Identifying Evidence-Based Early Childhood Intervention Practices:
What Counts as Evidence, Types of Studies, and Contributions of Research Syntheses

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Purpose of the Seminar

• Describe the purposes of different types of studies in early childhood intervention and other fields
• Describe a framework for categorizing different types of research syntheses for identifying evidence-based early childhood intervention practices
• Describe a practice-based approach to conducting research syntheses to identify which practice characteristics matter most in terms of positive intervention outcomes
What Counts As Evidence?

• This depends on the purpose of a study or a research synthesis and the question that is being asked. This can include either or both quantitative and qualitative data, observed or latent measures, etc.

• No *a priori* assumptions are made about the type of research design that is considered the “gold standard.” Different research designs are like different tools: You pick the right tool for the right job.

• Some measure of the size of effect between variables of interest, either in a single study or in a research synthesis, is the type of information needed to establish an evidential relationship.
Types of Research Studies

• Efficacy Studies
• Effectiveness Studies
• Efficiency Studies

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Definition of Terms

Efficacy is the extent to which an (intervention) has the ability to bring about its intended effect under ideal conditions such as a randomized clinical trial (Marley, 2000, p. 114).

Effectiveness is the extent to which a treatment is effective if it works in real life in non-ideal circumstances (Marley, 2000, p. 114).

Efficiency is the extent to which an intervention is worth its cost to individuals or society (Marley, 2000, p. 115).
Types of Research Studies in Early Childhood Intervention

- Group Design Studies
- Single Subject Studies
- Correlational Studies
- Case Studies
Group Design Studies

Group design studies are typically described as experimental, quasi-experimental, or pre-experimental investigations. These include, but are not limited to:

- Intervention vs. Nonintervention Studies
- Intervention A vs. Intervention B Studies
- Pretest vs. Posttest Studies
Single Subject Design Studies

Single subject or single participant design studies involve ongoing data collection of behavior under pre-intervention conditions (baseline) to behavior after interventions are introduced to establish the effectiveness of the interventions.

- Baseline, Intervention, Return to Baseline (ABA) Studies
- Multiple Baseline Design Across Children Studies
- Multiple Baseline Design Across Behavior Studies
- Multiple Baseline Design Across Setting Studies
Correlational Studies

Correlational studies involve analyses of the relationships between variations in intervention variables with variations in outcome variables to establish the nature of the relationships among variables.

- Covariation Among Variable Studies
- Multiple Regression Analysis Studies
- Structural Equation Modeling Studies
Case Studies

Case studies involve collection of information about intervention processes and outcomes associated with different processes to establish the effects or influences of the interventions

• Descriptive Studies
• Exploratory Studies
• Explanatory Studies
Research Syntheses of Intervention Studies

A research synthesis includes “methods for summarizing, integrating, and where possible, culminating the findings of different studies on a topic or research question” (Davies, 2000, p. 367)
Types of Research Syntheses

- Narrative Reviews
- Summative Reviews
- Systematic Reviews
- Meta-Analyses
Narrative Reviews

• Narrative, or traditional literature reviews, attempt to identify what has been written on a subject or topic, using which methodologies, on what samples or populations, and what findings

• Narrative reviews typically include descriptive summaries of the results from primary studies and interpretive statements about the nature of the relationships between an intervention practice and outcome variables of interest
Summative Reviews

• Summative reviews are similar to narrative reviews but include some type(s) of quantification, often in terms of the number of studies according to types of intervention, settings, research designs, study participants, or some other relevant intervention or study feature
Systematic Reviews

- Systematic reviews are research syntheses in which there is a comprehensive search for relevant studies on a specific topic, and those identified are then appraised and synthesized according to a predetermined explicit method.

- These types of research syntheses use a systematic approach for determining the types of studies to be included in a review, the search strategy to identify relevant studies, the methods to appraise the quality of identified studies, the methods for analyzing results, and the methods for establishing intervention effects.
Meta-Analyses

- A meta-analysis is a particular type of systematic review where effect sizes are used for assessing the relationship between a practice and outcome, where the combined effect size results from a series of studies are used to estimate the average effect of a practice.

- Research syntheses that use meta-analytic methods rely on the statistical analysis of study results as the basis for synthesizing and interpreting findings from studies of the same or similar practices.

- An effect size is a measure of the strength of the relationship between two variables expressed in terms of a quantitative metric.
Framework for Categorizing Research Syntheses

<table>
<thead>
<tr>
<th>TYPE OF RESEARCH SYNTHESSES</th>
<th>Group</th>
<th>Single Subject</th>
<th>Correlational</th>
<th>Case Study</th>
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<tbody>
<tr>
<td>Meta-Analyses</td>
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<tr>
<td>Systematic Reviews</td>
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<tr>
<td>Summative Reviews</td>
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<tr>
<td>Narrative Reviews</td>
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TYPE OF STUDY
A Practice-Based Approach to Conducting Research Syntheses

• Practice-based syntheses focus on *unpacking, disentangling,* and *unbundling* an intervention to isolate those practice characteristics that “matter most” in terms of explaining the results found in different studies of the same or similar interventions.

• Practice-based research syntheses can be used to examine any one of four types of studies (group, single subject, correlational, case) and be synthesized using any of the four types of research syntheses (narrative, summative, systematic, meta-analysis)
An Applied Definition of Evidence-Based Practices

Evidence-based practices are defined as practices informed by research findings demonstrating a statistical or functional relationship between the characteristics and consequences of a planned or naturally occurring experience or opportunity where the nature of the relationship directly informs what a practitioner or parent can do to produce a desired outcome.
Framework for Evaluating the Relationship Between the Characteristics and Consequences of an Intervention Practice

Characteristics → Consequences

Processes
Examples of Practice-Based Research Syntheses
Effects of Adult Verbal and Vocal Contingent Responsiveness on Increases in Infant Vocalizations

Carl J. Dunst            Ellen Gorman            Deborah W. Hamby

Number of Studies: 22 studies including 214 infants and toddlers (15 studies of typically developing infants and 6 studies of infants and toddlers with disabilities)

Research Designs: Baseline (A) and experimental (B), ABA, and ABAB single participant or group design studies

Adult Reinforcement: Imitation of child vocalizations, verbal comments (e.g., “good girl”) or pre-determined vocal sounds (“tsk, tsk, tsk”)

Social Concomitants: Influences of visual, social, and tactile adult concomitant behavior on infant vocalizations

Size of Effect: Cohen’s $d$ effect size for the difference between the baseline vs. experimental study conditions

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CELLreviews, 2010, Vol. 3, No. 1 (Available at www.earlyliteracylearning.org)
Relative Effectiveness of Three Types of Adult Reinforcement on Infant Vocalizations

<table>
<thead>
<tr>
<th>Type of Adult Reinforcement</th>
<th>Mean Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitation</td>
<td>3.4</td>
</tr>
<tr>
<td>Verbal Comment</td>
<td>2.0</td>
</tr>
<tr>
<td>Nonverbal Sounds</td>
<td>1.8</td>
</tr>
</tbody>
</table>
Effects of Adult Social Concomitant Behavior on Infant Vocalizations

![Bar chart showing mean effect size for different adult social concomitant behaviors: Social-Visual, Social-Tactile, Social-Visual-Tactile.](image)

- **Social-Visual** shows a higher mean effect size compared to **Social-Tactile** and **Social-Visual-Tactile**.

**ADULT SOCIAL CONCOMITANT BEHAVIOR**

**MEAN EFFECT SIZE**
Caregiver Sensitivity, Contingent Social Responsiveness, and Secure Infant Attachment\textsuperscript{a}

Carl J. Dunst        Danielle Kassow

\textit{Number of Studies}: 75 studies including more than 4500 parent-child dyads

\textit{Research Design}: Observational studies of parent-child interactions that included measures of child attachment (mostly the Stranger Situation)

\textit{Caregiver Sensitivity}: Explicit and implicit measures of caregiver contingent social responsiveness and sensitivity

\textit{Size of Effect}: Cohen’s $d$ effect size for the relationship between caregiver behavior and secure infant attachment

## Explicit Measures of Caregiver Sensitivity Behavior

<table>
<thead>
<tr>
<th>Caregiver Sensitivity Behavior</th>
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<tbody>
<tr>
<td>Caregiver/Child Synchrony</td>
<td>Synchrony is characterized by caregiver-child interactions that are reciprocal and rewarding to both the caregiver and child (Isabella, Belsky, and von Eye, 1989).</td>
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<td>Caregiver/Child Mutuality</td>
<td>Mutuality is characterized by positive caregiver-infant interactions where both the caregiver and child are attending to the same thing simultaneously.</td>
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<td>Response Quality</td>
<td>Caregiver response quality is characterized by a caregiver's ability to perceive infant signals accurately, interpret signals accurately, and respond to signals promptly and appropriately (Ainsworth, Bell, &amp; Strayton, 1974; Ainsworth, Blehar, Waters &amp; Wall, 1978).</td>
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<tr>
<td>Responsiveness</td>
<td>Caregiver responsiveness is characterized by a caregiver’s response to the infant’s behavior where the response functions as a reinforcement maintaining or sustaining infant behavior directed toward the adult (Gewirtz, 1991).</td>
</tr>
<tr>
<td>Response Contiguity</td>
<td>Caregiver response contiguity is characterized by a caregiver’s promptness and frequency or rate of response to the infant’s signals (DeWolf &amp; van Ijzendoorn, 1997).</td>
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</tbody>
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Implicit Measures of Caregiver Sensitivity Behavior

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<tr>
<td>Physical Contact</td>
<td>Caregiver physical contact is characterized by a caregiver’s quality and quantity of physical contact with the infant (DeWolf &amp; van Ijzendoorn, 1997).</td>
</tr>
<tr>
<td>Cooperation</td>
<td>Caregiver cooperation is characterized by a caregiver’s presence or absence of intrusive or interfering behaviors toward the infant whether the caregiver respects the infant’s autonomy, if the caregiver avoids interrupting the infant’s activities or demonstrates skill when interruption is necessary, and/or does not exert direct control over the infant (Ainsworth et al., 1974).</td>
</tr>
<tr>
<td>Support</td>
<td>Caregiver support is characterized by caregiver attentiveness and availability, supportiveness of the infant’s efforts, providing a secure base for the infant, and being involved with the infant by attending to both the infant and the task at which both parties are engaged (Matas et al., 1978).</td>
</tr>
<tr>
<td>Positive Attitude</td>
<td>Caregiver positive attitude is characterized by the caregiver’s expression of positive affect, warmth, empathy, and affection toward the infant (Zaslow, Rabinovich, Suwalsky, &amp; Klein, 1988).</td>
</tr>
<tr>
<td>Stimulation</td>
<td>Caregiver stimulation is characterized by any caregiver action toward the infant (Miyake, Chen, &amp; Campos, 1985). Stimulation typically includes caregiver encouragement, affective-stimulation, and stimulation/arousal of the infant.</td>
</tr>
</tbody>
</table>
Mean Cohen’s $d$ Effect Sizes and 95% Confidence Intervals for the Relationship Between the 10 Caregiver Sensitivity Measures and Secure Infant Attachment.
Practices for Increasing Referrals from Primary Care Physicians

Carl J. Dunst

Ellen Gorman

Number of Studies: 42 studies of more than 10,000 primary care physicians

Research Designs: Randomized controlled trials and time-series or before and after controlled designs

Types of Interventions: Information campaigns, referral guidelines, feedback to physicians, outreach to physicians, organizational interventions

Size of Effect: Percent difference in the referral rates of the experimental vs. comparison groups or baseline vs. experimental conditions

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a Cornerstones, 2006, Vol. 2, No. 5. (Available at www.tracecenter.info.)
Types of Interventions

*Information campaigns* included distribution of educational materials (e.g., brochures) or videos to promote referrals to secondary care specialists.

*Referral or practice guidelines* included descriptions of procedures for making referrals to secondary care specialists.

*Feedback to physicians* included feedback on referral rates and feedback on the use of referral feedback forms.

*Outreach to physicians* included specialist or consultant visits to primary care physicians to affect referrals.

*Organizational interventions* included the provision of specialty care in the primary care settings or the attachment of a specialist to a general practice.
Effectiveness of the Five Types of Interventions

Types of Intervention:
- Information Campaigns
- Referral Feedback
- Referral Guidelines
- Outreach
- Collaboration

Percent Increase in Referrals:
- Information Campaigns: ~5%
- Referral Feedback: ~10%
- Referral Guidelines: ~20%
- Outreach: ~25%
- Collaboration: ~25%
Public Awareness and Child Find Activities in Part C Early Intervention Programs

Carl J. Dunst                        Patricia W. Clow

Focus of Analysis: Types of child find activities used by States to locate infants and toddlers eligible for early intervention

Types of Interventions: Information campaigns, referral guidelines, feedback to physicians, outreach to physicians, organizational interventions

Size of Effect: Relative emphasis of different child find activities and interventions

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Relative Use of Five Different Kinds of Child Find Practices

PERCENT OF EMPHASIS

TYPES OF INTERVENTION

Information Campaigns  Referral Guidelines  Referral Feedback  Outreach  Collaborations
Types of Child Find Activities Used by States and the Sizes of Effects for the Effectiveness of the Different Practices in Studies Investigating Different Referral Interventions
Conclusions

• Different types of research syntheses yield different kinds of information (evidence) about the effects of different intervention approaches or practices.

• Practice-based research syntheses yield information that can directly inform identification of the key characteristics of evidence-based practices.

• The characteristics of evidence-based practices can also be used as standards against which practices can be evaluated in terms of the likelihood of being effective.