Teaching children with autism to talk about private events: establishing the verbal behaviour of emotions, inferences and perspective taking.

Francesca degli Espinosa

Ph.D., BCBA-D, CPsychol

National Autism Conference, Penn State, 2016

Learning objectives

- To describe the role of verbal divergent control in teaching verbal behaviour of public events
- To describe private events in terms of behavioural principles
- To understand learner progression for establishing abstract reasoning

My child can

- Speak fluently in grammatically correct sentences
- Can answer questions about present and past events
- Provide a description about an ongoing event
- Follow complex instructions

A general framework: overall objectives

	Beginner	Intermediate	Advanced
Social	People need to become S^Ds for delivery of S^Rs: Eye-contact as CMO-T and joint attention	Attention and shared activities as S^Rs: reciprocal commenting and comment extensions	Verbal interaction as the S^R: conversation
Verbal: function & structure	Conditional discriminations: visual and unmediated selection (receptive) Communication: mands Establishing basic noun and action vocabulary: tacts and receptive Generalised imitation Naming Structure: single words	Tact and intraverbal conditional discriminations: objects and ongoing events Listener (mediated selection, jointly controlled responding) Relations between nouns: and classes (categories), and actions (functions), and nouns (parts), properties (adjectives) Descriptions (tacts of compound stimuli): events and objects Structure: basic utterance (SVO, articles, and agreements)	Tact and intraverbal conditional discriminations: general topics and past events Descriptions of past events (remembering) Abstract reasoning: predictions, inferences, temporal relations/sequences Problem solving and tacting private events of others (Theory of Mind) Structure: Multi-clause, connected sentences (discourse)
Academic	Drawing imitation and colouring	Textual (decoding), taking dictation, number/quantity relations	Story comprehension and story writing, maths, word problems, sums

But he

- Can’t predict what another person will do, think, say or feel
- Can’t explain how he knows something
- Sees things only from his point of view

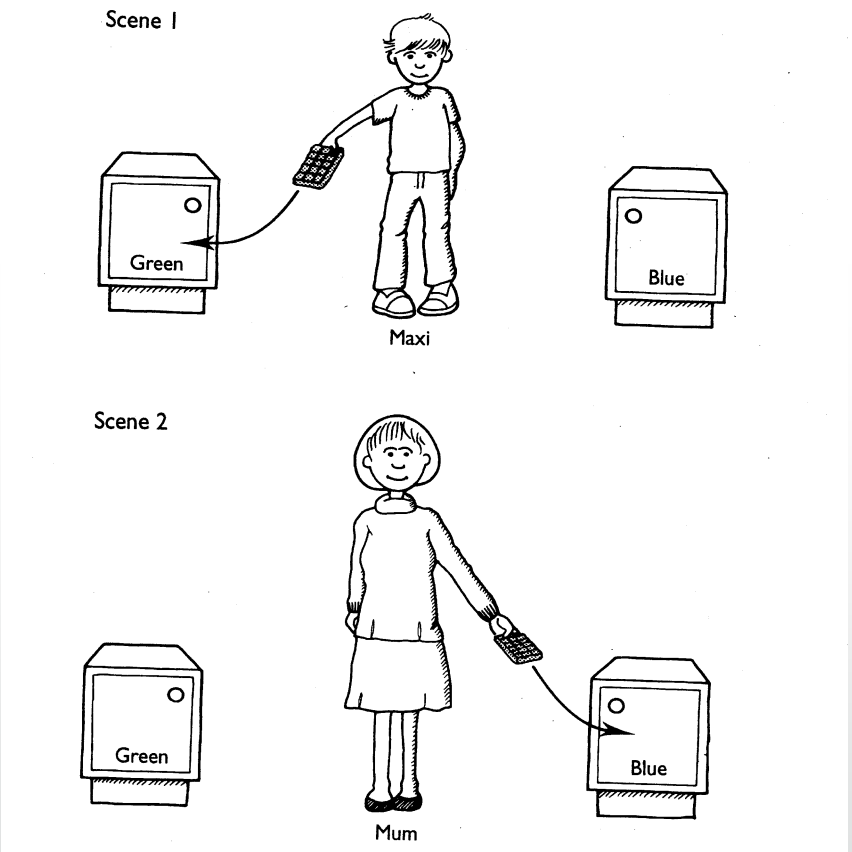
Does he lack a "Theory of Mind?"

- *"The ability to attribute independent mental states to oneself and others, in order to explain and predict behaviour. These mental states must be independent both of the real world state of affairs and independent of the mental states others have"* (Happé, 2005, p.35)

Assessments

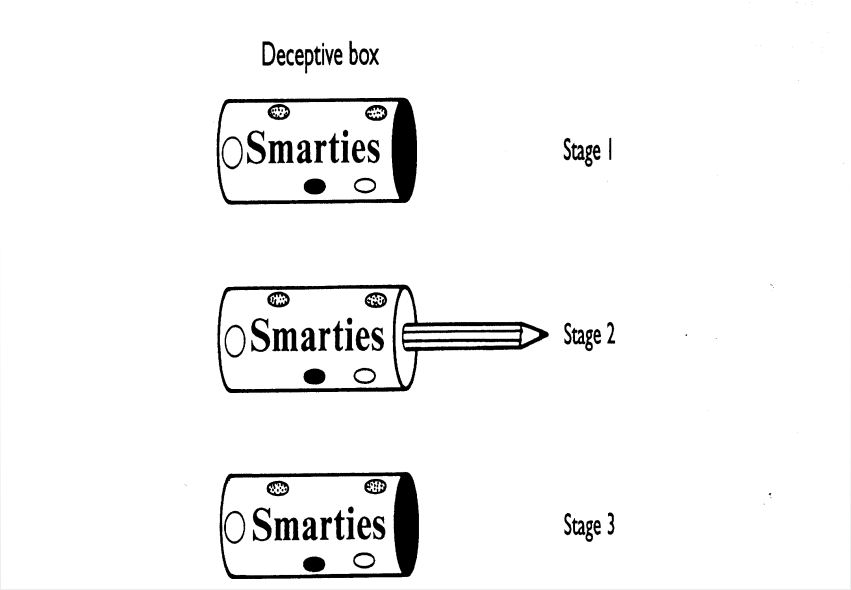
- The appearance-reality task (Flavell, Green & Flavell, 1986)
- First-order false belief tasks (Baron-Cohen, Leslie & Frith, 1985)
- Seeing leads to knowing tests (Baron-Cohen & Goodhart, 1994)
- Tests on multiple causes of emotions (Baron-Cohen, 1991)
- Gaze direction inferences (Baron-Cohen & Cross, 1992)
- Tests of monitoring own intentions (Philips, Baron-Cohen & Rutter, 1998)
- Tests of deception (Baron-Cohen, 1992)
- Metaphor, sarcasm, jokes and irony (Baron-Cohen, 1997)
- Tests of pragmatics (Tager-Flusberg, 1993)
- Strange stories (Happe, 1994)

The unexpected transfer task
(Wimmer & Perner, 1983)



- Maxi puts the chocolate in the green cupboard.
- While he is out playing, his mum takes the chocolate out and grates some of it into a cake
- She then puts it in the blue cupboard
- Where will Maxi look for his chocolate?

The Smarties task (Perner, 1987)



- What's inside the tube?
- I have taken away the smarties and put a pencil in the tube
- When you first saw the tube, before we opened it, what did you think was inside? What will ____ think it's in the tube?

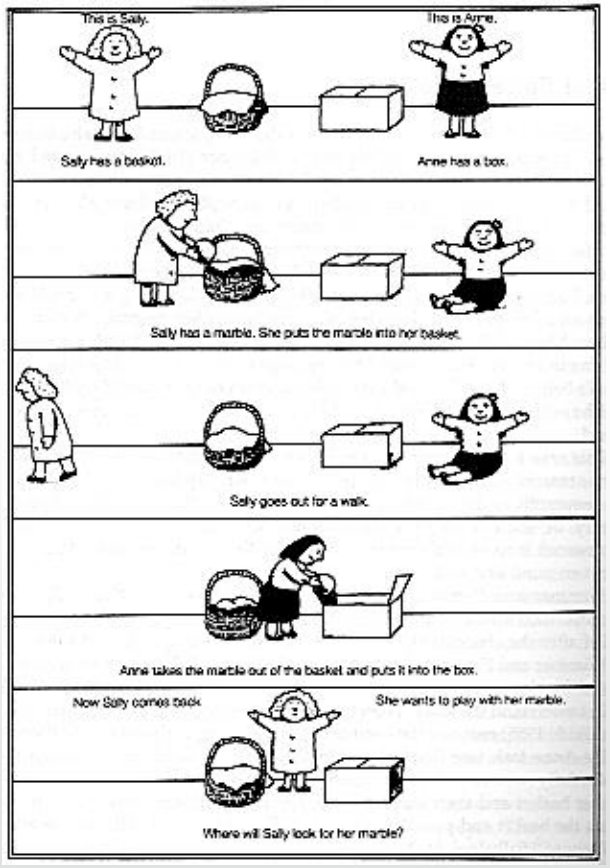
Is it universal?

- Avis and Harris (1991)
- Gave the the unexpected transfer test to people from the Baka community of Cameroon
- Used a real life scenario. A teenage boy cooking mango in a pot inside his hut. He goes outside ‘for a smoke with his friends’. E and the child conspire to move the mango from the cooking pot to a bowl in another part of the hut. As the teenager is about to return E asks child where the boy will look for his mango.
- 5-year-olds correctly judged: cooking pot. Younger children incorrectly judged: bowl

Age-trends

- Children undergo a radical conceptual shift at 4 years of age (Perner, 1991)
- Wellman et al. (2001): Meta-analysis of studies of more than five hundred false belief studies show that three year olds make the false belief error and cease making it as age increases

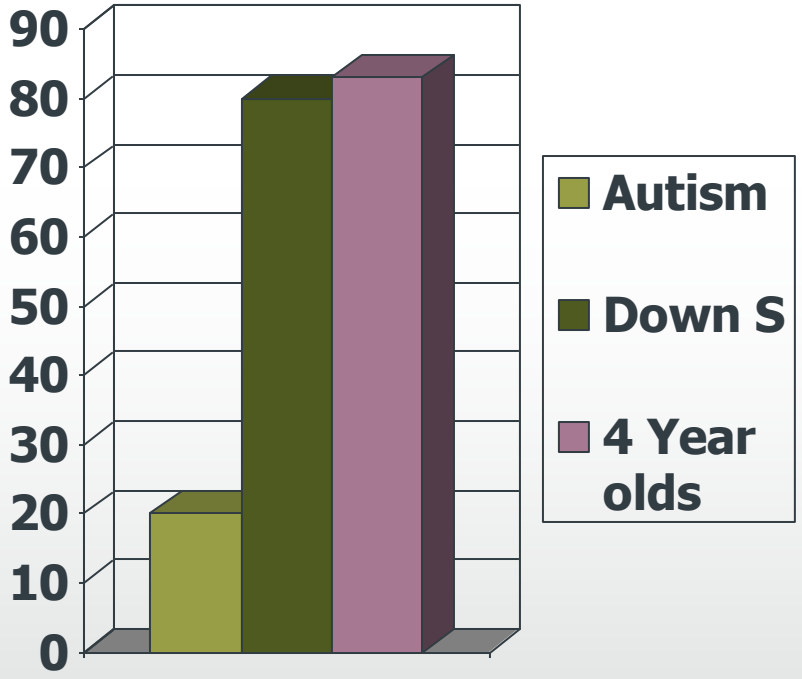
The Sally-Anne false belief task and autism (Baron-Cohen, 1985)



- Two dolls called Sally and Ann.
- Sally has a basket and Ann has a box.
- Sally puts her marble in the basket and leaves.
- When Sally is away, Ann puts the marble in the box.
- Sally's going to come back now!
- Where will Sally look?

Results

Children with Down Syndrome and Autism were matched on VMA, not on chronological age. Down's children were approximately 4 years old, the children with autism had a CA of 12 years and a mean VMA of 5.5. years.



A comprehensive theory?

Lack of ToM in autism accounts for Wing and Gould (1977)'s triad of impairments:

- Socialisation (difficulty with social relationships, lack of appreciation of people as having independent minds)
- Communication (literalness, inability to represent intentions or recognise language as representing thoughts)
- Imagination (lack of pretence/meta-representations)
- Essentially it predicts that processes involving *primary representations* will remain intact (rote memory, perception)

Can it be established?

- Studies from the cognitive literature specifically targeting establishment of ToM skills based on direct task training
- Some studies examining teaching *prerequisite* skills (perception, pretence, imitation, emotions)
- Limited behavioural studies
- Some improvement in task performance and maintenance; generalisation either not tested or poor
- Does task demonstration lead to social behaviour changes (e.g., empathy, prosocial behaviour)?

ToM as an entity…

- Employed as a causal explanation for behavioural and social deficits in autism (if tests are not passed, child does not have ToM)
- Thought to be a central deficit, both specific and universal
- Lack of experimental manipulation in studies (presence vs absence, rather than cause-effect)

A label to summarise certain behaviours?

- "How and in what manner are the behaviours from which ToM is inferred acquired?" (Schlinger, *in press*)
- Under which observable circumstances do we tact the presence or absence of ToM in a child?
- How are those responses acquired?
- What teaching contingencies can we establish?

Operational definitions

Inferring mental states to predict action?

- "…observing the behaviors of another individual in a given situation and (b) predicting the individual's subsequent behavior (e.g., "He's going to look where the ball was hidden before he left") or responding in accordance with the private thoughts or emotions another individual might typically experience in that situation (e.g., making consoling remarks, such as "better luck next time," after the observed individual lost a tennis match)" (Leblanc et al., 2003, p.254)
- Tacting the future occurrence of another person's behaviour based on accompanying public events, collateral responses and private events

The verbal community

- Children are taught to describe their own private experiences by the verbal community observing the public accompaniments (broken toy) or a collateral response (crying)
- Similarly observed circumstances in others may then lead to attributing a similar private event and to tact the future occurrence (predict) of behaviour

Skinner, 1953, 1957

Observation, description, prediction…

- Predictions about behaviour of others based on:
    1. Observations and descriptions of the behaviour of a specific individual in similar situations
    2. Observations and descriptions of the behaviour of many different people in similar situations
    3. Observations and descriptions of one's own behaviour in similar situations

Spradlin & Brady, 2008

A primary autism deficit: social

- Fundamental role of the social community in establishing tacting of private events in early childhood.
- “Theory of Mind” may therefore result from extensive experience of social interactions and consequent acquisition of complex overt and covert verbal behaviour through social reinforcement (i.e., from early childhood, the speech of, and interactions with, others function as conditioned reinforcers).

Impact of social reinforcement

- Altered social stimuli salience, insensitivity to social stimuli
- If interaction with other people is not a source of reinforcement, behaviour such as looking at people, reading the facial expressions of others, seeking their attention, developing language to interact with them, and responding in socially appropriate ways to their changing behaviour, is likely to be deficient (Lovaas, Berberich, Perloff, & Schaeffer 1966).

Perspective taking

- To develop effective procedures however, we must be able to generate an analysis of the controlling variables and a sequence of developmental steps or skills that can be established throughout intervention.

- **In behavioural terms, taking another's perspective (or having a "theory of the mind") can be viewed as tacting the variables that are controlling that person's verbal and/or non-verbal behaviour**

Autoclitic: tacting sources of control

- To be able to engage in such verbal behaviour, we must first have learned to tact the verbal or non-verbal stimuli that evoke what we ourselves say and do (e.g., “I know Daddy is washing the dishes because I can hear the plates rattling”).
- As a result of extensive personal experience of such behaviour, we will have learnt to tact the future probability of another person’s verbal or non-verbal behaviour by contacting an event that shares common properties with our own previous experiences (e.g., “Molly thinks her Mummy is washing the dishes because she can hear the plates rattling”).

Teaching component verbal behaviours

- Emotions
- Inferences
- Seeing leads to knowing

Skills targeting verbal responses about the controlling variables (visual, auditory) for another person's private event and/or public behaviour

A general framework: overall objectives

	Beginner	Intermediate	Advanced
Social	People need to become S^Ds for delivery of S^Rs: Eye-contact as CMO-T and joint attention	Attention and shared activities as S^Rs: reciprocal commenting and comment extensions	Verbal interaction as the S^R: conversation
Verbal: function & structure	Conditional discriminations: visual and unmediated selection (receptive) Communication: mands Establishing basic noun and action vocabulary: tacts and receptive Generalised imitation Naming Structure: single words	Tact and intraverbal conditional discriminations: objects and ongoing events Listener (mediated selection, jointly controlled responding) Relations between nouns: and classes (categories), and actions (functions), and nouns (parts), properties (adjectives) Descriptions (tacts of compound stimuli): events and objects Structure: basic utterance (SVO, articles, and agreements)	Tact and intraverbal conditional discriminations: general topics and past events Descriptions of past events (remembering) Abstract reasoning: predictions, inferences, temporal relations/sequences Problem solving and tacting private events of others (Theory of Mind) Structure: Multi-clause, connected sentences (discourse)
Academic	Drawing imitation and colouring	Textual (decoding), taking dictation, number/quantity relations	Story comprehension and story writing, maths, word problems, sums

Advanced teaching objectives

- Beyond talking about public events
- Establish abstract reasoning and problems solving: initially at a factual level
- Establish the verbal behaviour of own private events
- Establish the verbal behaviour of perspective taking (others private events and their effects)

Prerequisites

- Eye contact as a social vehicle (joint attention)
- Divergent control and tacting complex stimuli (descriptions) – explaining what others do
- Personal and possessive pronouns
- Temporal concepts (i.e., before, after, first, then, last)

Emotions: tacting the private event and public accompaniment

- Collection of responses with elicited and operant components
- Establish tact of own emotion: seize the moment!
- Verbal description of own emotion and public accompaniment in the absence of the event
- Prediction of others private event based on public accompaniment (also auditory)
- Prediction of future action

Establish the vb of emotions (1)

Learning the vocabulary on self (not others): Tacting own private events that correspond to specific public events.

The child's toy breaks (antecedent and public event 1) child cries (child's behaviour and public event 2 for mother) teacher actively tacts the private event "oh you are sad" and the public event "your toy is broken". And then actively teaches the response to the question "how do you feel" "sad" why? "because my toy is broken", this way the teaching of the tact matches the potential private change that we conventionally call sadness (because those are the public signals we have learned to tact with such word) at the time of the event that is correlated with it.

Establish the vb of emotions (2)

- Intraverbal control: recall private event in the absence of the event based on verbal account of public event.
- Having established a strong repertoire of step 1, teacher proceeds to ask questions related to those events: how did you feel when your toy was broken?
- Prediction (generalization): So, How would you feel if your new Wii game was torn? How do you feel when you got the car you wanted for your birthday? And so on…

Establish the VB of emotions (3)

- Tacting the public event and predicting the private event of others. Having learned to tact his own private event, to tact/predict the private event of another based on properties of the public event that are common to his own experience or verbal repertoire.

Objective		Description	Absent Emergent Achieved
2	Tacting own emotions: Tells how s/he feels as the event occurs and tells why	I am cross because my game is not working	
2	Tells how certain events make him feel	I get cross when my game doesn't work	
2	Predicts own emotion based on possible event	If I got a new game I would be happy	
2	Infers emotion of a third party based on public event	The boy is happy because he is eating an ice-cream	
3	Predicts emotion of a third party based on that person's public event and personal information (no picture)	Adult tells the story: Mark really likes insects. For his birthday his parents buy him a special jar in which to put insects he might find in the garden and a magnifying lens. How do you think he feels? Why?	
3	Uses more complex emotional terms	Satisfied, anxious, worried, content, frightened	
3	Tacts emotion based on changes in tone of voice	Adult says a neutral phrase (e.g. the car is blue) with different tones of voice.	
3	Matches tone of voice to sentence	Reads dialogue with matching tone of voice. Matches tone of voice to sentence.	
3	Offers alternatives to change someone's emotion (and own)	What could mum do to make Sarah happy?	
3	Empathy: reacts appropriately to others events and expressions (real life)		

Early Behavioural Intervention Advanced Curriculum Checklist (degli Espinosa, 2011)

Inferences: how do you know?

- Drawing the inference (tact of the event)
- Explaining how one knows: learning to tact the source of stimulus control for the previously generated tact
- Thematic prompting rather than echoic
- The importance of tacting the source of stimulus control:
  - Because I can see
  - Because I can hear

  (will then become, because she can see/hear; can't see/can't hear; seeing/hearing leads to knowing)

Objective		Description	Absent Emergent Achieved
2	**Cause and effect - why/because factual**	Why do you use an umbrella	
2	**Why/because events and intentions**	Why did he come back to the house? To get the umbrella	
2	**Discriminates between true/false, possible/impossible**	A banana is blue (false). A pig can fly (impossible)	
2	**Simple inferences - visually or auditory based**	What is dog doing? Scratching at the door. What does he want to do? Go out. How do you know he wants to go out? Because I SEE that he is scratching at the door.	
2	**Simple inferences - intraverbal**	I have a hose in my hand and am looking at a house on fire. Who am I? Why do you say that?	
3	**Story-based inferences - concrete information**	When the whistle blew, the children jumped and because I was close by I got wet. Where are the children? What are they doing? How do you know?	
3	**Private events inferences**	She held the register in her hand and was walking crossly in the corridor. When they saw her the children ran back to their classrooms.	
3	**Predictions - do**	It's dad's birthday. His favourite sweet is chocolate. What will mummy do?	
3	**Predictions - say**	It's dad's birthday. His favourite sweet is chocolate. Mummy goes to the bakery, what will she say to the baker?	
3	**Predictions - think**	It's dad's birthday. His favourite sweet is chocolate. Mummy goes to the supermarket and sees some chocolate bars, what is she thinking?	

Objective		Description	Absent Emergent Achieved
2	**Problem solving direct experience**	When IPAD turns off, checks if out of charge. When pen stops working, see if ink has run out.	
2	**Problem solving - tact**	As above, but with video or pictures	
2	**Problem solving - no visual**	Short story where character has a problem. Child identifies the problem and generate possible solution	
2	**Complex social problem solving**	Jane finds a wallet on the floor…	
2	**Predictions: third party private event - story based**	Sarah is very shy, she doesn't like going to places with lots of people. Her friend invites her to her birthday party… What do you think she will do/say/think?	
3	**Predictions: same event, multiple people**	Jane invites her friends to her party. Mary loves chatting and meeting new people. Sarah is very shy. What will Mary say/think/do? How about Sarah? Why?	
3	**Guiding (seeing/not seeing)**	Guides someone who is blindfolded across an obstacle course. Guides someone across an obstacle course using gestures	
3	**Problem solving direct experience**	When IPAD turns off, checks if out of charge. When pen stops working, see if ink has run out.	
3	**Problem solving - tact**	As above, but with video or pictures	
3	**Problem solving - no visual**	Short story where character has a problem. Child identifies the problem and generate possible solution	

2

A **Ben has just cleared the table. He is standing by the sink and the hot tap is turned on.**

1. What is he going to do?
   (a) wash up
   (b) cook the dinner
   (c) wash some clothes
2. Is he in the kitchen or the bathroom?

B **Liz has a pen in her hand. There is some paper, an envelope and a stamp on the table.**

1. What is she going to do?
   (a) eat an apple
   (b) write a letter
   (c) read a paper
2. What will she write on the envelope?

C **A man is in a bus. He is holding out some money to a man who is standing in front of him.**

1. What is he doing?
   (a) buying a book
   (b) reading a paper
   (c) paying his fare
2. Is he facing the front or the side of the bus?

10.

As they sat round the fire eating cakes & sandwiches the radio was switched on. Soon their feet were tapping, and looking round, Father saw three happy, smiling faces.

As they listened they forgot the weather, except when an extra heavy gust rattled the windows.

Questions:

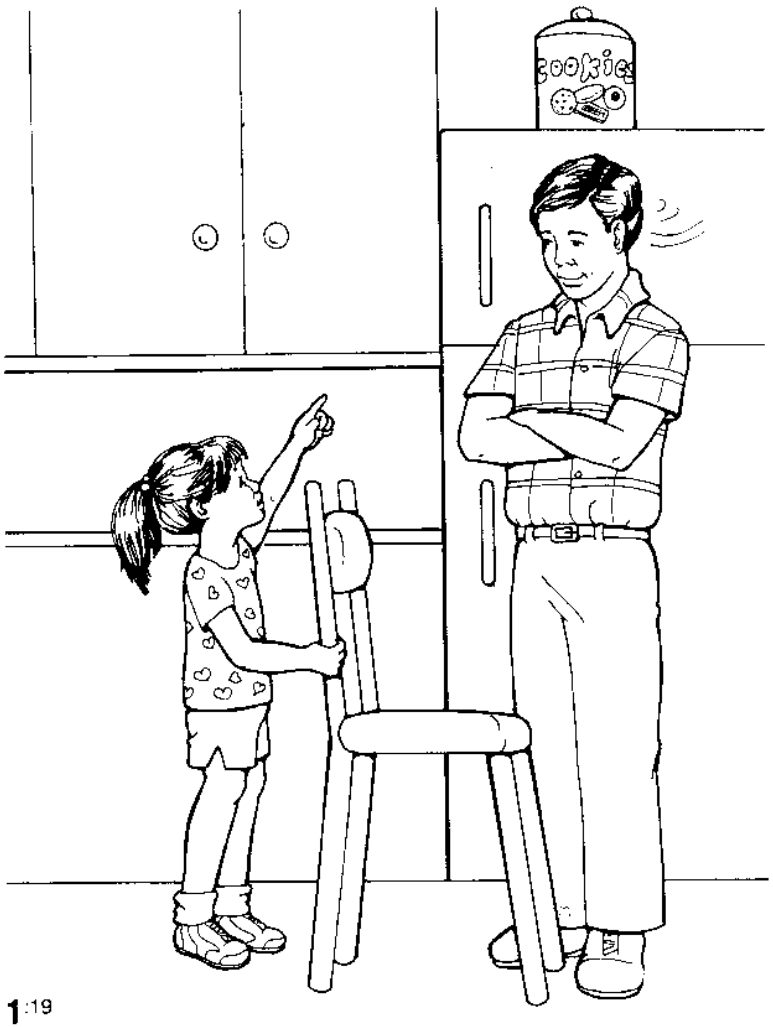
1. What time of day do you think it was?
2. How many of them were there?
3. Why weren't they playing out-side?
4. What was making their feet tap?

11.

When the teacher came to David, he stopped and looked carefully. "Sky isn't all blue, you know. There's some white in it. The same is true of the sea; it is more green than blue, as a general rule. I like the boat; you might have coloured those sails. They could be blue, or orange, and you might have put a few more birds in."

Questions:

1. What lesson was this?
2. What colour did David do the sky?
3. What colour did he make the sea?
4. What colour did he make the sails?
5. Were there any birds in it?

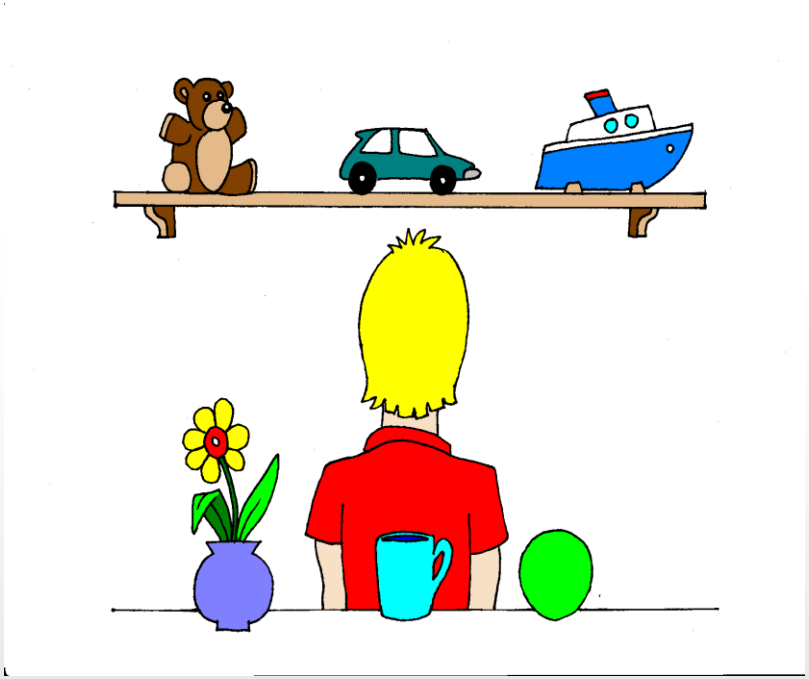


1:19

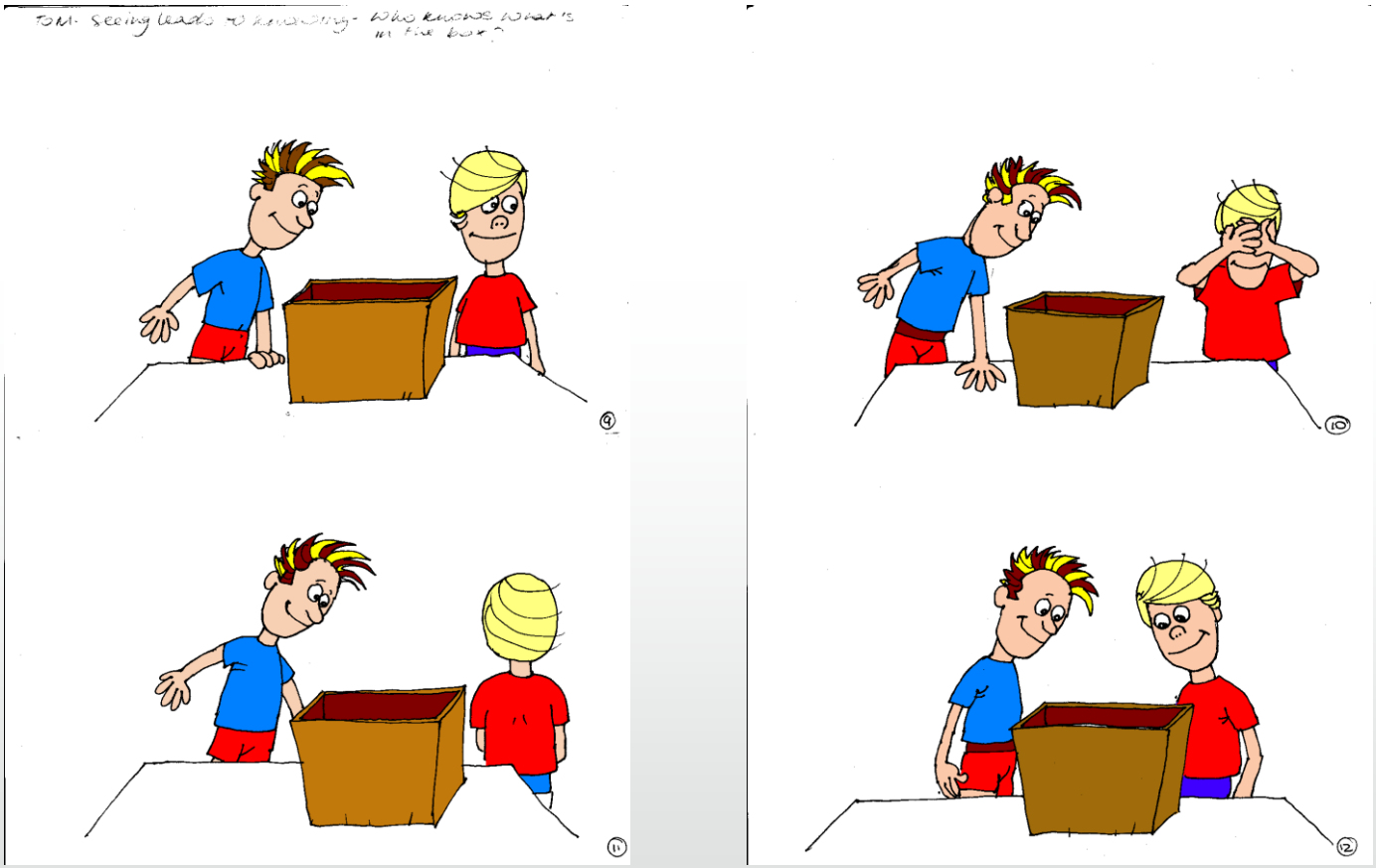
Seeing or hearing leads to knowing

- Issues with changes in stimulus control
- Tacting the public event
- Was the person present? (could she see, hear or did someone tell her?)
- Prediction of future event

Seeing vs not seeing – not seeing but knowing



Seeing leads to knowing: who is looking? Who knows?



	Objective	Description	Absent Emergent Achieved
3	**Visual perspective taking**	Tells what someone can and can't see based on their positions.	
3	**Visual perspective taking**	Tells how someone is seeing something (a 9 and a 6)	
3	**If you were me and I were you**	If you were sitting in my chair, what colour would your chair be? If I were you what number would it be to me? (6/9)	
3	**Seeing leads to knowing - not seeing - not knowing**	Who can see in this room, who can't see? Who knows what colour is the thing you are holding right now? Why?	
3	**Hearing leads to knowing - not hearing, not knowing**	As above but with hearing	
3	**Theory of mind games**	Playing tricks	
3	**Theory of mind stories**	Stories with false belief and deception	

Strange Stories (Happe', 1994)

- Late one night old Mrs. Peabody is walking home. She doesn't like walking alone in the dark because she is always afraid that someone will attack her and rob her. She is really very nervous! Suddenly, out of the shadow comes a man. He wants to ask Mrs. Peabody what time it is, so he walks towards her. When Mrs. Peabody sees the man coming towards her, she starts to tremble and says, "Take my purse, just don't hurt me".
- Was the man surprised at what Mrs. Peabody said? Why did she say that, when he only wanted to ask her the time?

Analysis derived from application

- A comprehensive analysis of the controlling variables remains limited.
- Demonstration of the controlling variables will be in the procedures employed in successfully producing changes in behaviours that are described as demonstrating the presence of Theory of Mind in those who lack it.

Thank you!

degliespinosa@gmail.com