Evidence-Based Practice and Empirically-Supported Practices in Child Language Disorders

Laura Justice
Ron Gillam
Christine Dollaghan

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“There is science in what we do, yes, but also habit, intuition, and sometimes plain old guessing... The gap between what we know and what we aim for persists.

And this gap complicates everything we do.”

-Atul Gawande,

Complications (2002)
Agenda

• Empirically-validated treatments: Definition and examination of practices in other disciplines (Justice)

• Empirically-validated treatments: Description of practices in speech-language intervention that meet this criteria (Gillam)

• Evidence-based practice: Overview of steps and processes, examination of how to integrate empirically supported practices into evidence-based practice (Dollaghan)

• Concluding comments, questions and answers
Empirically-validated treatments: Definition and examination of practices in other disciplines

Laura Justice
EBP Triangle

National Center for Evidence-Based Practice in Communication Disorders
EBP Triangle

Empirically Supported Treatments

Current Best Evidence

Clinical Expertise

Client/Patient Perspectives

National Center for Evidence-Based Practice in Communication Disorders
Empirically Supported Treatments

ESTs

• Therapies of ‘proven efficacy’ (APA, 1993)

• AKA: Empirically Validated Treatments, Evidence-Based Treatments, Effective Treatments, Research Based Treatments

• NOT a synonym for Evidence-Based Practice
Intuitive Appeal

• Therapies with empirical support:
  – Should ‘work’ when used in field
  – Reduce need for ‘trial and error’
  – Gives confidence to third-party payors
  – Give estimates of treatment effects
How Much Support is Enough?

- What kinds of studies?
- How good should the studies be?
- How many studies?
What Kinds of Studies?

• Only some studies allow causal claims
  – People make causal claims anyway!

• Only some studies are designed and conducted really well
  – Clear ascertainment procedures
  – Adequately powered
  – Reliably implemented
  – Well thought-out counterfactuals
  – Reasonable measures (proximal and distal)
Determining Causal Effects

PARTICIPANTS

Random Assignment

Condition 1

Condition 2

Measurement of Change

The RCT
Determining Causal Effects

PARTICIPANTS

Condition 1
Condition 2

Measurement of Change

The QED
Studies Permitting Causal Claims

• Random-assignment study
  – Simple or blocked assignment
  – Clearly specified, theoretically based counterfactuals

• Quasi-experimental study
  – Comparative conditions
  – Propensity-score matching in observational data

• Single-subject experiments
Consumers Beware!

• Comparison of children in summer reading program versus summer day camps
  – Pretest on bizarre measures
  – No posttest: “We attempted to conduct posttests using similar measures, but had little success. Results were impossible to correlate”

• Conclusion: “Despite the lack of posttest measures, our findings point to great success for children who attend library programs”
The Efficacy of Treatment for Children With Developmental Speech and Language Delay/Disorder: A Meta-Analysis

A meta-analysis was carried out of interventions for children with primary developmental speech and language delays/disorders. The data were categorized depending on the control group used in the study (no treatment, general stimulation, or routine speech and language therapy) and were considered in terms of the effects of intervention on expressive and receptive phonology, syntax, and vocabulary. The outcomes used in the analysis were dependent on the aims of the study; only the primary effects of intervention are considered in this review. These were investigated at the level of the target of therapy, measures of overall linguistic development, and broader measures of linguistic functioning taken from parent report or language samples. Thirty-six articles reporting 33 different trials were found. Of these articles, 25 provided sufficient information for use in the meta-analyses; however, only 13 of these, spanning 25 years, were considered to be sufficiently similar to be combined. The results indicated that speech and language therapy might be effective for children with phonological or expressive vocabulary difficulties. There was mixed evidence concerning the effectiveness of intervention for children with expressive syntax difficulties and little evidence available considering the effectiveness of intervention for children with receptive language difficulties. No significant differences were found between interventions administered by trained parents and those administered by clinicians. The review identified longer duration (>8 weeks) of therapy as being a potential factor in good clinical outcomes. A number of gaps in the evidence base are identified.

KEY WORDS: child language, child speech, intervention, efficacy, meta-analysis
## Quantitative Reviews

<table>
<thead>
<tr>
<th>Table 1. Inclusion criteria.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Participants were randomly assigned either the experimental group or the control group (e.g., randomized between-subjects designs). All other study designs (i.e., case studies, case series, nonrandomized between-subjects designs, multiple baseline designs, and crossover designs) were excluded.</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
</tr>
<tr>
<td>Children or adolescents with primary speech and language difficulties.</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>To improve expressive or receptive phonology, syntax, or vocabulary.</td>
</tr>
<tr>
<td>Did not focus on learned misarticulations, stammering, or voice.</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Outcomes relate to speech or expressive or receptive phonology, syntax, or vocabulary.</td>
</tr>
</tbody>
</table>
Quantitative Reviews

Figure 1. Expressive syntax outcomes (SMD = standard mean difference; CI = confidence interval).

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>Measures of overall expressive syntax development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fey et al., 1993</td>
<td>21</td>
<td>5.66</td>
</tr>
<tr>
<td>Gibbard, 1994</td>
<td>18</td>
<td>38.70</td>
</tr>
<tr>
<td>Głogowska et al., 2000</td>
<td>70</td>
<td>83.87</td>
</tr>
<tr>
<td>Law et al., 1999</td>
<td>28</td>
<td>74.74</td>
</tr>
<tr>
<td>Matheny &amp; Panagos, 1978</td>
<td>8</td>
<td>-30.62</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity, $\chi^2(4, N = 140) = 28.99, p &lt; .00001$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect, $z = 1.64, p = .10$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of utterances in a language sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gibbard, 1994</td>
<td>18</td>
<td>89.50</td>
</tr>
<tr>
<td>Girolametto et al., 1996b</td>
<td>12</td>
<td>182.90</td>
</tr>
<tr>
<td>Law et al., 1999</td>
<td>28</td>
<td>102.94</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity, $\chi^2(2, N = 55) = 13.03, p = .0015$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect, $z = 1.18, p = .2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean length of utterance from language sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gibbard, 1994</td>
<td>18</td>
<td>2.30</td>
</tr>
<tr>
<td>Law et al., 1999</td>
<td>28</td>
<td>2.42</td>
</tr>
<tr>
<td>Robertson &amp; Ellis Weismer, ’99</td>
<td>11</td>
<td>1.32</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Test for homogeneity, $\chi^2(2, N = 54) = 11.02, p = .004$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect, $z = 1.35, p = .18$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent report of phrase complexity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gibbard, 1994</td>
<td>18</td>
<td>5.00</td>
</tr>
<tr>
<td>Girolametto et al., 1996b</td>
<td>12</td>
<td>16.70</td>
</tr>
<tr>
<td>Law et al., 1999</td>
<td>28</td>
<td>23.80</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity, $\chi^2(2, N = 55) = 13.55, p = .0011$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect, $z = 1.67, p = .09$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How Good Should the Studies be?

• What is a good study?
  – Permits causal claims (e.g., random assignment)
  – Has a clear counter-factual
    • Comparable in all ways except mechanism of change
    • Overlap between groups in mechanism documented
  – Adequately powered
  – Reliable measures (proximal and distal)

• Good studies must be coupled with good scholarship
SIGN Checklists
(Scottish Intercollegiate Guidelines Network: www.sign.ac.uk)

• Quantitative reviews
• RCTs
• Cohort studies
• Case-control studies
• Diagnostic studies
### Table IV. Internal validity criteria.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Random assignment</td>
<td>Participants randomly assigned to treatment conditions. Prevents or reduces selection bias. Not applicable for single-subject designs.</td>
</tr>
<tr>
<td>2. Comparison treatment</td>
<td>Comparison group receives alternate, comparable treatment in group or single subject experimental designs. Comparison to alternate treatment controls for expectancy bias and Hawthorne effect. Shows that a treatment is more effective than prevailing approaches (versus comparison of a treatment to no treatment or baseline condition).</td>
</tr>
<tr>
<td>3. Equivalent instruction time</td>
<td>Treatment time for contrasting conditions is equivalent. Controls for expectancy bias. (Note: If a comparison treatment was not studied, equivalent instruction time defaults to NO.)</td>
</tr>
<tr>
<td>4. Operationalized measures</td>
<td>Dependent measures adequately described, including inter-rater agreement. Controls for instrumentation bias.</td>
</tr>
<tr>
<td>5. Treatment fidelity</td>
<td>Treatment implemented consistently across participants. Ensures certainty of findings by establishing fidelity to a treatment protocol.</td>
</tr>
<tr>
<td>6. Measurement sensitivity</td>
<td>Dependent measures not susceptible to ceiling and floor effects. Controls instrumentation bias.</td>
</tr>
<tr>
<td>7. Data analyses</td>
<td>Methods of data analyses are appropriate for the purposes and hypotheses of the study. Ensures certainty of findings.</td>
</tr>
</tbody>
</table>

Sources: include Troia (1999) and others.

### Table VI. Findings for internal validity criteria.

<table>
<thead>
<tr>
<th>Study</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Certainty Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernard-Opitz et al. (2003)*</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>0.8</td>
</tr>
<tr>
<td>Eikeseth et al. (2002)*</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>0.6</td>
</tr>
<tr>
<td>Lovaas (1987)*</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>0.6</td>
</tr>
<tr>
<td>Sheinkopf &amp; Siegel (1998)*</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>0.4</td>
</tr>
<tr>
<td>Smith et al. (1997)*</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>0.4</td>
</tr>
<tr>
<td>Smith et al. (2000a)*</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>1.0</td>
</tr>
<tr>
<td>Smith et al. (2000b)*</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Notes:

- a: 1 = random assignment, 2 = comparison treatment, 3 = equivalent instruction times, 4 = operationalized measures, 5 = treatment fidelity, 6 = measurement sensitivity, 7 = appropriate data analyses.
- b: * denotes group design investigation.
- c: certainty index is proportion of indicators met for random assignment, operationalized measures, treatment fidelity, measurement sensitivity, and appropriate data analyses.
How Many Studies?

- **Efficacy**: 2 well-conducted (rigorous) experimental trials conducted by two research teams (APA, 1993; SPR, 2005)
  - Defined samples from defined populations
  - Sound measures and data-collection procedures
  - Rigorous statistical analyses
  - Consistent positive effects (2 + trials)
  - One significant follow-up
How Many Studies?

• **Effectiveness**: requirements for efficacy plus *(SPR, 2005)*
  - Manuals and training for 3rd party implementation
  - Evaluated in real-world conditions, with fidelity assessments
  - Demonstrated **practical** benefits
  - Clear demonstration of who can be generalized to

• **Scale-Up** *(SPR, 2005)*:
  - Ability to go to scale
  - Clear cost information
  - Monitoring and evaluation tools for adopters
Evidence Maps
http://www.ncepmaps.org/Evidence-Maps-Background.php
Traumatic Brain Injury (Children): Current Best Evidence

Finding and synthesizing research information can be a daunting task for clinicians, clients, and caregivers, as well as for researchers. In the Current Best Evidence section of the evidence maps, only evidence-based guidelines and systematic reviews are included. Learn more about this section.

> Click the red boxes to view the available evidence.

Use the image below to navigate to other sections of the Traumatic Brain Injury (Children) evidence map.
Two Peer-Reviewed Quantitative Reviews

• Communication Interventions for Individuals with Acquired Brain Injury
  – Rispoli, M. J., Machalicek, W., et al. (2010); Developmental Neurorehabilitation, 13(2), 141-151.

• Behavioural Interventions for Children and Adults with Behaviour Disorders After TBI: A Systematic Review of the Evidence
EBP Triangle

Empirically Supported Treatments

Current Best Evidence

Clinical Expertise

Client/Patient Perspectives

National Center for Evidence-Based Practice in Communication Disorders
Empirically-validated treatments: Description of practices in speech-language intervention that meet this criteria

Ron Gillam
What are we looking for?

- **Efficacy**: 2 well-conducted (rigorous) experimental trials conducted by two research teams *(APA, 1993; SPR, 2005)*
  - Defined samples from defined populations
  - Sound measures and data-collection procedures
  - Rigorous statistical analyses
  - Consistent positive effects (2 + trials)
  - One significant follow-up
EBP Searches

• Time efficiency
• Identify the best and most current evidence first
• Identify evidence that is pre-filtered

Comprehensive Pearl Growing

1. Compilation of studies from a recent narrative review
2. Determine keywords
3. Use keywords in a building block strategy
4. End when the articles retrieved are decreasingly relevant
Milieu teaching

• Increase intentional nonverbal communication acts

• Children with developmental delays between 9 and 15 months

1. arrange the environment to increase opportunities for communication
2. Follow the child’s attentional lead - imitation
3. Build social routines
4. Natural consequences
Narrative Review


• Keywords
  – Milieu OR responsivity
  – Language AND (disorder OR impairment OR prelinguistic OR delay)
  – Nonverbal OR gestures OR vocalization
  – Randomized OR clinical trial
Searching for Evidence

• Systematic Reviews
  – http://www.sumsearch.org/
  – http://www.speechbite.com

• ASHA*
  – ASHA journals or Highwire
  – http://jslhr.asha.org/search.dtl
  – http://www.asha.org/members/ebp/compendium/
Searching for Evidence

- Cochrane Collaboration
  http://www.cochrane.org/reviews/index.htm
- Campbell Collaboration
  http://www.campbellcollaboration.org/library.php
- Guideline.gov
  www.guideline.gov
- What Works Clearinghouse
  http://ies.ed.gov/ncee/wwc/
- Web-based databases
Results

• 5 RCTs
  – Fey et al (2006) – moderate effects (d=.68) of milieu teaching on measures of intentional communication acts for children with developmental delays at 6 months
  – Fey et al (2008) – minimal effects of milieu teaching after 6 – 12 months for children with developmental delays
Other Evidence

• 6 single-subject design studies
  – All demonstrated visible treatment effects when children were used as their own controls
Thinking about SLP practices

• Treatment Outcomes

• Procedures
  – Neuromuscular Electrical Stimulation Therapy
  – Focused Stimulation
  – Print referencing during shared story-book reading
  – Narrative-based Language Intervention
  – Traditional articulation therapy?
  – Phonological approaches (minimal pairs)?
Treatment Outcomes

• Multiple RCTs demonstrate
  – Improvement on language measures after intervention for individuals with aphasia
  – Changes on standardized assessments of vocabulary growth in children with language disorders
  – Changes on measures of expressive syntax, especially when the treatments combine parent and clinician involvement
  – Changes on measures of phonology
Neuromuscular Electrical Stimulation Therapy for Swallowing

- 9 RCTs
- Many quasi-experimental studies
- 1 meta-analysis (Carnaby-Man & Crary, 2007)
  - 255 patients across 7 studies
  - High heterogeneity across studies
  - Low methodological grading
  - Relatively small effect sizes
Focused Stimulation

• Focused repetition of a linguistic target (vocabulary item, grammatical morpheme, sentence structure)
• Arrange contexts of use
• Pause and wait expectantly for a response
Studies

• 3 RCTs of FS in a parent-based program, “It Takes Two to Talk” (Girolemetto and colleagues)

• 1 RCT of FS in a clinician-based program with Late-talkers (Robertson and Ellis Weismer, 1999)

• Quality –
  – moderately-high to high
  – Moderate to large effect sizes
Cautions

• School-age children
• Children with SLI
• Linguistic and Cultural Diversity
• Long-term impact
Print referencing in shared storybook reading

- Teachers, parents
- Read storybooks aloud
- Print-referencing style
  - Code-based instruction
  - Meaning-based instruction
Studies

• Random assignment at the level of the teacher
  – Justice, et al., 2009, 2010
  – Girolemetto, et al., 2007
• Numerous quasi-experimental studies
• 1 single-subject design
  – Lovelace & Stewart,
• Quality
  High quality,
  Moderate effect sizes
Narrative Based Language Intervention


• Narrative intervention –
  – oral narratives as a medium
  – language-related features of narratives are modeled by the clinician and practiced by the participant.
Studies

- 3 Pre-post (no comparison group)
- 2 Multiple Baseline Design
- 1 Two-group, Time-series Design
- 2 Nonrandomized Comparison Studies
- 2 RCTs (Klecan-Aker, Flahive & Fleming, 1997; Gillam, et al, 2008)

Quality

- 2 with 6/8 appraisal points
- 2 with 7/8 appraisal points
- 1 with 8/8 appraisal points
Intervention Procedures

• Retelling – wordless picture books
• Retelling – children’s literature
• Peer modeling
• Graphic organizers
• Book making
• Vocabulary discussion
• Sequence cards
Effect Sizes

- Narrative macrostructure
  Moderate to large effect sizes .73 to 1.57
  No clear connection between effect size and type of procedures or materials

- Narrative microstructure
  Negative to large effect sizes -.97 to 1.33
  Larger effect sizes for studies that measured change on specific targets
Conclusion

• Intervention with repeated story retellings and a focus on story structure is likely to facilitate moderate improvements in narrative macrostructure.

• Studies that implemented intervention for 320 total minutes or longer reported moderate to large effect sizes.
Cautions

• Narrative Comprehension
• Cultural and linguistic diversity
• Maintenance of narrative skills
• Transfer to other language-related academic skills
Child Phonology


• 134 intervention studies
  – Ib: 20 RCTs (14.8%)
  – IIa: 13 non-RCTs (9.6%)
  – IIb: 56 quasi-experimental studies including SSD (41.5%)
  – III: 44 nonexperimental studies (32.6%)
Multiple studies of therapies

- Minimal pairs – Ib, IIb
- Complexity approaches – IIa, IIb, III
- Cycles – IIb, III
- Morphosyntax – Ib, IIa, IIb
- Traditional articulation therapy – Ib, IIa, III
Conclusions

• ESTs – Few treatments supported by 2 well-conducted (rigorous) experimental trials conducted by two research teams

• Suggestive evidence

• We must carefully integrate the external evidence that is available with our clinical expertise and the needs of the client
Integrating empirically supported practices into evidence-based practice

Chris Dollaghan
Callier Center for Communication Disorders
University of Texas at Dallas
EBP Triangle

Empirically Supported Treatments

Current Best Evidence

Clinical Expertise

Client/Patient Perspectives

National Center for Evidence-Based Practice in Communication Disorders
An alternative to the EBP triangle (Dollaghan, 2007)

Clinical expertise

Best external scientific evidence

Patient preferences and values

Clinical Decision
Scientific evidence: the bully on the block

Best external scientific evidence

- Best evidence from clinical practice (expertise and experience)
- Best evidence concerning preferences of a fully informed patient

Clinical Decision
EST perspective worsens this imbalance

Best external scientific evidence

≥ 2 RCTs* conducted by different teams

Best evidence from clinical practice (expertise and experience)

Best evidence concerning preferences of a fully informed patient

Clinical Decision
Criticisms of EST perspective

• Useful in its time, but now outdated
• Falsely invests faith in RCT as the best tool for studying every clinical question
• Ignores key questions about participants, measurement, power, effect size, precision
• Group-centered vs person-centered analyses
• Listing “empirically supported” treatments invites the inference that there is no evidence for treatments that aren’t on the list (absence of evidence vs evidence of absence)
By automatically excluding certain scientifically respectable methods in favor of a single “gold standard,” scientists of this ilk have merely transferred the mantle of authority from a person to a method.

(Beutler, 2009: 302)
As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by randomised controlled trials. ... only observational data exist. We think the most radical protagonists of evidence based medicine should volunteer for a double blind, randomised, placebo controlled, crossover trial of the parachute.
EBP perspective restores a realistic balance

- High-quality (HQ) RCTs
- Best external scientific evidence concerning that decision, from similar patients
- HQ quasi-experimental, correlational, epidemiologic studies
- Best evidence from clinical practice (expertise and experience)
- Best evidence concerning preferences of a fully informed patient
But EBP requires us to appraise the quality of evidence
Appraising quality of scientific studies

- Research design appropriate to the research stage and question, i.e., causal inferences warranted?
- Large, representative, “one-gate” sample
- Valid, reliable measures
- Controls for subjective bias
- Results probably not due to nuisance variables
- Appropriate statistical treatment (significance testing, effect size, social validity, durability of benefits and/or harms, cost-benefit)
Factors contributing to quality of a research design (all else being equal*)

• Experimental > Observational
  – Experimenter actively manipulates the phenomenon of interest rather than simply observing it

• Controlled > Uncontrolled
  – Experimenter compares outcomes in different groups or conditions

• Prospective > Retrospective
  – Data do not pre-date the onset of the study

• Randomized > Nonrandomized
  – Every subject has an equal probability of being assigned to each experimental group
Scientific evidence and EBP

• High-quality scientific evidence, *when available*, should trump evidence of lower quality
• But high-quality evidence that generalizes across all patients, settings, and clinicians is rarely available
• Clinical decision-making always occurs in a context of some uncertainty, so both scientific reasoning and practical reasoning are required
Practical Reasoning (Zeldow, 2009:4)

- the capacity to choose the best course of action in uncertain circumstances
- differs from the rationality of science, partly by virtue of its commitment to the individual case
- Practical reasoning provides a pathway for integrating evidence based on clinical expertise, evidence concerning patient preferences and values, as well as scientific evidence into clinical decision-making
ESTs and EBP (Hagemosher, 2009: 610)

• EST = one type of tool that a professional has
• EBP = what a professional does, applying scientific and practical reasoning to use all of the evidence tools that are available
Some Food for Thought


