


NIH Toolbox
Assessment of Neurological and Behavioral Function

“Importance of Toolbox to Pediatrics---And Importance of Pediatrics to the Toolbox”

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For more information, please visit www.nihtoolbox.org
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Initial Mandate of the NIH Toolbox



- The mandate of the NIH Toolbox was to develop a battery that could be used across the lifespan---ages 3-85
- Developing assessments for young children presents a significant challenge
- But providing assessment tools across domains will have a significant impact on the field of pediatric assessment
- As well, including pediatric assessment adds important value to the Toolbox

Current Status of Pediatric Assessment



- While there are many pediatric assessments, particularly in the area of Cognition, and to some extent in the area of Emotion:
 - These measures are expensive
 - They are normed on homogeneous non-diverse populations
 - They are not brief and easily administered
 - They do not easily link up to their adult counterpart

Current Status of Pediatric Assessment *(continued)*



- There is a paucity of instruments to assess “normal children” for Motor and Sensation
- In many of these domains there is a general reliance on proxy reporting
- These measures are rarely based in the current thinking in neuroscience
- National norms are typically based upon Caucasian, English speaking samples

Importance of a Developmental Perspective



- Developmental conceptualizations necessary for understanding etiology of chronic diseases in children and adults
- Many chronic mental and physical illnesses begin in early childhood
- Treatments, interventions and prevention targeting children may offer best hope of reducing long-term morbidity

Importance of a Developmental Approach



- In order to understand developmental processes involved in illness etiology we need:
 - Longitudinal research starting and targeting pediatric populations
 - Assessment of normative functioning across multiple domains of behavior

Example



- National Children's Study
 - 105,000 children and families
 - 21 years
 - Examines details of exposure to environmental toxins and looks at etiology of disease and psychopathology
 - Needs reliable, validated instruments for assessment across multiple domains of behavior



Challenges Presented by Pediatric Assessment



- There are significant changes in children's motor abilities that must be taken into account when requiring motor responses during assessment
- Young children need non-written language stimuli
- Interactions between test administrator and subject should be crafted to the age of the child

Dealing with the Challenges of Pediatric Assessment



- Pediatric consultants were identified and recruited for all of the domains and by sub-domain
- State-of-the-art assessment measures were identified and selected for validation
- A working group was formed to develop guidelines for administration of pediatric assessments

SUBDOMAIN WORK GROUPS in Cognition---
bolded names are Pediatric Consultants



Executive Function

Adele Diamond
Phil Zelazo
Joel Kramer
Beth Borosh

Episodic Memory

Sureyya Dikmen
Patricia Bauer
Gordon Chelune
Dean Delis
Joni Machamer

Language

Richard Gershon
Sandy Weintraub
Jennifer Manly
Jean Berko Gleason
Kathy Hirsch-Pasek
Roberta Golinkoff
Beth Borosh

Processing Speed

Nancy Chiaravalloti
David Tulsy
Timothy Salthouse
Keith Yeates
Amanda O'Brien

Attention

Sandy Weintraub
Nathan Fox
Koralay Perez-Edgar
Frank Zelko
Dick Havlik

Working Memory

David Tulsy
Nancy Chiaravalloti
Bob Heaton
Amanda O'Brien
Timothy Salthouse
Keith Yeates

Pediatric Assessment in Toolbox



- Allows measurement of same constructs through developmental ages
- Provides validated measures that are brief, reliable, and normed across diverse populations
- One example follows from the Cognition Domain---Executive Functioning

Dimensional Change Card Sort Task



- Developed by Phil Zelazo (University of Minnesota)
- Designed to assess set shifting abilities in young children
- Similar to adult measures such as the Wisconsin Card Sort
- Science based link to neuroscience data on brain development

Dimensional Change Card Sort Task



-Structure

- 1 block of 10 Shape trials
- 1 block of 10 Color trials
- 1 block of 40 Mixed trials (20 Shape, 20 Color)
- Relevant dimension cued by written and spoken word ('Shape' or 'Color')
- Order of dimensions counterbalanced (i.e., half of participants complete shape trials first, other half complete color trials first.)

We're going to play a game! If you hear the word **COLOR** press the button that is the same color as the picture in the middle of the screen.

If it is **RED** like these two



Press this button



If it is **BLUE** like these two



Press this button





SHAPE



Meeting the Challenge of Pediatric Assessment



- Working group established to identify issues specifically important to testing young children
 - Clarity of instructions
 - Appropriate feedback
 - Stop rules
 - Attention to varying motor and language abilities
 - Training of test administrators

Pediatric Assessment Summary



- Pediatric Assessment – *to date*:
 - Instruments that assess children in all four domains have been reviewed
 - Choices have been made for reliable, brief, inexpensive instruments
 - A good deal of thought, care and work has gone into this effort and selection

Validating the Pediatric Assessments



- Validation of the measures in a pediatric sample is about to begin. It will ultimately enable:
- Accurate assessment at *all* age levels across diverse populations
 - Tracking of function changes across the lifespan
 - Easy comparisons between studies



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