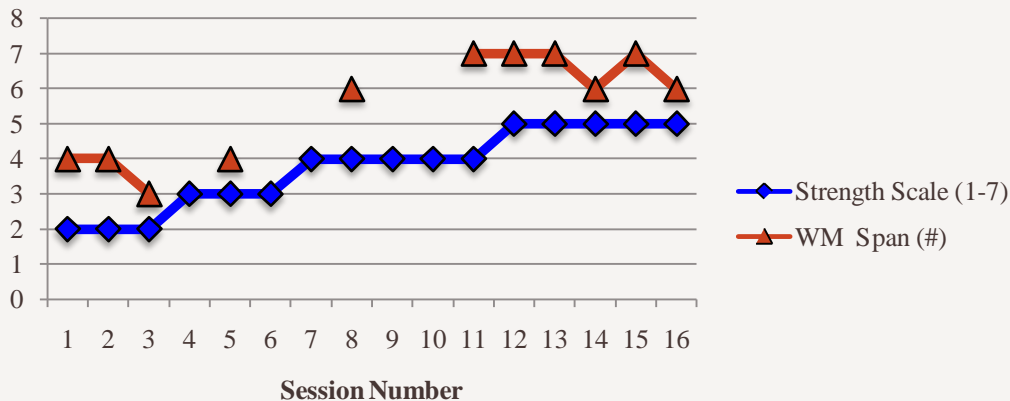
### Duration of Meal (min)



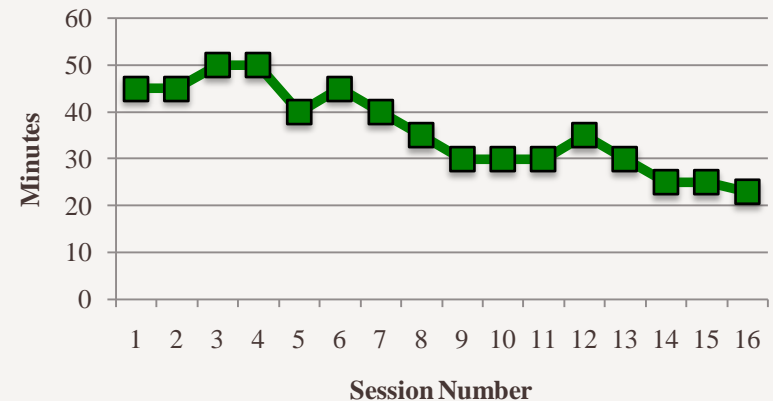
# Some Sample Data for PBE Decision-Making

- ❖ Tongue Strengthening program in acute care following R frontal CVA

### Changes in Tongue Strength & WM



### Duration of Meal (min)



- ❖ PT reports improvement in L body strength, balance, and mobility
- ❖ Client and family report overall improvements

# *Small Group Task #3*


- ❖ For your *one* formulated goal & data collection plan...
  - Graph some hypothetical data to show that your client is improving in a meaningful way as a result of your intervention (and not some other factor)
  - How would your graphed data look if the change was due to spontaneous recovery?
- ❖ How will you apply this PBE framework to your actual practice next week (or after Thanksgiving)?





# *Interaction of EBP & PBE*

## EBP

- ❖ Ask a question
- ❖ Search for evidence
- ❖ Appraise evidence
- 
- ❖ Implement therapy
- ❖ Track outcomes
- ❖ Share findings

## PBE

- ❖ Define/Formulate therapy
  - ◆ Target
  - ◆ Goals & Objectives
  - ◆ Select Intervention
  - ◆ Plan Outcome Measures
- ❖ Implement therapy
- ❖ Evaluate outcomes
- ❖ Share findings





*Conclusions on  
EBP & PBE*



# *Walk-away Steps...what might happen once you leave*

- ❖ “Show me the data!”
  - ◆ I looked for evidence, but didn’t find anything to match my client
  
- ❖ “....Darn it!”
  - ◆ I know what types of **evidence** I need to show that my **treatment is working** with this client

# *What you will do next...*

- ❖ “I’ll show **you** the data!”
  - ◆ I thoughtfully planned my data collection to answer three questions about the treatment outcomes
    - Did the client respond to the intervention?
    - Was the progress due to my treatment?
    - Was there a meaningful, significant change?
  
- ❖ “... am I done?”

# *What you will do next...*

❖ “Oh, right! I analyze my data!”

◆ Two possible conclusions:

I can now say that the Tx **was** effective for this client (and here are my data). The data support that the client improved on functional tasks because of the intervention.....OR

I will say that the data show that the client **did not** improve **and** here is what I plan do to next about that.....

❖ “Now that I’m a superstar data collector... am I done?”

# *Just a final check...*

- ❖ Are you defensible on the stand?
  - ◆ “Yes, I have strong evidence to make an appeal if denied by insurance” ....and/or
  - ◆ “Yes, I can use my data to support my professional judgment (when test scores are not enough).”
- ❖ “In the end, I used evidence generated by this client to support (or refute) the decision to continue/modify the Tx with this client.”

# *What YOU Can Do...*

- ❖ Read practice guidelines and reviews in your common practice areas
- ❖ Research your common practices – Are they supported by research evidence and current theory? [ No evidence: Theoretically sound?]
- ❖ Control the evidence that finds you
  - Subscribe to peer-reviewed, clinically focused journals
  - Subscribe to eTOC alerts
  - Join a Special Interest Group
- ❖ Be a critical consumer of workshops/products
- ❖ Form local workgroups & journal clubs!
- ❖ Bookmark reliable, useful EBP resources
- ❖ Supervise a student

# *PROBE acronym for Conference!*

Population	To which patient populations and under which circumstances might this approach be relevant?
Results	How does the presenter/author measure results/outcomes? Is there a theoretical rationale for how/why these might change?
Objectivity	Does the presenter/author acknowledge any drawbacks or limitations to recommendations? Did the research design account for other possible explanations?
Bias	Does the presenter have any potential bias or conflict of interest? Does s/he have anything to gain by convincing you to do (or not do) something? Who funded the research?
Evidence	Are data presented to support what the presenter/author is saying?



***THANK YOU!***



***Got  
Questions?***