

# Distillation and Matching: Identifying Components of Evidence-Based Practice

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# Acknowledgements

- Chorpita, B. F., Daleiden, E., & Weisz, J. R. (2005). Identifying and selecting the common elements of evidence based interventions: A distillation and matching model. *Mental Health Services Research, 7*, 5-20.
- Chorpita, B. F., & Daleiden, E. L. (2009). Mapping evidence-based treatments for children and adolescents: Application of the distillation and matching model to 615 treatments from 322 randomized trials. *Journal of Consulting and Clinical Psychology, 77*, 566-579.
- Chorpita, B. F., & Daleiden, E. L. (2014). Structuring the collaboration of science and service in pursuit of a shared vision. *Journal of Clinical Child and Adolescent Psychology, 43*, 323-338.

# Meta Analysis

- Basic problem in all areas of science – how do we make large numbers of findings useful?
- We have already expended the costs, how do we maximize the benefits?

# Meta Analysis of Child Treatments

- In general, findings show broad classes of child treatments are effective, as are specific manuals
  - Cognitive Behavior Therapy
    - Coping Cat (Kendall, 1990)
    - Parent Management Training
- Good effect sizes

# Practitioner Concerns

- Fixed content
- Fixed intensity
- Fixed length
- Single target approach
- Replacement
- Empty cell problem
- Crowded cell problem
- Expiration problem

Aarons (2004); Addis & Krasnow (2000); Addis, Wade, & Hatgis (2004);  
Chorpita, Daleiden, & Weisz (2005);  
Kimhan & Chorpita (2006); Persons (1995)

# Researcher Concerns

- Poor specification of IV
  - Lack of a formal aggregator
- Limited examination of context variables
  - Diagnosis-specific main effects, with two-way interactions (diagnosis x age) in some cases

Chorpita et al., (2002); Chorpita, Daleiden, & Weisz (2005)

# How Can We Get More Out of Existing Data?

- **Distillation:** Reduce protocols to their elements to facilitate aggregation
- **Matching:** See how protocols match with context variables

# Distillation & Matching Methods

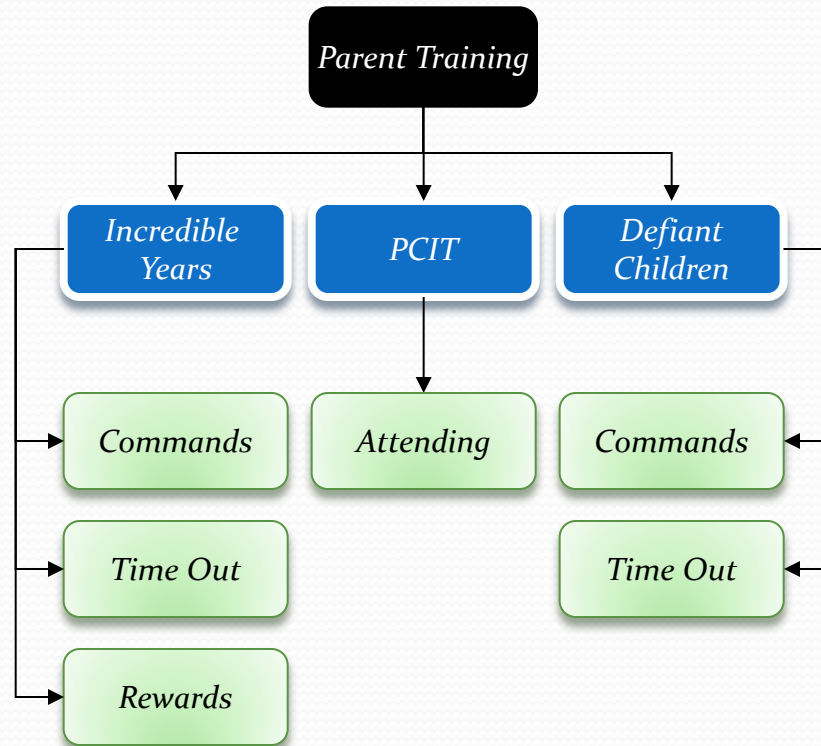


# Distillation

*Families*

*Protocols*

*Practice Elements*



# Data Mining Procedures

- Coding of 322 RCTs involving 615 treatment protocols:
  - 25,435 youth participants
  - 41 years of research
  - > \$400 million in today's dollars
- Analysis of the resulting data set
- Expert review of resulting model

# Coding Procedures

- Developed through pilot testing, expert feedback
- Used best available description of protocol
- Coded:
  - Sample characteristics
  - Protocol descriptions
  - Treatment outcomes

# Coding Procedures: Sample Characteristics

- 29 study codes in 4 domains:
  - Problem
  - Age
  - Gender
  - Ethnicity

# Problem Codes (n=16)

- Aggression
- Anger
- Anxiety
- Attention
- Autism
- Avoidance
- Depressed Mood
- Hyperactivity
- Justice Involved
- Oppositional/Non-compliant
- Phobia/Fears
- School Refusal/Truancy
- Shyness
- Substance Use
- Traumatic Stress
- Willful Misconduct, Delinquency

# Coding Procedures: Protocol Descriptions

- 41 practice element codes
  - Cognitive
  - Commands
  - Exposure
  - Praise
  - Relaxation
  - Self-Verbalization
  - Time Out

# Coding Procedures: Treatment Outcomes

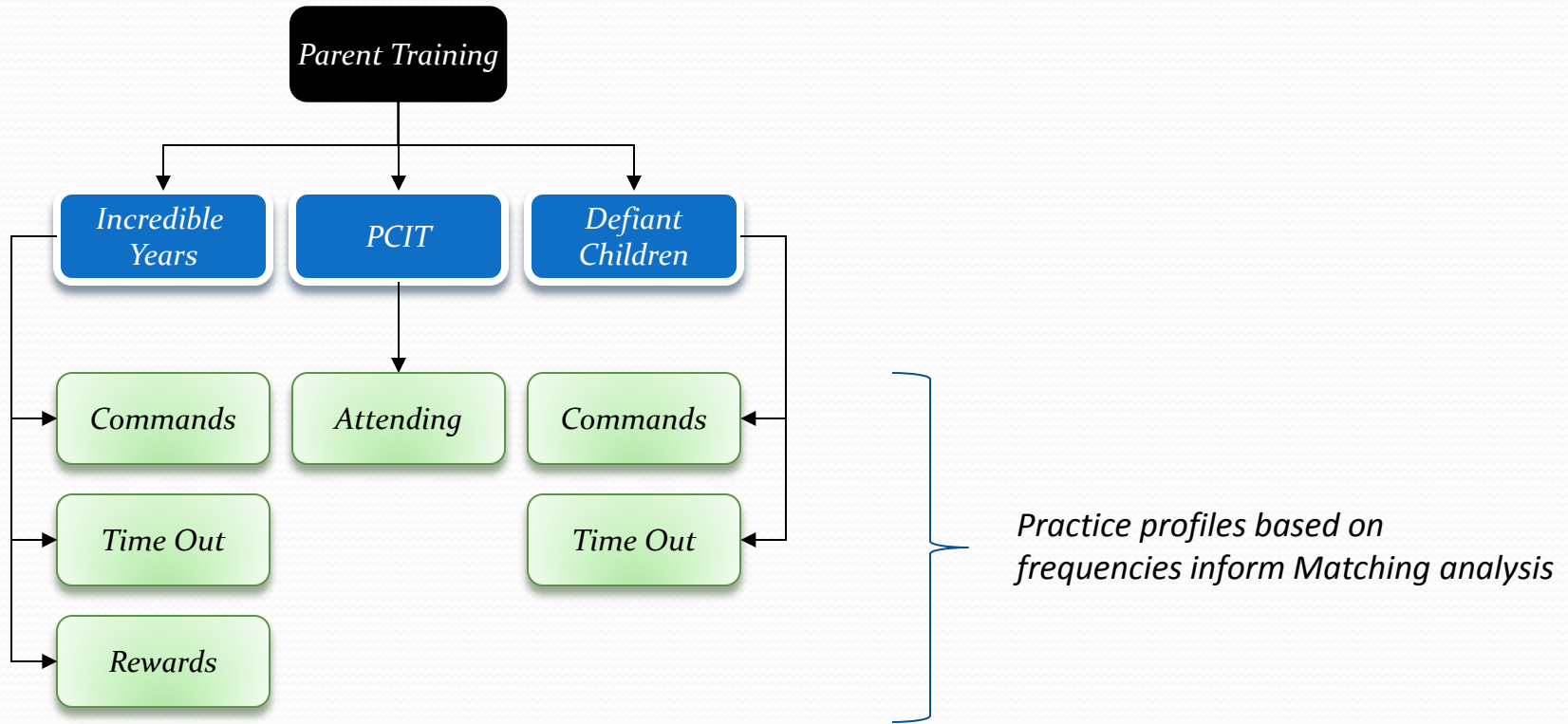
- Baseline and post-treatment scores
- “Winning” treatments:
  - Significantly better than a control group on a primary measure of clinical symptoms of functioning
- Resulted in 279 “winning” treatment groups

# Reliability

- Protocol Codes (Kappa)
  - Median = .75, Mean = .88
- Study Codes (Kappa)
  - Median = 1.0, Mean = .93
- Evidence-Based Classification
  - Spearman R = .95



# Distillation



# Matching: Analytical Approach

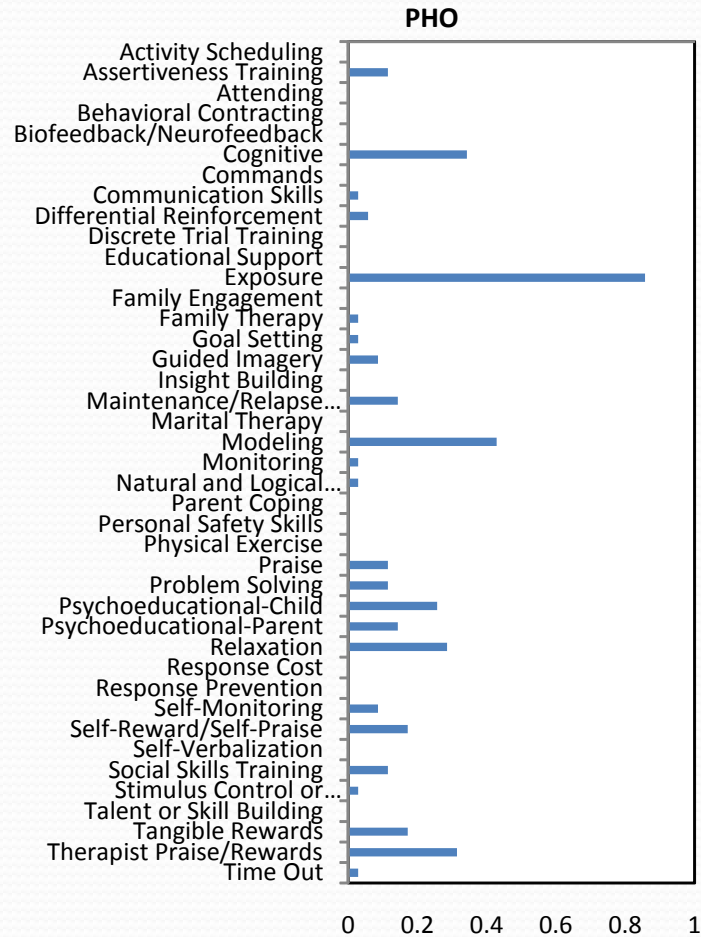
Are treatments organized differently based on contextual variables?

How do we know when treatments are “alike” or “different?”

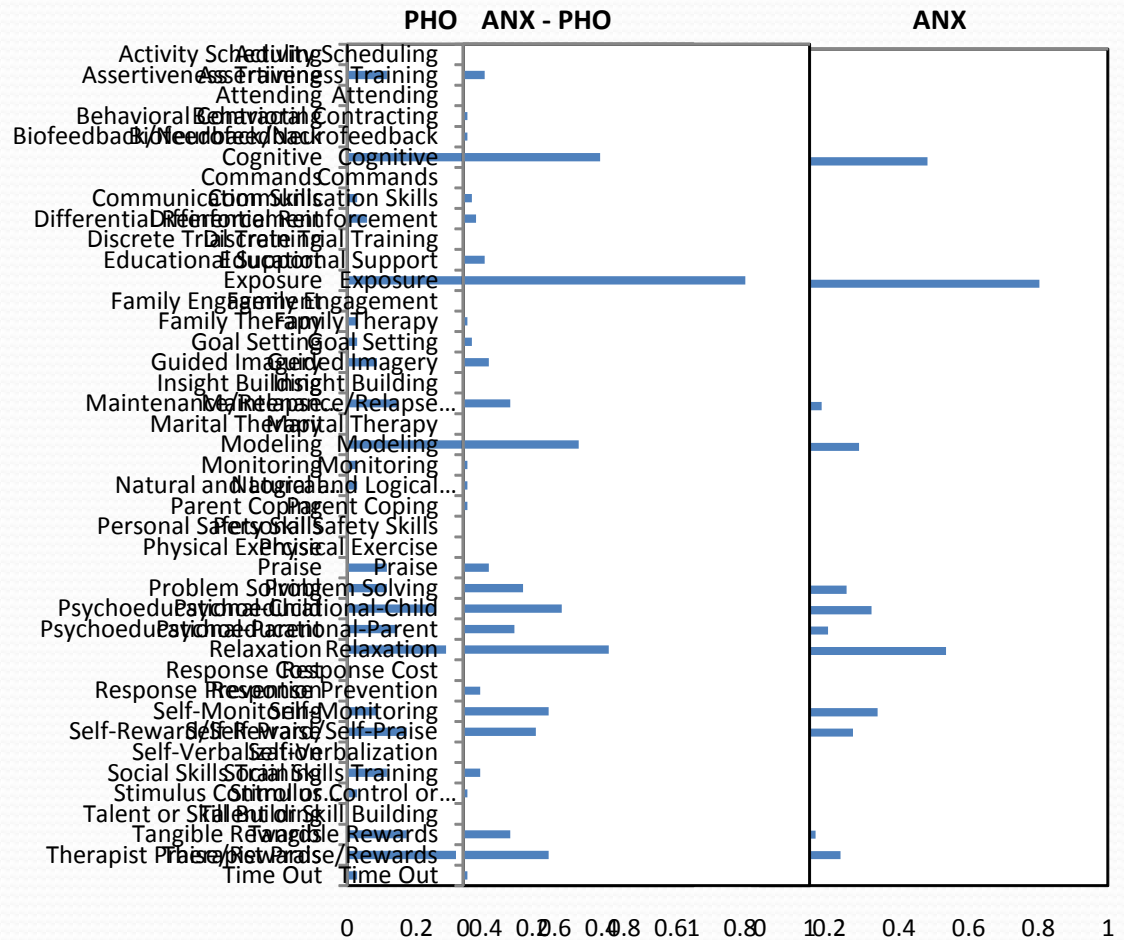
# Analytic Approach

- Examine all factors of interest
- Within each factor, determine whether categories can merge
- Intraclass correlation coefficient
  - High ICC between different categories of matching factor means that variance due to practices, not groups
- Iterative until no more merges
- Determine which factor maximizes differences
  - Based on alpha-to-split criterion
- Recursive within each node

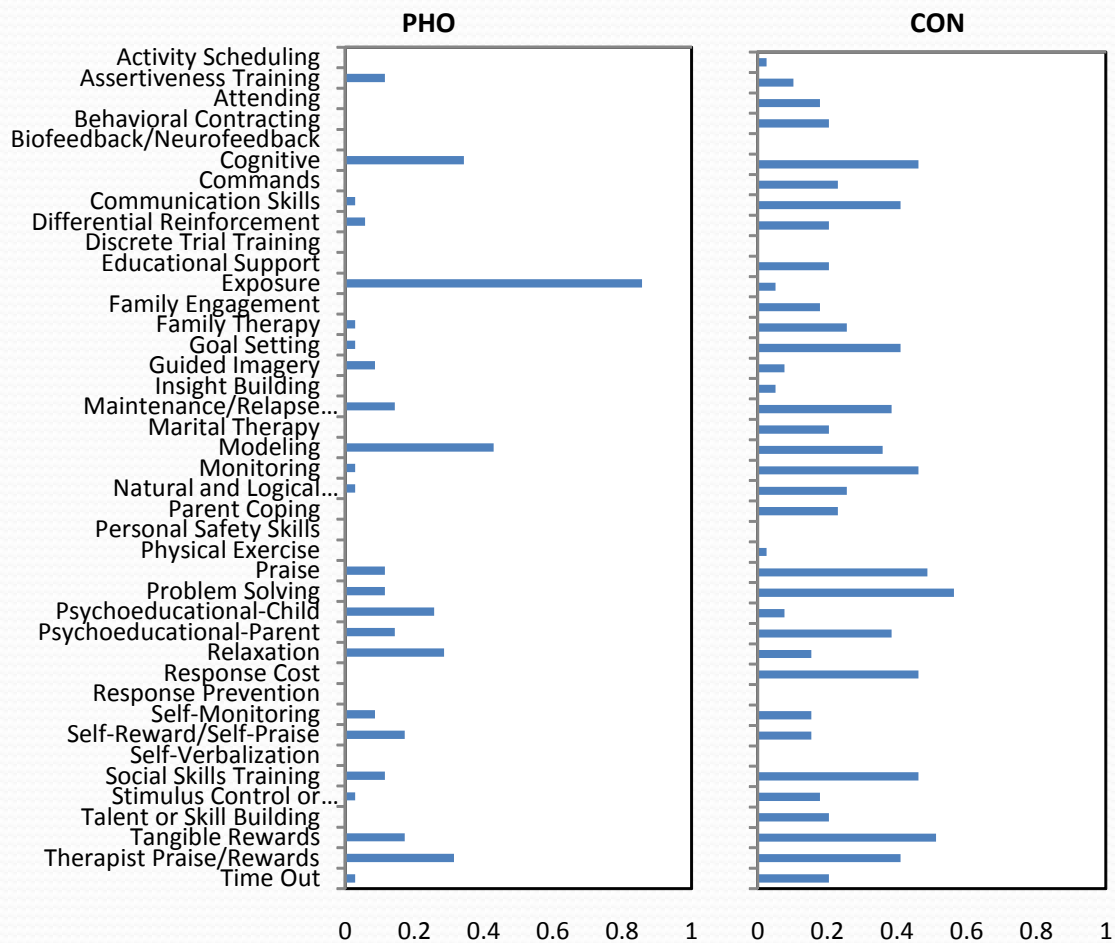
# Matching: Problem



# Matching: Problem

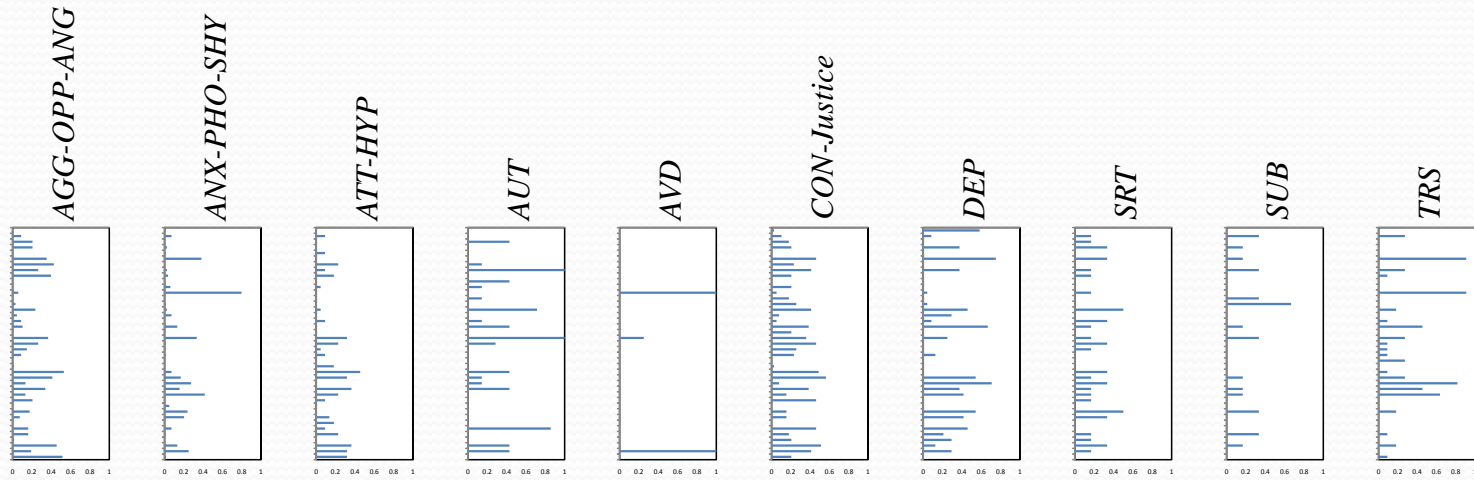
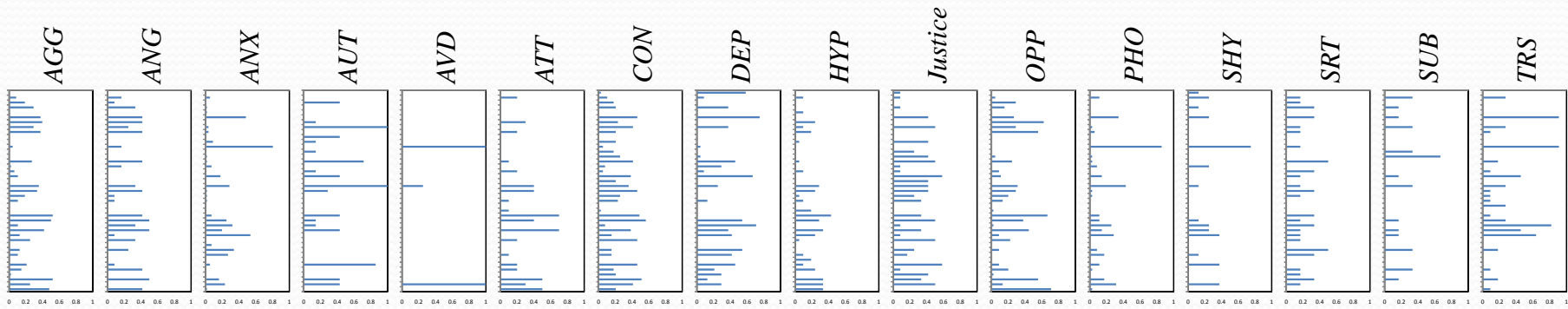


# Matching: Problem



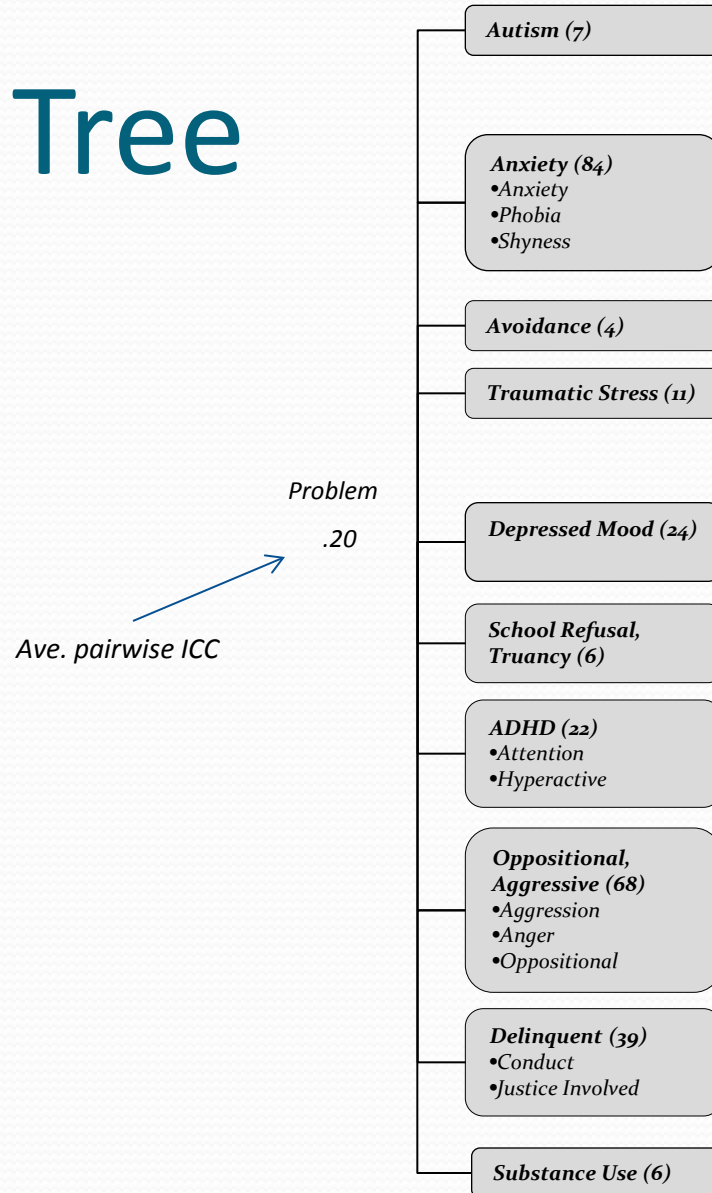
# Results

# Problem

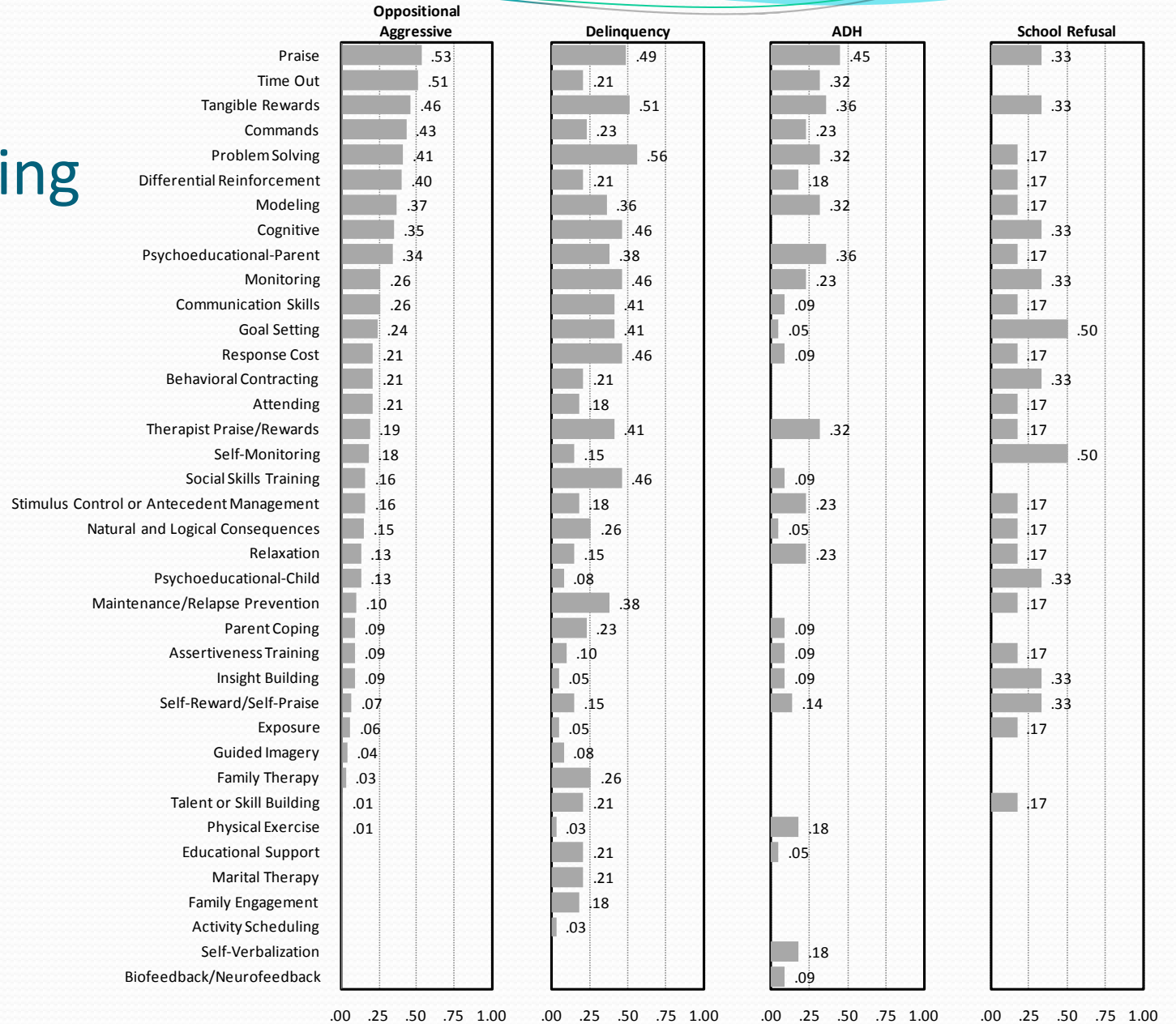




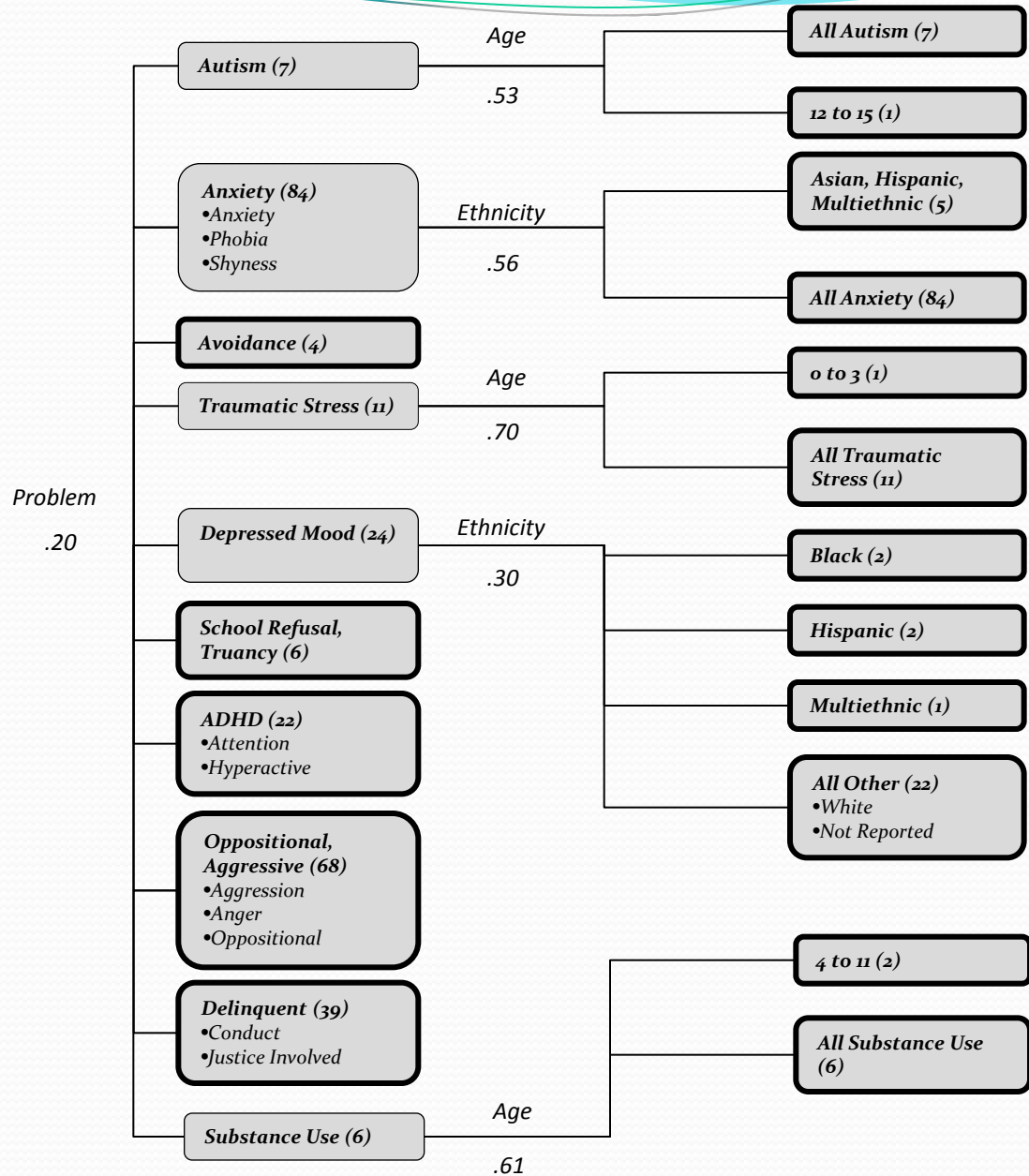
# Final Tree



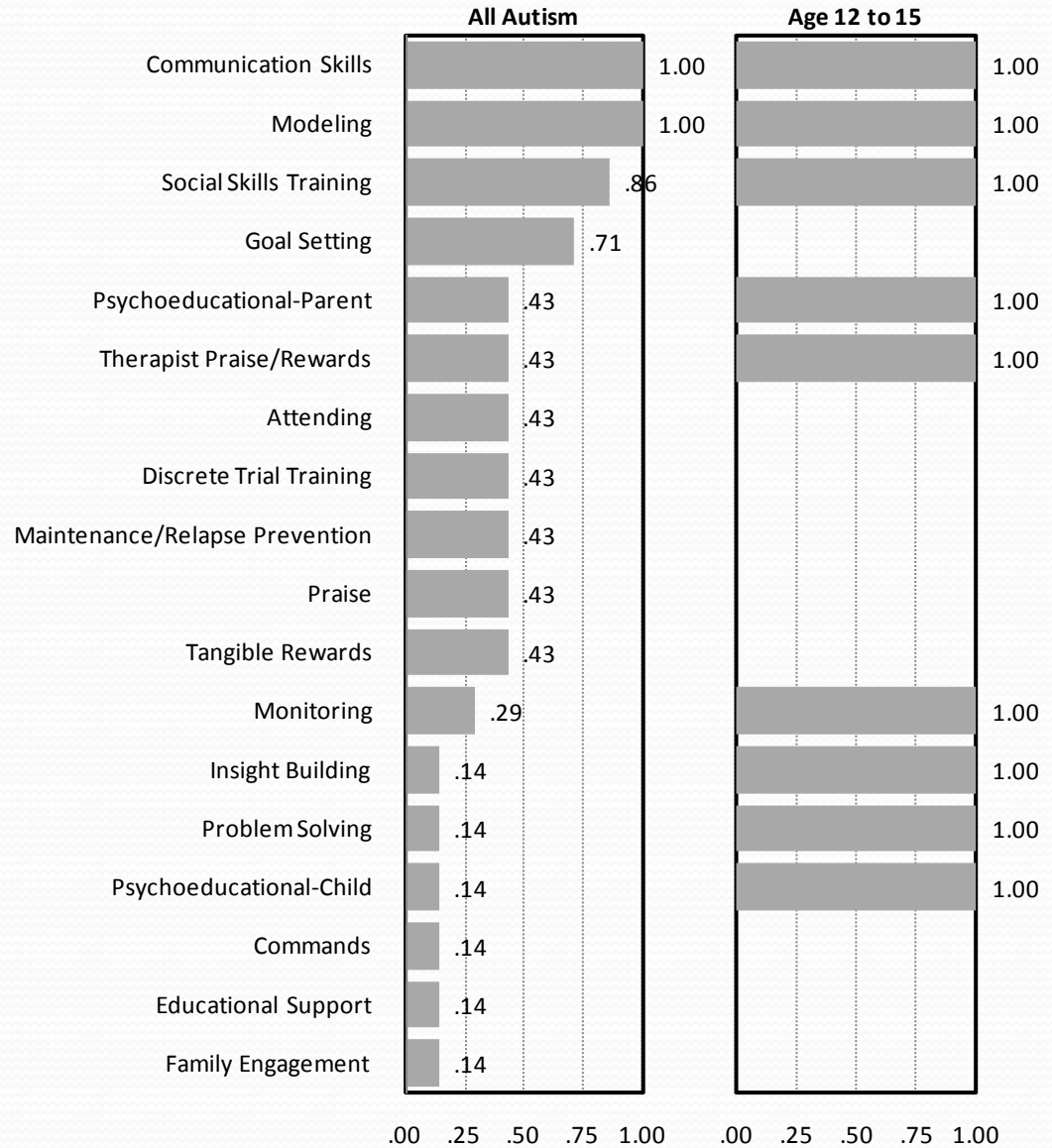
# Externalizing



# Final Tree



# Autism (Special Case)



# What The Results Tell Us...

- DMM is a data analysis strategy (“common elements”), not a treatment design strategy
- The features of successful interventions
- That the features vary according to different variables of interest
  - Problem
  - Age
  - Ethnicity

# What This Means for Clinicians...

- Need not deconstruct promising interventions – can also point to them
  - Can point to a single, fully elaborated intervention or choice of multiple promising interventions
  - Manages the problem of no evidence: Averages across broad classes of targets to leave fewer areas for which there are no informed options
  - Enhance usual care by adding practices that appear in profile for a particular group
  - Special cases might provide more ideas
- More efficient assembly, avoids shotgun approach

# What This Means for Researchers...

- Test combinations of practices (e.g., two-component intervention versus five-component intervention)
- Test “special case” intervention versus “parent node” intervention
- Highlights areas in which there are few studies (e.g., youths age 12+ with autism)

# What The (Primarily Descriptive) Results Do Not Tell Us...

- Does not tell us what will work, only what has...
- Does not tell us what components are necessary (practice elements themselves are not necessarily “evidence-based”)
- Does not address many other aspects of therapy
  - Coordination of elements: selection, sequencing, pacing, etc.
  - Therapeutic process (e.g., alliance, homework)



# Limitations

- Feasibility study, with small n and small code set
- The tree is a function of the completeness of the literature (confounds, holes lead to artifactual branches)
- To date, have coded more than 700 RCTs with a much larger codeset
- Continued coding increases the reliability of findings, particularly in the lower nodes where there have been fewer studies

# Real Time Data and Improved Clinical Reasoning

- MAP: Managing and Adapting Practice (Chorpita & Daleiden, 2014)
- Integrating findings from organizational change, clinical feedback, and evidence based practice literatures (e.g., Daleiden & Chorpita, 2005) to create an evidence-based services framework to enhance clinical decision making:
  - What is the evidence base for interventions (DMM)
  - What are the steps involved in a practice element
  - Is the treatment plan working

The background is a solid blue color. At the top, there are several wavy, overlapping lines in shades of blue and teal, creating a decorative header effect.

**Thank You!**