



Innovations in Theory of Mind Assessment & Intervention for Children with ASD

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Overview of the Afternoon

What

- Define theory of mind (ToM)
- Describe several tasks that can be used to assess ToM
- Identify strategies that support the perspective taking of children and adolescents with ASD

How

- Present key procedures for selected assessments & interventions
- Apply assessment results to intervention planning
- View several video clips of assessment and intervention procedures

Why

- Increase awareness of the importance of ToM assessment
- Provide emerging evidence for ToM interventions

Social Attribution Task (SAT)

Attributing social meaning to ambiguous visual stimuli (Klin, 2000)

- Individuals with ASD narrate the cartoon animation (SAT)
 - Results indicate that individuals with ASD identified only about 1/4 of the social elements & 1/3 of attributions were irrelevant to the social plot
-

Theory of Mind: What is it?



- **Generally=>ability to take on another's perspective; ability to attribute mental states to individuals other than self (Altable et al., 2009)**
 - **Narrow view=>acquisition of false belief understanding**
 - **Broader view=>synonym for social cognition**
(Astington, 2005)

Theory of Mind: Multifaceted

Meta-representation

Pretence

Ability to deceive

Mental–physical distinction

Appearance –reality
distinction

Seeing leads to knowing

Causes and consequences
of feeling/knowing

Visual perspective-taking

Affective recognition

Empathy

Comprehension of mental
state terms and speech acts

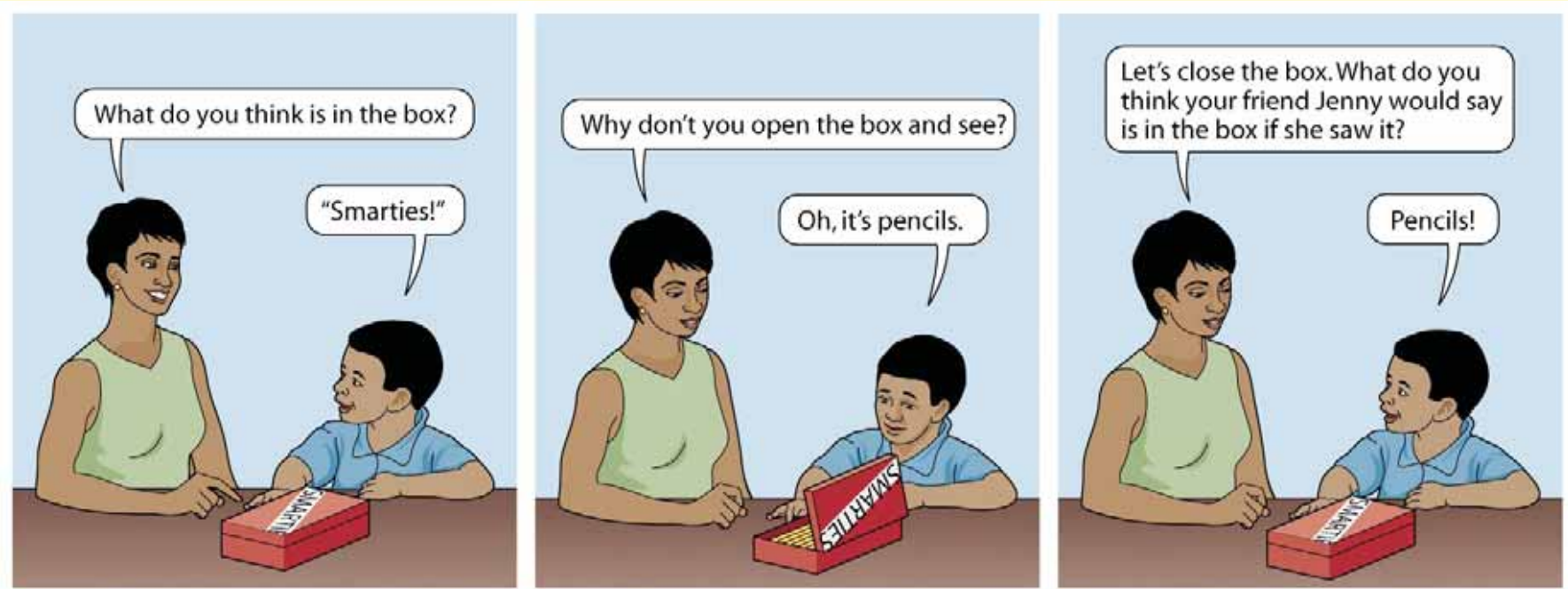
Understanding sarcasm

Counterfactual reasoning

Second-order thinking

Intentionality

The Smarties task



The Smarties task is frequently used to study preschoolers' theory of mind. Most 3-year-olds answer like the child in the cartoon, which suggests that they fail to realize that other people may have false beliefs that deviate from what the child knows to be true.

Challenges for children & adolescents with ASD

- Establishing joint attention & playing symbolically
- Recognizing and understanding emotions
- Adjusting one's behavior to accommodate a situation
- Planning one's own behavior & recognizing the plans of others
- Predicting behavior
- Inferring mental states (Example of terms-next slide)
 - Children with ASD less likely to talk about mental states of characters in px/stories (Baron-Cohen et al., 1986)

Mental-State Words



Think
Know
Jump
Dream
Pretend
Eat
Hope
Wish
Move
Imagine

By 4 years children
can pick out words
from a list that tell
what goes on in the
mind.

(Baron-Cohen, 1992)

Challenges for children & adolescents with ASD

- **Writing narrative & expository text** (Brown & Klein, 2011)
 - Adults with HFASD write lower quality narrative & expository texts, & shorter narratives
 - ToM positively associated with writing quality & text length across genres
- **Oral narratives** (Loveland & Tunali, 1993; Tager-Flusberg, 1993)
 - Difficulty understanding listener's knowledge & affective states
 - Limited awareness of characters' thoughts or affective states
 - Problems recognizing character goals in stories

Challenges for adolescents & adults with ASD

- **Using narratives & communication games**
(Begeer et al., 2010)
 - **Adolescents & adults with & without ASD with typical intellectual development**
 - **Heard a narrative & retold it**
 - **Those with ASD used fewer mental state terms in story narration=>poorer ability to represent interactions in mentalistic terms**
 - **Played a communication game requiring them to take into account another's perspective**
 - **Those with & without ASD showed similar performance, so a systematic ToM deficit seems unlikely=>more research needed**

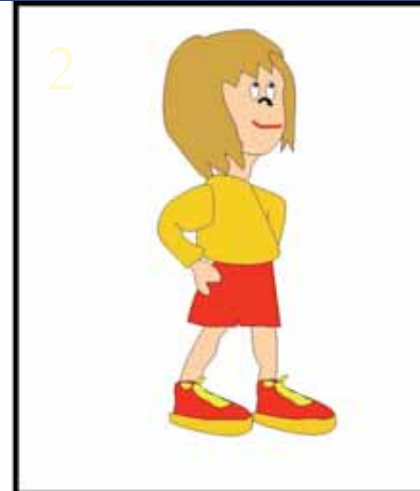
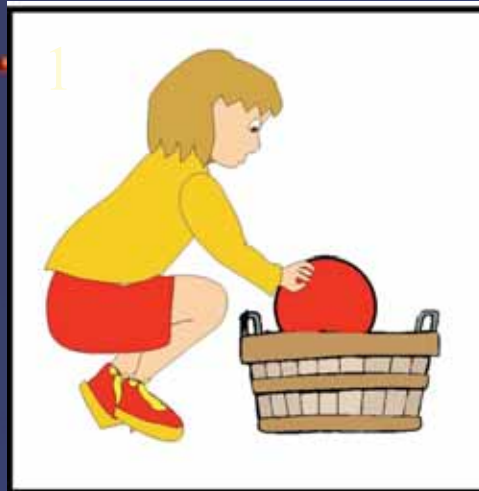
Challenges for children & adolescents with ASD

- **Understanding deception**
 - **Recognizing false beliefs** (Examples next 2 slides)
 - **Children with ASD with an MA above 4 years failed the Sally & Ann task when children with Down Syndrome of the same age were successful (Sodian & Frith, 1993);**
 - **Children with ASD do poorly on these tasks because of their poor cognitive capacity to represent internal beliefs, feelings & thoughts of others** (Mundy, Sigman & Kasari, 1993)
-

Sally Anne False Belief Task

The Sally-Anne task is usually administered using puppets or dolls.

Like all False Belief tasks it requires the child to take the perspective of another, and to answer questions based on what the other person knows.



1) Sally plays with her ball, puts it in a basket. 2) Then she leaves.



3) Anne moves the ball to a box. 4) Where will Sally look for it?

Where does Anne think Sally will look for the ball?

First-Order False Belief



The ability to infer one person's mental state. In this case, the child recognizes that Little Red Riding Hood *thinks* that it is her grandmother in the bed, but the child knows it is really the wicked wolf.

Typically developing children recognize this by 4 yrs; MA matched children with autism instead report what they themselves know; may pass it at older MA

Assessment Tasks

- **Physical-Causal Story task**
 - **Context=>show 4 px sequence of child tripping over a rock**
 - **Questions to ask:**
 - **What happened?**
 - **Put these pictures in order to tell the story**
 - **Why did this happen?**
-

Assessment Tasks

- **Eye Gaze task:**
 - **Context**
 - Give child px of a person looking at you & away from you
 - Show child px of face & 4 candy bars
 - **Questions to ask:**
 - Which person is looking at you?
 - Which candy bar will Charlie choose?
-

Assessment Tasks

- Shared Attention task:
 - Context
 - Give child toy car
 - Questions to ask:
 - Make the car so I can see it
 - Make the car so I can't see it
 - Children with ASD have difficulty hiding the car
-

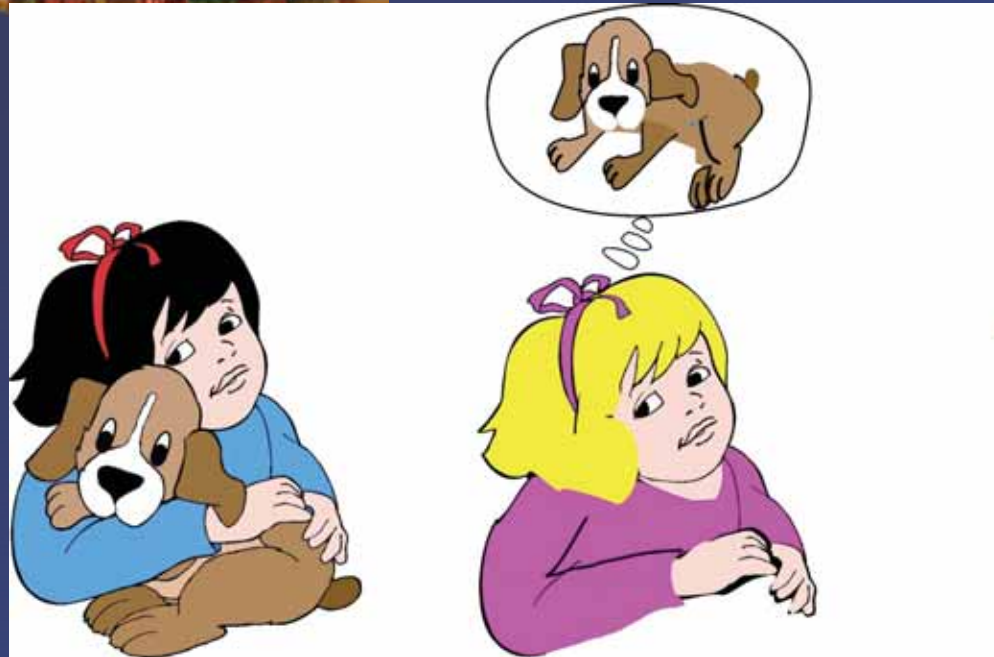
Assessment Tasks

- **Determining expression task:**
 - **Context**
 - Give child px of people who are thinking
 - Give child px of people with different facial expressions
 - **Questions to ask:**
 - Which one is thinking?
 - Match the people who feel the same.
 - How do they feel?
 - Children with ASD identify thinking expressions & basic feelings; have difficulty with surprise & interpreting reasons for feeling

Assessment Tasks

- Seeing is Knowing task:
 - Context
 - Show child px of 2 girls & a box, explain that one is touching the box & one is looking in the box
 - Question to ask:
 - Which one knows what is in the box?
 - Children with ASD understand seeing but not knowing
-

Mental-Physical Distinction



Which girl can feed the dog? Which girl can change the size of the dog? Easily passed by 3 years, but older mental-age matched children with autism failed the task.

Assessment Tasks

- **Deception task:**
 - **Context**
 - Give child a penny
 - **Question to ask:**
 - Ask child to hide the penny in one hand
 - Children with ASD hide object but leave visible clues

Appearance-Reality Distinction



What is this?

A candle
shaped like an
apple

By 4 years children can identify objects by their dual identity. Children with autism could only name one identity. (Flavell et al. 1986)

Tests of 'Advanced' ToM

Designed to assess social cognition in those with HFA & Asperger syndrome

Some well known tests include

- The 'Reading the Mind in the Eyes' Test
 - Strange Stories
-

The “Reading the Mind in the Eyes” test

(Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001)



Strange Stories

(Happe, 1994)

Ann's mother has spent a long time cooking Ann's favorite meal; fish and chips. But when she brings it in to Ann, she is watching TV, and she doesn't even look up, or say thank you. Ann's mother is cross and says, "Well that's very nice, isn't it! That's what I call politeness!"

Comprehension question: *Is it true, what Ann's mother says?*

Justification question: *Why does Ann's mother say this?*

The Animated Theory of Mind Inventory for Children (ATOMIC)

(Beaumont & Sofronoff, 2008)

- Computerized measure designed to examine ToM of children with Asperger Disorder
 - Includes a scale assessing central coherence (5 items) & its relationship to ToM (12 items)
 - 18 cartoons (1 practice & 17 test items)
 - Represents characters' complex emotions
 - Displays items with a variety of child, adolescent & adult themes

The ATOMIC: ToM Scenario (Beaumont & Sofronoff, 2008)

Primary school students are running in a race. One student, Jane, narrowly wins the race over a second student, Amanda. At the end of the race, Jane congratulates Amanda on having run a good race. Amanda says to Jane in a jealous tone of voice, *“I don’t care that you won. I didn’t really try that hard, anyway.”*

QUESTION: *How was Amanda MOST likely to be feeling when she said, “I don’t care that you won. I didn’t really try that hard, anyway?”*

- a. Jealous
- b. Angry
- c. Sad
- d. Unconcerned

Who won the race?

- a. Amanda
- b. Jane
- c. Amanda & Jane tied
- d. Another competitor

The ATOMIC: Central Coherence Scenario

(Beaumont & Sofronoff, 2008)

A beach scene is shown with waves crashing on the shore, & several people dressed in swimwear playing & lying on the beach. One man is pictured wearing a jumper, long pants, a woolen hat & a scarf.

QUESTION: *Was there anything that looked out of place?*

- a. Yes, clothing that man was wearing
- b. Yes, sunglasses that man was wearing
- c. Yes, some people were wearing hats & others were not
- d. No, everything in the scene looked normal

What was the weather like?

- a. Cloudy & raining
- b. Sunny & windy
- c. Sunny with clouds in the sky
- d. Sunny with no clouds in the sky

Limitations of Traditional ToM Assessments

Influenced by cognitive & linguistic factors

- Almost always require a verbal MA of about 4 years

Influenced by motivational & situational factors

Limited in content coverage

Most suffer from ceiling effects

Questionable social validity

Mode of presentation differs & can influence results (van Buijsen et al., 2011)

Further...

“Interest in people with high-functioning autism can obscure the fact that most people with the disorder have moderate to severe learning difficulties. In classic autism this may be about 75%, and more than half of those affected develop no appreciable language. This means that theory of mind deficits in autism have only been examined in a fraction of sufferers; typically experiments include only children with verbal mental ages of above 4 years” (Doherty, 2010).

Two ToM Tools Developed at UVM

Theory of Mind Task Battery (Hutchins & Prelock)

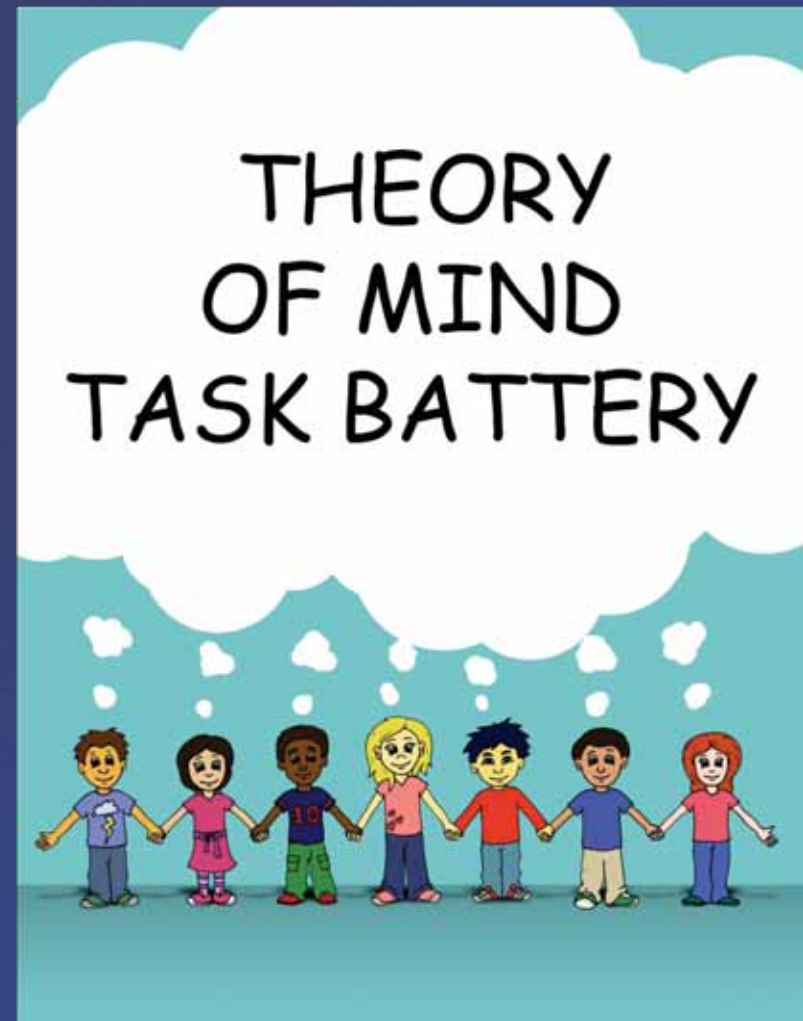
Theory of Mind Inventory (Hutchins, Prelock & Bonazinga)

Direct measure of child performance

16 questions within 9 tasks

Arranged in ascending difficulty

From basic facial expression recognition to complex 2nd order false beliefs



www.theoryofmindinventory.com

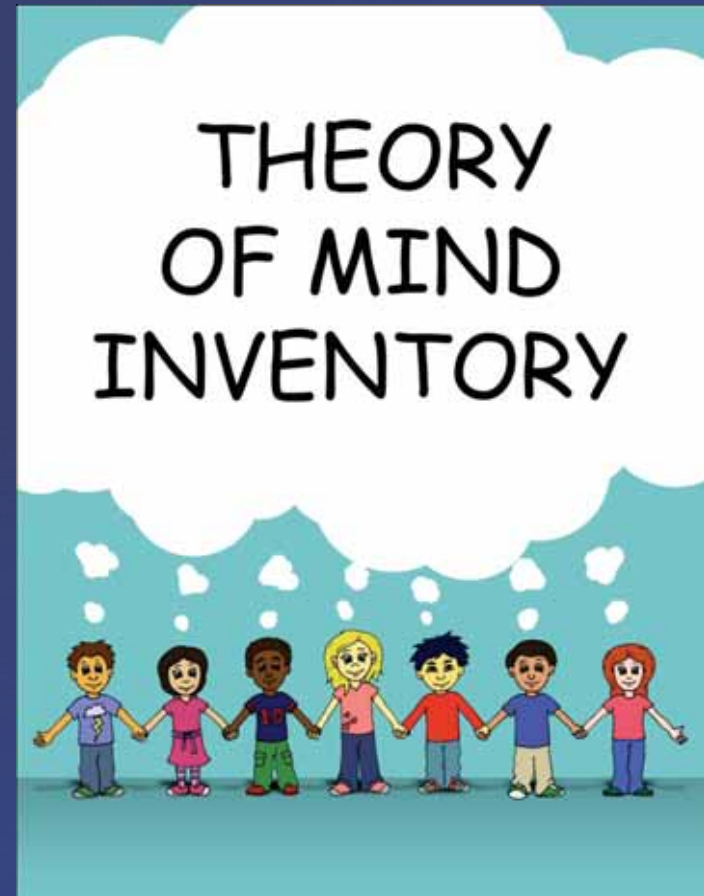
Previously named the *Perceptions of Children's Theory of Mind Measure* (PCToMM; Hutchins, Bonazinga, Prelock, & Taylor, 2008)

Now a 47 item parent-report measure

Items designed to tap all
aforementioned ToM dimensions

Website can be used to

- ✓ Access information about reliability and validity
- ✓ Generate reports (subscale, composite scores, percentiles)
- ✓ Allow parents to use the tool=>password is tomi2011



ToM Component	Example Item
Pretence	My child can pretend that one object is a different object (for example, pretending a banana is a telephone).
Ability to deceive	My child understands that people can lie to purposely mislead others.
Mental–physical distinction	My child understands that when someone is thinking about a cookie, they cannot actually smell, eat or share that cookie.
Intentionality	My child understands whether someone hurts another on purpose or by accident.
Empathy	My child is able to put himself/herself in other people’s shoes and understand how they feel.

ToM Component	Example Item
False beliefs	If I put my keys on the table, left the room, and my child moved the keys from the table to a drawer, my child would understand that when I returned, I would first look for my keys where I left them.
Idiomatic language	If I said “Let’s hit the road!” my child would understand that I really meant “Let’s go!”
Certainty	My child understands that when someone makes a ‘guess’ it means they are less certain than when they ‘know’ something.
Speech acts	My child understands that when a person promises something, it means the person is supposed to do it.
Visual perspective-taking	My child understands that if two people look at the same object from a different standing point, they will see the object in different ways.

ToM Component	Example Item
Affect-based behavior	My child understands that when someone says they are afraid of the dark, they will not want to go into a dark room.
Seeing leads to knowing	My child understands that to know what is in an unmarked box, you have to see or hear about what is in that box.
Mental state terms	My child understands the word 'think'.
Sarcasm	If it were raining and I said in a sarcastic voice "Gee, looks like a really nice day outside," my child would understand that I didn't actually think it was a nice day.
Counterfactual reasoning	My child understands the word 'if' when it is used hypothetically as in, " <i>If I had the money, I'd buy a new house.</i> "

ToM Component	Example Item
Humor	If I said “What is black, white and ‘ <i>read</i> ’ all over? It’s a newspaper!” my child would understand the humor in this play on words.
Shared attention	My child is able to show me things.
Affective recognition	My child understands that, when I show fear, the situation is unsafe or dangerous.
Second-order thinking	My child understands that people often have thoughts about other peoples’ <i>thoughts</i> .

Response Arrangement

20-unit continuum with the following anchors:



Scores

Summed and averaged

Range 0- 20

Higher values reflect greater ToM
competence

Psychometric Evaluation: Sample Characteristics

ASD (n = 135)

Ages 2 – 17 ($M = 10$)

Diagnosis

- Autistic Disorder = 52%
- PDD-NOS = 22%
- Asperger Syndrome = 21%
- Other = 5%

Language Level

- Nonverbal = 15%
- Limited speech = 18%
- Verbal = 67%

TD = (n = 124)

Ages 2 = 12 ($M = 7$)

All (50% males; 50% females) were native English speakers

No history of disability including uncorrected visual or hearing impairment

Psychometric Evaluation: Sample Characteristics

Race/Ethnicity

- Asian = 2.1%
- African American = 6.4%
- Hispanic Latino = 7.8%
- White = 79.4%
- Other = 4.3%

SES: *Md* = \$65,000

Education: *M* = 15.5 years

Respondents represented 14 states

- All major regions represented
- Urban, suburban, and rural communities represented

Psychometric Evaluation

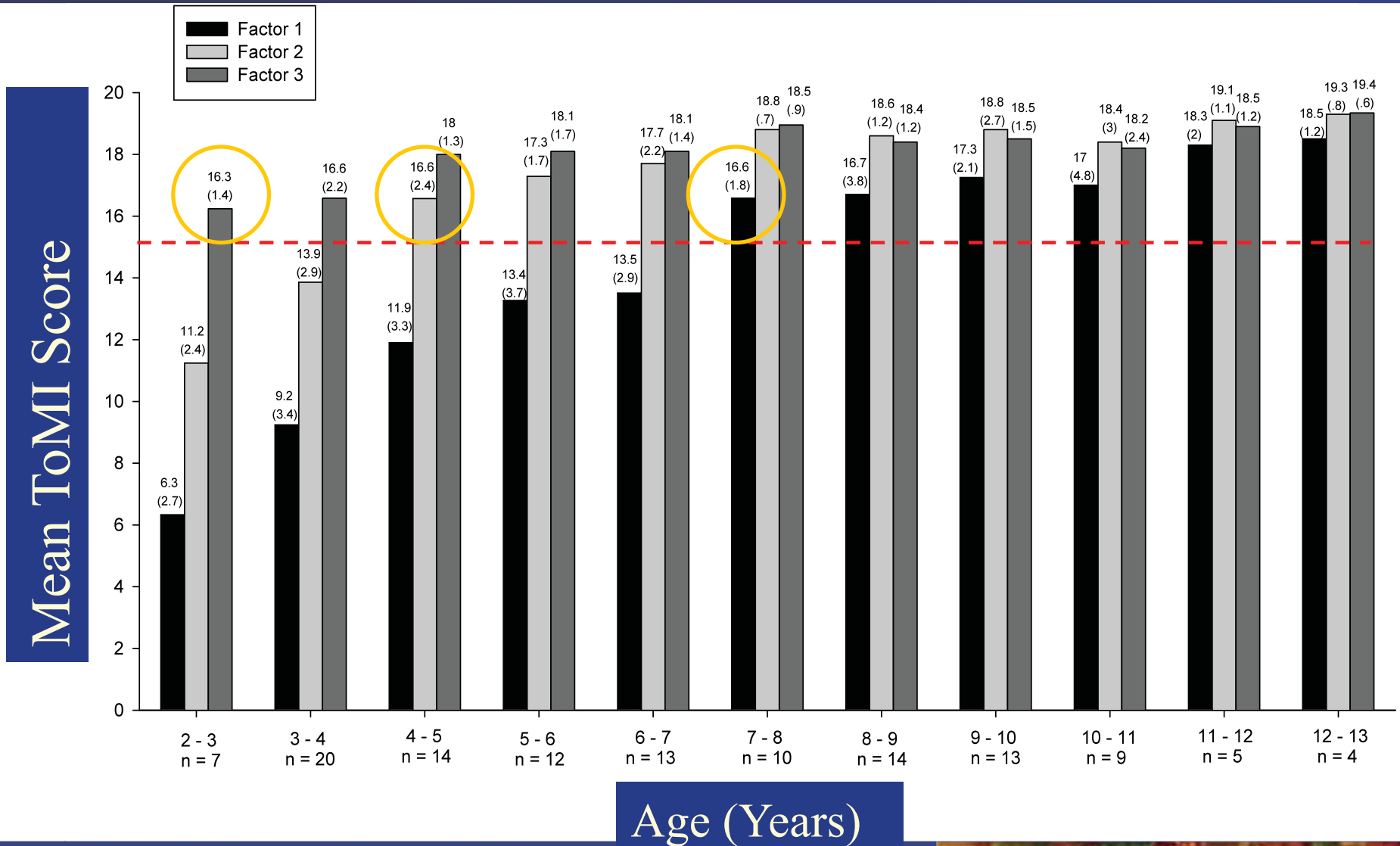
Test-retest reliability (14 – 70 days)

- ($r = .89, p < .01$)

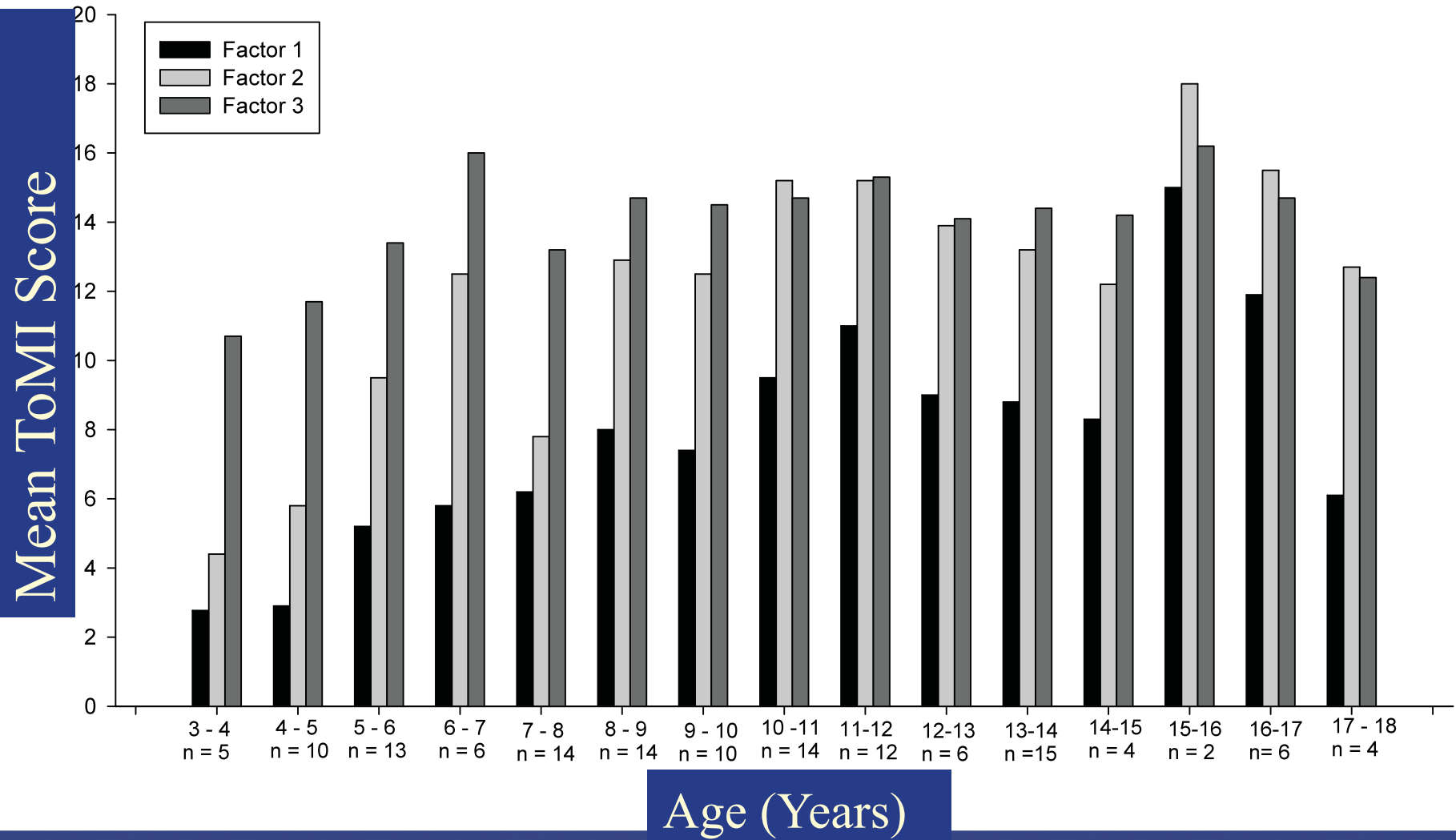
Internal consistency: $\alpha = .98$

Scores for the ASD sample significantly lower ($M = 10.8$) than typically developing sample ($M = 15.6$), $p < .01$.

Typical Sample

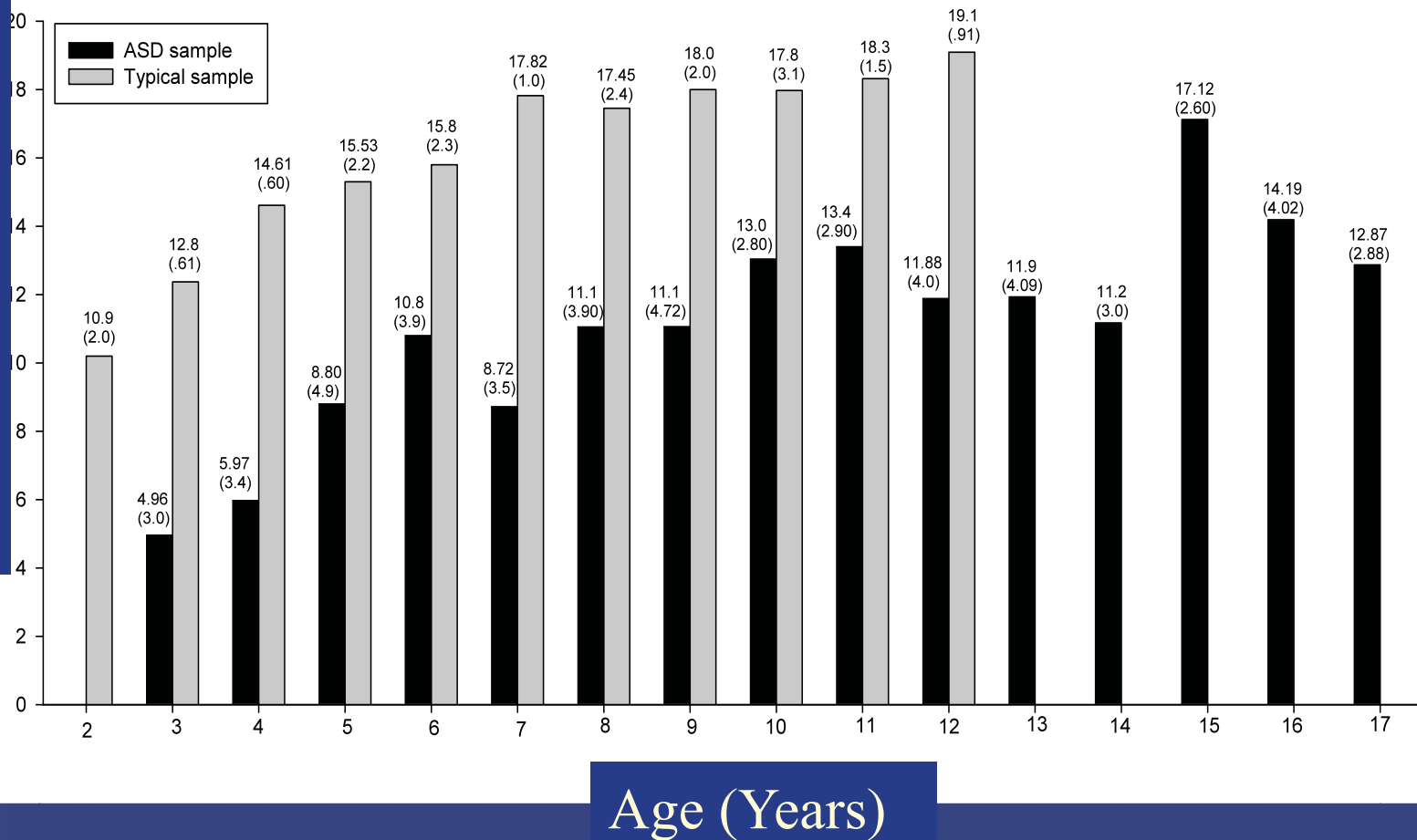


ASD Sample



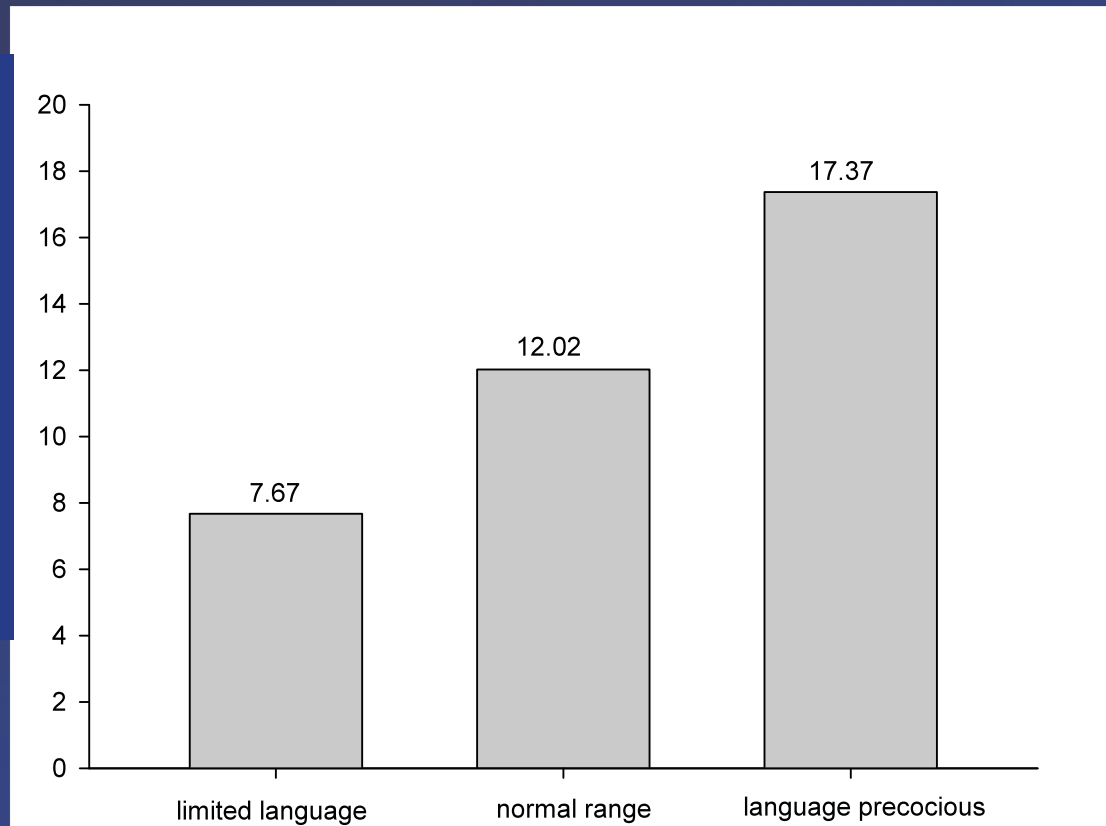
ASD and Typical Sample

Mean ToMI Score



ASD Sample: ToMI by receptive vocabulary

Mean ToMI Score



Psychometric Evaluation

For ASD sample, ToMI correlated with:

- ToM Task Battery (Hutchins, Prelock, & Chace, 2008)
($r = .66, p < .01$)

 - Peabody Picture Vocabulary Test-4 (Dunn & Dunn, 2007)
($r = .73, p < .01$)
-

Psychometric Evaluation

Factor Analysis

- Factor 1 ~ Advanced ToM: Complex Recursion, Mind as Active Interpreter and Social Judgment (16 items)
 - Factor 2 ~ Basic ToM: Metarepresentation and Developmentally Related Understandings (19 items)
 - Factor 3 ~ Early ToM: Reading Affect and Sharing Attention
-

ToMI and Response to Parental Distress:

Our most recent efforts to validate the ToMI involve comparisons of ToMI scores to observations of children's behavioral responses to parental distress.

K.F.

15-year-old male diagnosed with Autistic Disorder

Enjoys video games, American History, science and sports

Verbal (uses language in a variety of ways to communicate with others)

ToNI-4 = 80 (9th %)

PPVT-4 = 75 (5th %)

ToMI score = 9.04

(see report form)

J.M.

8 year old male diagnosed with Autistic Disorder

Enjoys trains, snuggling, and Disney movies

Nonverbal

ToNI = 101 (52nd %)

PPVT-4 = 54 (1st %)

ToMI score = 10.13

(see report form)

S.L.

11 year-old male diagnosed with Autistic Disorder

Enjoys cars, videos, and interacting with peers

Verbal (uses language in a variety of ways to communicate with others)

TONI-4 = 87 (19%)

PPVT-4 = 78 (7th %)

ToMI score = 12.1

(see report form)

J.D.

17 year old male diagnosed with PPD-NOS

Enjoys music, the computer, and creating works of art (wind chimes)

Limited speech (uses meaningful 2-3 word phrases on a regular basis)

ToNI-4 = 90 (25th %)

PPVT-4 = 54 (1st %)

ToMI score = 13.46

(see report form)

S. N.

12.7 year old male diagnosed with Asperger's

Enjoys science & the computer

Has OCD tendencies

ToNI-4 = 100 (50th %)

PPVT-4 = 126 (96th %)

ToMI score = 15.74

(see report form)

ToMI: Connections to Practice

Create profiles of social cognitive strengths & challenges

Used in conjunction with other measures

Identify potential intervention targets

- Consider factors (subscale scores) to establish areas of intervention focus
 - Early Emerging ToM: Reading Affect & Sharing Attention
 - Basic ToM: Developing Metarepresentation
 - Advanced ToM: Complex Recursion, Mind as Active Interpreter & Social Judgment
-

ToMI: Connections to Practice

Look within subscales to identify specific areas of strength/weakness to guide treatment planning

Identify general developmental level to select appropriate treatment program

KF Report: What to do next?

Early=>12.86 (some challenge with affect recognition related to early perspective taking)

Basic=>10.64 (overall start here)

Advanced=>5.15 (not yet ready for this)

Possible interventions: social stories and comic strip conversations related to emotions, false beliefs, deception; **emotions library**

JM Report: What to do next?

Early=>13.30 (some challenge with intentionality)

Basic=>10.55 (overall start here)

Advanced=>7.76 (not yet ready for this)

Possible interventions: social stories focused on perspectives of others, emotions & use of mental state terms; **emotion library**

SN Report: What to do next?

Early=>16.71

Basic=>14.84 (overall start here)

Advanced=>15.38 (can move to this)

Possible interventions: **comic strip conversations** focused on emotions, pretense, & deception

ToMI: Conclusions

- Administration is not complicated by child memory, linguistic, cognitive & motivational factors
 - Appropriate for individuals with ASD (even those with the most limited language)
 - Quick and easy to administer and score
 - Does not suffer from ceiling effects (ASD) or practice effects
 - Good evidence for reliability and validity
 - Can be used to guide treatment planning
-

Strategies to Support ToM



Comic Strip Conversations & Social Stories™

- Make explicit what others are thinking
 - Translate the ‘secret code’ involved in social interaction into ‘practical, tangible information’ (Gray, 1998)
 - Help children inform, advise and reflect upon social situations from a person’s actual experience by visually presenting the information
-

CASE EXAMPLE: Learning about Zach & his Family

Interview

- Asked to reflect on problem behaviors, communicative challenges & perspective taking deficits
- Theme emerged: defiant & aggressive behavior when things don't go 'Zach's way'

Record Review

- 5 year old with ASD
- V & NV IQ=>1 SD below Mean

ToM Assessment =>ToMI and a ToM task battery indicated:

- Early Emerging ToM competencies were developing (e.g., identifying emotions)
- Basic and Advanced ToM skills not yet demonstrated (e.g., false belief, seeing leads to knowing, second order reasoning)

CASE EXAMPLE: Learning about Zach & his Family

Intervention Individualized

- Considered Zach's aggressive behavior, its frequency & explosiveness
- Sought to promote Zach's understanding of the causes & consequences of his own & others' mental states to change behavior

Zach's Social Story

- Descriptive sentences to provide information about context
- Perspective sentences to explain causes & consequences of his behavior (*It makes my mom & dad sad when I throw a fit.*) including 'thinking' sentences (*They might think, 'I wish we could make Zach happy.'*)
- Directive sentences to offer more socially acceptable behavior (*If I get mad or disappointed, I can use my words to talk to my mom & dad.*)

Zach's Comic Strip Conversation

- Talking & thinking bubbles used to revisit a recurring problem, highlighting what people do, say, and think

Social Story Research (Prelock & Hutchins, 2006)

HOME Based (3 tx/week)

Immediate intervention
group

Wait intervention group

3 Stories

Behavior

Communication

Perspective taking

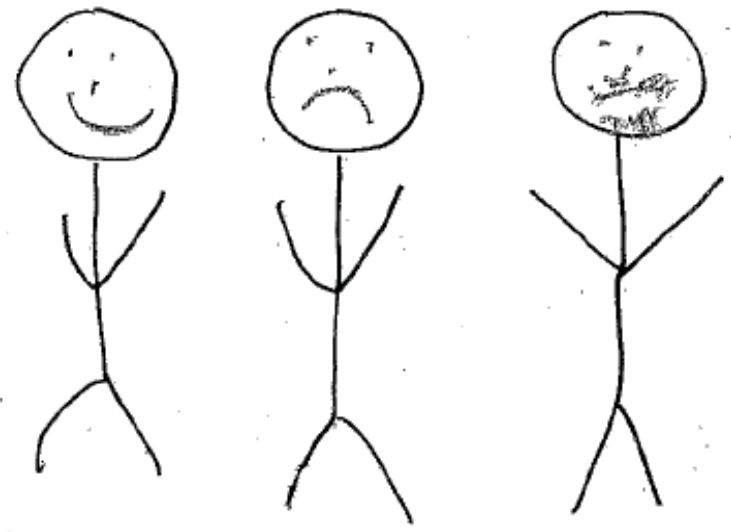


Social Story=>Outcome Measures

- Theory of Mind Inventory
- Theory of Mind Task Battery
- Communication skills
- Daily Diaries



"Hey, let's play in the water." 1

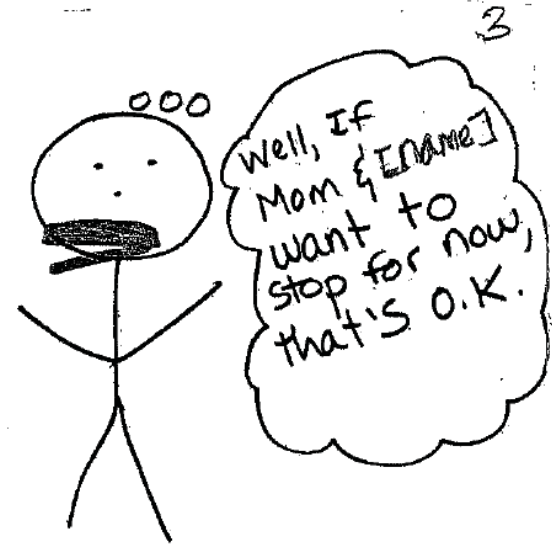


(Victoria) (MOM) (Sister's name)

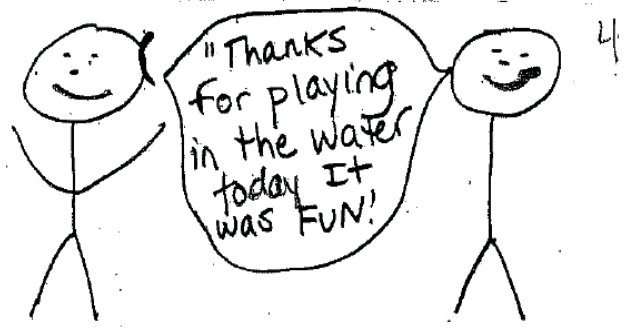




Victoria

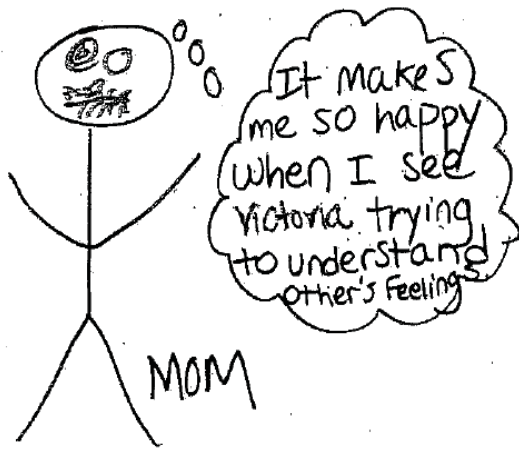


Victoria
NOT OK



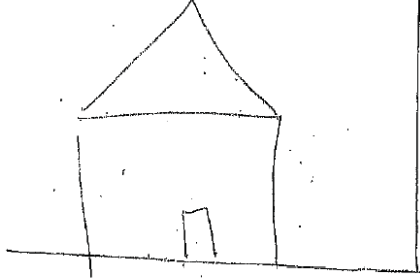
(Sister's name)

(Victoria)



MOM

Home



#

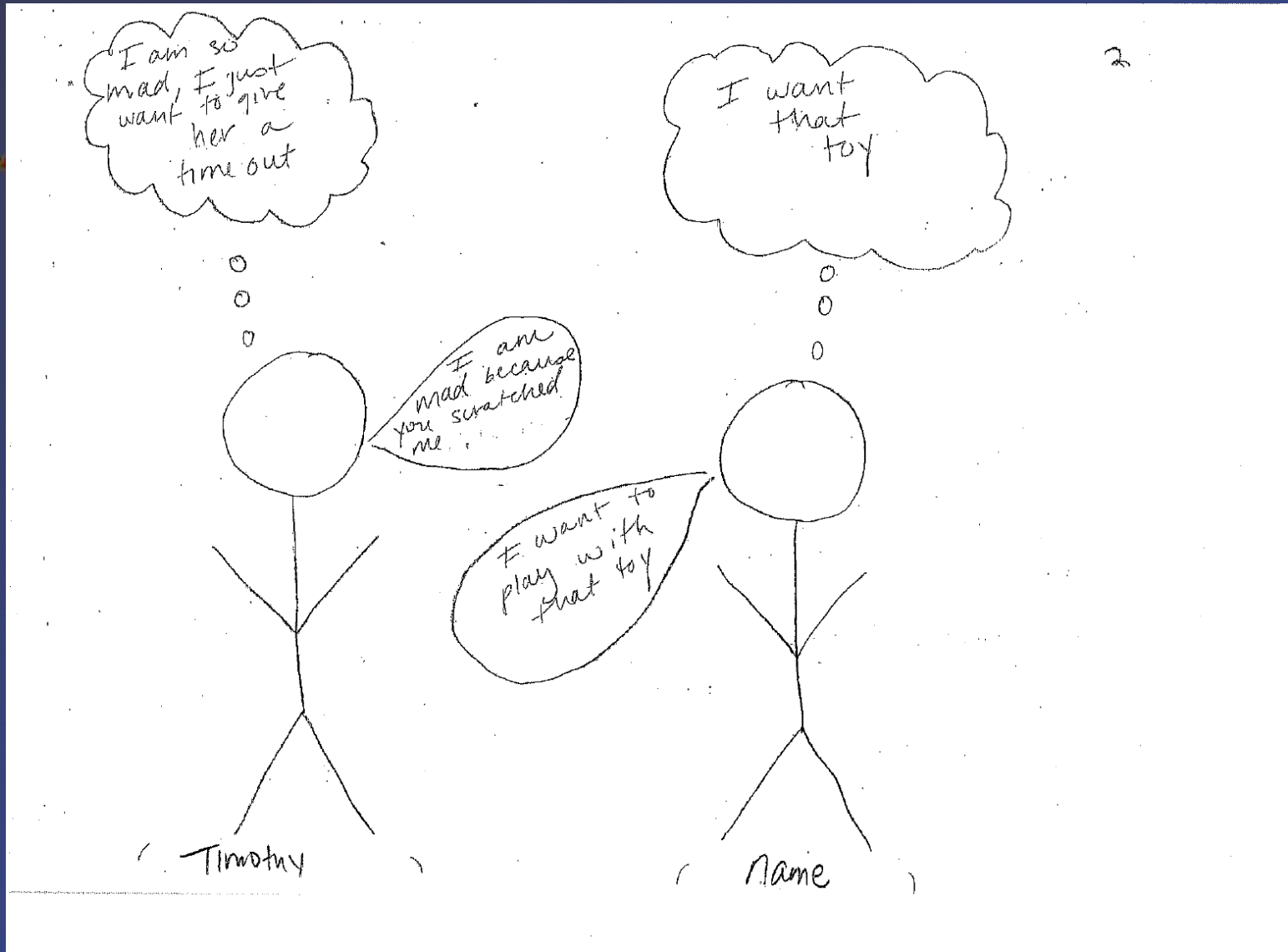
I hate everything you do, I hate you

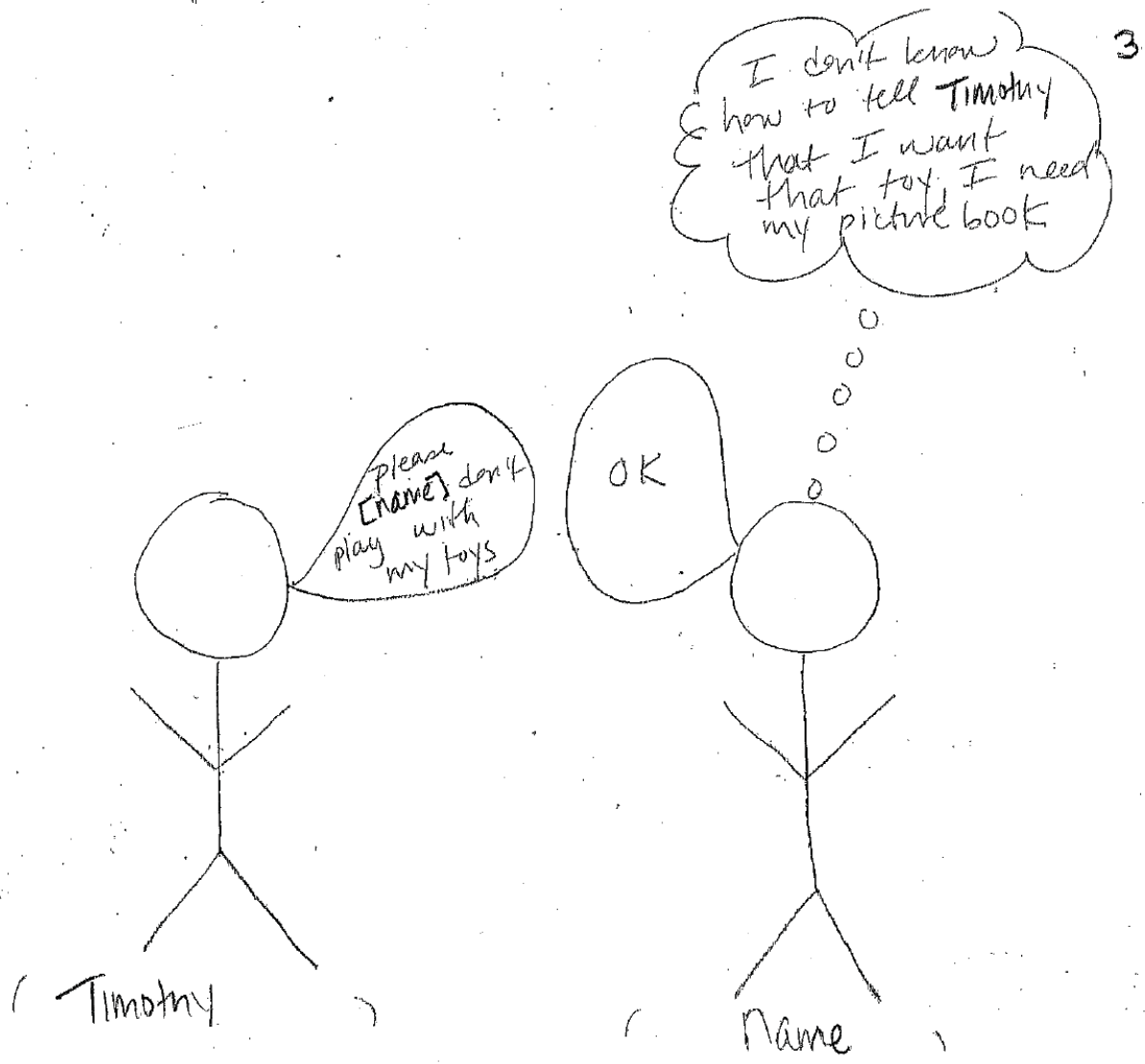
I hate you, too

I am sad that Timothy said he doesn't like me

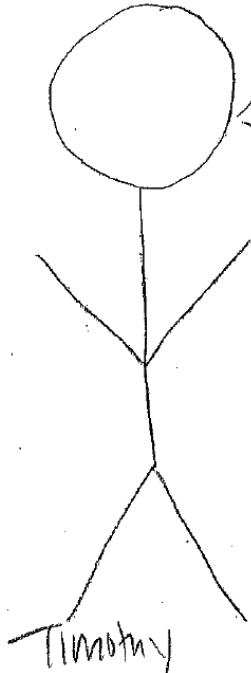
(Timothy)

(Name)





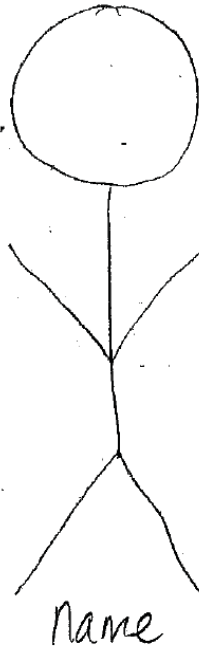
I feel nice because she used her words instead of scratching me



Please don't scratch me again.

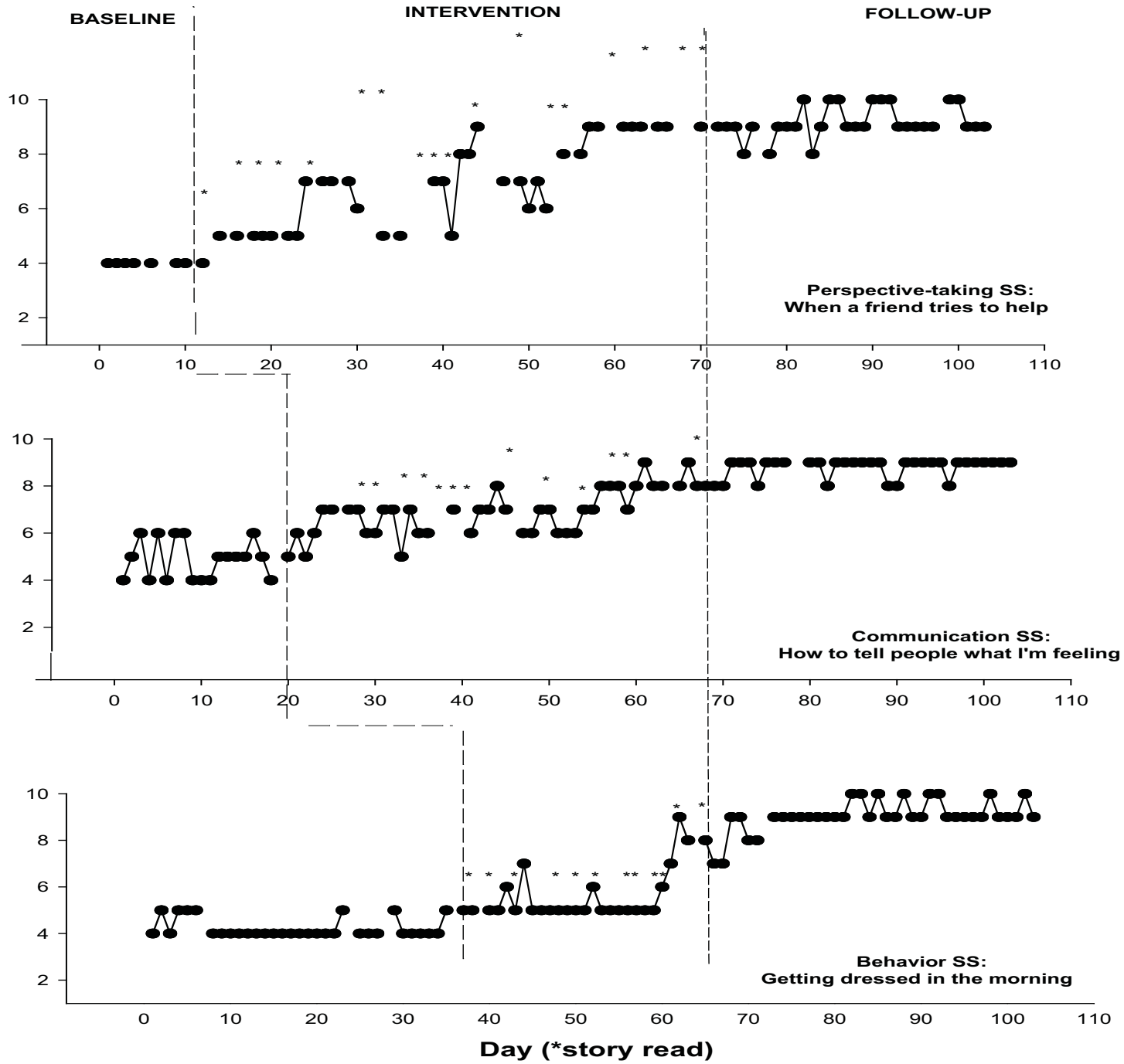
Okay Timothy

Tommy asked me nicely, I like it when Timothy uses my words



4

confidence that targeted probi



New Research (Hutchins & Prelock, 2010)

50 participants

2 to 17

3 conditions

- CSC
- SS
- SS + CSC

ToM, affective task, video analysis, etc. used to assess learning



Training ToM (Fisher & Happe, 2005)

- **Rules for thinking about beliefs ('photos in the head'):**
 - **When a person sees something, they have a thought in their head--picture**
 - **Thought pxs can stay in person's head & used to look for things**
 - **Different people have different thought pxs**
 - **Sometimes thought pxs can be out of date**
 - **Thought is like a thought px, only we can't see it**
-

Theory of Mind Training

(Gevers et al., 2006; Steerneman et al., 1996)

Manualized treatment

- 16 weekly sessions, 90 minutes each
 - 5-6 children at a time, age within 3 years of each other
 - Parents joined last 15 minutes to brief on assignments for next meeting on how to promote social cognition through game playing & story telling
-

Theory of Mind Training

(Begeer et al., 2011; Gevers et al., 2006; Steerneman et al., 1996)

53 structured sessions focusing on ToM skills

- Listening to others & making acquaintances
- Understanding differences between fantasy & reality
- Assessing social situations
- Recognizing others' intentions & emotions
- Placing oneself in the thoughts & feelings of others
- Understanding deception
- Using imagination

Theory of Mind Training

(Begeer et al., 2011; Gevers et al., 2006; Steerneman et al., 1996)

Randomized controlled trial

- Compared to controls, 8-13 year old children with ASD & normal intelligence improved their conceptual ToM skills
- Self-reported empathic skills & parent report of social behavior did not improve
- Results did not provide strong evidence for effectiveness of ToM training on daily life mindreading skills

Effects of ToM & Social Skill Training-for one 11 year old with ASD (Feng et al., 2008)

Training Content	Skills Trained (using multimedia animation)
Stage 1	
Entry level ToM	Identifying desire-based emotion & basic belief
Emotional expression	Expressing own emotions & controlling anger
Stage 2	
Advanced ToM	Understanding 1 st & 2 nd order false belief
Conversational interactions	Greeting & expressing needs appropriately

Effects of ToM & Social Skill Training- Teaching Procedures (Feng et al., 2008)

Teacher

- Presents ToM episode in animation
- Verbally explains the episode
- Asks questions about the episode

Student=>responds to questions

- Incorrectly: teacher provides prompts (animation cue, question cue, direct prompt)
 - Correctly: teacher provides verbal praise
-

Effects of ToM & Social Skill Training- Teaching Procedures (Feng et al., 2008)

Teacher-Student role play the episode

Teacher summarizes episodes' main points

Student shares experiences related to the episode

Assessment probe occurs

- 80% correct with 3 consecutive probes=>small group training & next episode
 - <80% correct=>return to original episode
-

Effects of ToM & Social Skill Training- Results (Feng et al., 2008)

ToM & social skill training =>improvements in ToM acquisition via learning outcomes evaluation probes & increased social interactions across time & settings during 1-1 training, small group training, maintenance & follow-up phases

Teachers, mother & peers responded positively to the intervention

Teaching Children with ASD what other people see (Gould et al., 2011)

Multiple exemplar training procedure (8-12 trials) used to teach 3 preschool children with ASD what other people can see (simple perspective-taking skill); using pictures, children were asked to identify what a person saw based on the direction of eye gaze

Participants generalized learning to novel tasks but not to probes in the natural environment

FaceSay: Improving Social Skills using avatars in computer-based intervention

(Hopkins et al., 2011)

Three Games included in the TX

1. **Amazing Gazing**=>teaches children to attend to eye gaze & respond to JA; children must touch the object the avatar is looking at
2. **Band aid Clinic**=>teaches children facial processing & facial recognition; a portion of avatar's face is distorted & children must select appropriate 'band aid' to fix the face

FaceSay: Improving Social Skills using avatars in computer-based intervention

(Hopkins et al., 2011)

Three Games included in the TX

3. **Follow the Leader**=>teaches children to attend to subtle eye movements to improve ability to discriminate facial expressions;
 - a. **First Level**: children identify identical emotional facial expressions by selecting Yes or No
 - b. **Advanced Level**: children change avatar's expression to match the avatar's twin

FaceSay: Improving Social Skills using avatars in computer-based intervention

(Hopkins et al., 2011)

Objectives=>examine impact of FaceSay on

1. Emotion & facial recognition
2. Social behaviors in the natural environment

Methods=>49 children with ASD

1. 24 in High functioning group
2. 25 in Low functioning group

Treatment=>12 sessions of FaceSay over 6 weeks in school

FaceSay: Improving Social Skills using avatars in computer-based intervention

(Hopkins et al., 2011)

Outcomes (assessed pre-post TX)

1. Emotion recognition: Ekman & Friesen's (1975) photos & schematic drawings
2. Facial recognition: Benton Facial recognition Test (1980)
3. Social Skills Rating System (Gresham & Elliott, 1990):
4. Social Skills Observation: two, 5 minute assessment during recess

FaceSay: Improving Social Skills using avatars in computer-based intervention

(Hopkins et al., 2011)

Results

1. Emotion recognition: LFA & HFA both improved significantly
2. Facial recognition: HFA improved significantly
3. Social Skills Rating System: LFA & HFA improved significantly
4. Social Skills Observation: LFA & HFA improved significantly

Implications for ToM Intervention Research

Strategies have been effective in lab-based experiments

Generalization & maintenance of intervention gains within the natural environment is more problematic

Since ToM deficits are seen by age 2, interventions are needed to address early deficits in children with ASD

(Howlin, 2008)

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