The Theory of Mind Test (TOM Test)

Developed 1999 by Muris, Steerneman, Meesters, Merckelbach, Horselenberg, van den Hogen & van Dongen
Formatted 2013 by Karen L. Anderson, PhD, Supporting Success for Children with Hearing Loss

Theory of mind pertains to children's capacity to analyze the behavior of others by recognizing mental states (desires and beliefs) that underlie intentional and social behavior. It consists of various aspects, such as the recognition of emotions, the assessment of how others think, and understanding the motives underlying behavior of others. The TOM Test was developed to measure this broad range of aspects from a developmental perspective. As children grow older, their theory of mind develops and they pass more TOM Test items. One expects that younger children will primarily use TOM items that tap the basic domain of theory of mind, whereas older children should increasingly pass items that measure the more aspects of theory of mind. Because the TOM Test is informative about the development phase of children's theory of mind, it enables teachers to tailor their intervention to specific problems for each child. For example, when the TOM Test indicates that a child fails on items that measure precursors to theory of mind (TOM 1) it would be futile to teach this child understanding of false beliefs. The TOM Test can also be used to evaluate the efficacy of intervention.

The TOM Test can be used with children **between the ages of 5 and 12 years** to screen for deficits in theory of mind. It consists of stories about which the child has to answer a number of questions and takes approximately 35-minutes to administer. When administering the items place a piece of paper over drawings on the page, other than the item you are currently administering to the child.

Subscales of the TOM Test

I. **Precursors of Theory of Mind = TOM 1**
Children attribute needs, emotions, and other mental states to people and use terms such as 'know', 'remember', and 'think.' They understand that certain stimuli lead to behavior, and that mental states can be inferred from stimulus-behavior links. For example, if someone lost their dog they would be worried, not happy.
   a. Recognition of emotions
   b. Pretense

II. **First Manifestations of a Real Theory of Mind = TOM 2**
Children recognize that the mind is separate from and differs from the physical world. They realize that a person can think about an object even though the object is not physically present. They also learn that the mind can represent objects and events accurately or inaccurately. They realize that a representation can be false with respect to a real object or event (false belief task, i.e., Item 5), behavior can be false with respect to a mental state (e.g. when a sad person smiles, i.e., Item 4), and two people's perceptual views or beliefs can differ (perspective taking, i.e., Item 1).
   a. First-order belief
   b. Understanding the belief

III. **More Advanced Aspects of Theory of Mind = TOM 3**
Children learn to understand that the mind actively mediates the interpretation of reality. They recognize that prior experiences affect current mental states which in turn affect emotions and social inferences (i.e., Items 6, 9)
   a. Second-order belief
   b. Understanding humor

Complete information at: Muris, P., Steerneman, P., Meesters, Merckelbach, C. , Horselenberg, R., van den Hogen, T. & van Dongen, L. (1999). The TOM Test: A new instrument for assessing theory of mind in normal children and children with pervasive developmental disorders. *Journal of Autism and Developmental Disorders,* Vol. 29 (1), p. 67-78. http://www.autism-community.com/wp-content/uploads/2010/11/TOM-Test-Relibility.pdf

Some Background About Theory of Mind

Other types of behavior that require theory of mind:

- **Intentionally communicating with others** Here, communication refers to the acts undertaken to change the knowledge stateof the listener. A dog who is barking at a cat may not intend to change the knowledge state of the cat, but simply to make the cat run away. To intentionally inform others requires the belief that others have minds that can be informed.
- **Repairing failed communication** It requires a theory of mind to understand that a message may not be understood and the message needs to be communicated again in a different way.
- **Teaching others** When teaching one wants to change the knowledge state of a less knowledgeable listener.
- **Intentionally persuading others** Persuading is changing someone else's belief about something. Although the goal is often to change the behavior of the other, it is realized by changing the belief and intention state of the other.
- **Intentionally deceiving others** As above, intentionally deceiving others has as goal to change the belief state of the other. In contrast, an animal with camoflage, whose appearance saves it from being eaten by a predator, is not engaging in a deception that requires theory of mind.
- **Building shared plans and goals** When sharing a goal with another person, both must recognize the intention of the other and work out how to coordinate their actions with those of the other to achieve the shared goal. Animals hunting in packs may seem to work together, but often they fail at building shared plans and goals.
- **Intentionally sharing a focus or topic of attention** Looking at the same target at the same time is not shared attention if each is only aware of his own point of view. Shared attention requires a theory of mind only if both individuals are aware of the other being aware of looking at the same target.
- **Pretending** is to temporarily treat an object as if it were another, or as if it had attributes that it clearly does not have. It requires theory of mind in the sense that the pretender has to switch between thinking about his own knowledge of the real identity and the pretend identity.

From: http://www.rinekeverbrugge.nl/PDF/Supervisor%20for%20Masters%20Students/ThesisLisePijl%20(1).pdf

The Sally-Ann Story: A classic false-belief task that children should pass around the age of 4.

Sally places her marble in a basket, covers the basket and departs. After Sally has departed, Ann moves the marble from the basket and places it in the box. The subject is then asked where Sally would look for the marble when she comes back. To pass this task, the subject must attribute a false belief to Sally that the marble is in the basket and predict her to look there. Around at the age of 4, children become able to pass this task and also show in a variety of other tasks, that they have developed an ability to understand others' mental states (Level II).

Level II - Example First order belief: The story is about John and Mary, who are both interested in the location of an ice-cream van. They are both at the park when it is announced that the van will stay in the park for the afternoon. However, when Mary is on her way home and John is still at the park, it is announced in the park that the van will be at the church for the rest of the day. So, Mary does not know that the ice-cream van moved to the church. Where does Mary go when she wants to get an ice cream? If we use our theory of mind capabilities, we would answer that Mary will go to the park. After all, she does not know that the ice-cream van moved to the church. She thinks the van is in the park.

Level III - Example Second order belief: When Mary is on her way home, she meets the ice-cream van at a stop light. Mary asks the driver where he is going and he answers that he will be at the church for the rest of the day. Where does John think Mary thinks the ice-cream van will be during the rest of the day? John does not know that Mary knows that the van will be at the church. He believes that Mary believes that the ice-cream van is still at the park. Therefore, we think that John will think that Mary thinks that the ice-cream van is still at the church. This is an example of second-order theory of mind or second-order belief attribution, because we have to access two mental states (John's mental state of Mary's mental state) to answer the question.

Humor (Level III): Mind Reading Hypothesis suggests that all humor involves an observer reading the mind of the target of humor and making the observation that the target of humor resolves "the collision between old perception and new reality." Surprise Theory: Listeners are led to expect one outcome, but encounter an unexpected outcome, which they must make sense of (i.e., My wife and I were happy for twenty years. Then we met. – Rodney Dangerfield). Incongruity Theory: Incongruity occurs when an observed situation contains some aspects that are not expected to occur together (i.e., When I was growing up, we had a petting zoo, and well, we had two sections. We had a petting zoo, and then we had a heavy petting zoo. For people who really like the animals a lot. – Ellen DeGeneres). From: http://www.epjournal.net/wp-content/uploads/ep01214253.pdf

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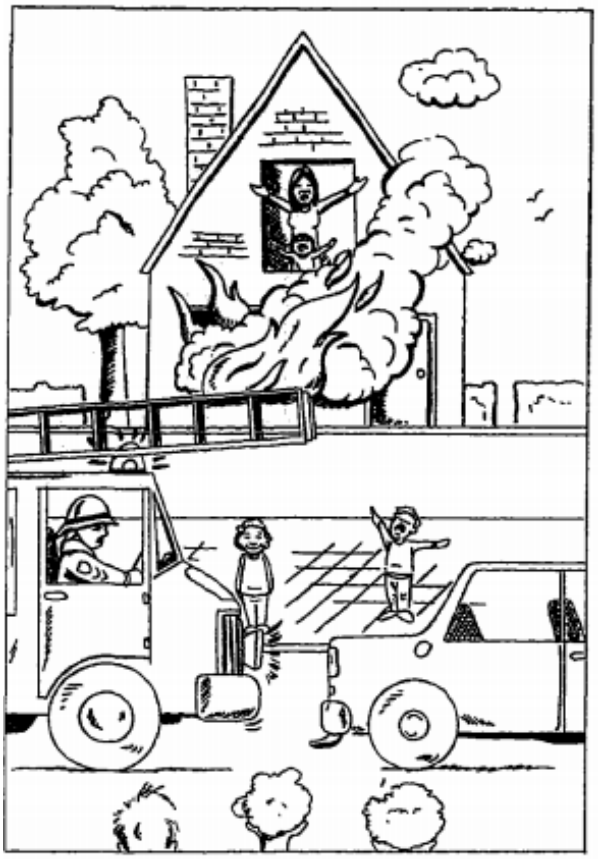
The Theory of Mind Test (TOM Test) Items Show drawing as you present questions. Cover all items not currently presented

Item 1



Item 2

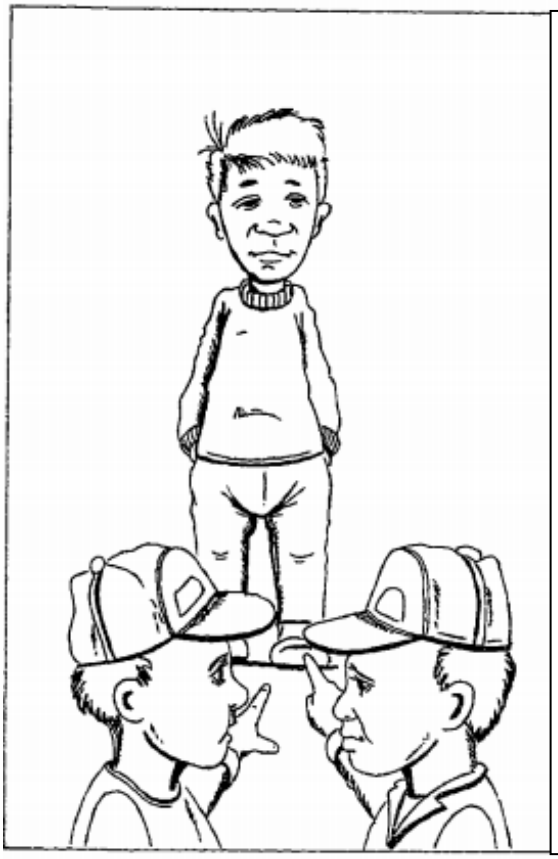
I will read you a short story.
Listen carefully.

Story:

Pat is one year old. He's at home, playing on the floor. Mother has given him a piece of apple. Suddenly, Pat bites his lip and he starts to cry. He throws the piece of apple on the floor. Mother lifts Pat up, comforts him, and puts the piece of apple on the table.

When father arrives at home, mother is on the phone. Father lifts Pat up and hugs him. Then he puts Pat back on the floor, and gives him the piece of apple which is still lying on the table. As soon as Pat sees the piece of apple he starts to cry.

Item 3



Story Item 3:

The two boys in the foreground gossip about the other boy.

Suddenly, the boy approaches them and hears what they are saying.

The two boys are startled.

Item 4

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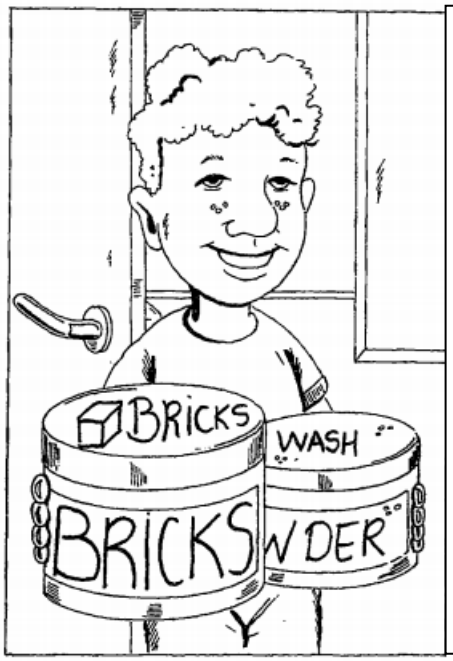
Item 5

Item 5



Story for Item 5:
This is Ben. Ben wants to play with his bricks (blocks).
READ QUESTION 5-1 before going on
Ben opens the box of bricks and surprisingly he finds out that it is filled with washing powder (laundry soap). He closes the box and opens the other smaller box. There are his bricks! He takes out some bricks and goes to play with them in his bedroom. Then his brother Tim is entering the room. Tim also wants to play with bricks…

Item 6

I will read you a short story. Listen carefully.
Story: Father and mother are at a birthday party. They only know a few people, and think the music is too loud. "Wow" says father, "It's a pleasure to be here!"

Item 7

Pretending different actions. **Read questions to student.**
Combing hair; brushing teeth; feeling cold; feeling scared.

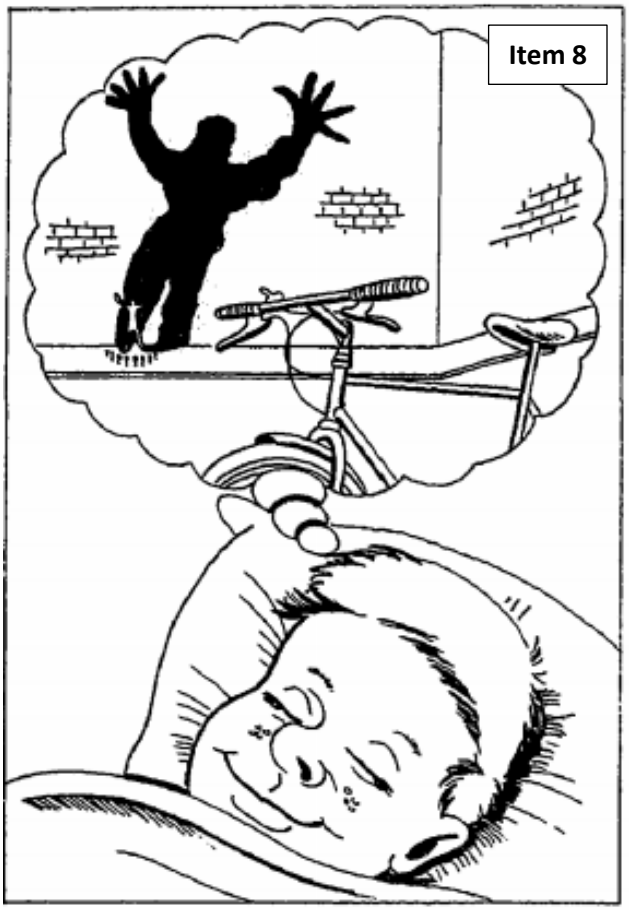
Item 8

I will read you a short story. Listen carefully.
Story for Item 8: This is John. John often dreams. Sometimes he dreams about a new bike that he would like to have.
READ QUESTION 8-1 before going on
Sometimes John has a frightening dream. Then he dreams about shadows.

Item 9

I will read you a short story. Listen carefully.
Story: It is summer. Will and Mike are on vacation. They go out for a bicycle ride. Suddenly, there is a downpour and they have to find shelter in a bus station. There are two men in the bus station who also shelter from the rain. One of the men remarks, "Wow, we have nice weather today!"

Item 8



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Student name_____ **Date**_____ **School**_____ **Evaluator**_____

Show item drawing and/or read story, then present item questions below. Test administrator determines answer appropriateness.

Question#	**If the student has answered correctly, circle the X under the TOM stage.**	TOM 1	TOM 2	TOM 3
1-1	What has happened? Can you tell me something about it? *(describe fire and people)*	X		
1-2	Who in this picture is afraid? *(mom and child in house)*	X		
1-3	Why is this person afraid? *(house is burning, they are trapped)*		X	
1-4	Who in this picture is happy? *(boy looking at fire truck)*	X		
1-5	Why is this person happy? *(he likes fire trucks)*		X	
1-6	Who in this picture is sad? *(boy in front of house waving at fire truck)*	X		
1-7	Why is this person sad? *(fire truck is not putting the fire out yet, people in danger)*		X	
1-8	Who in this picture is angry? (*fire truck driver*)	X		
1-9	Why is this person angry? (*car in the way*)		X	
2-1	Why is Pat crying when father gives him the piece of apple? *(bit his lip eating apple)*	X		
2-2	Does father know why Pat is crying? *(no)*		X	
2-3	Does father know that Pat has bitten his lip when he wanted to eat the apple? *(no)*		X	
3-1	What do you think is happening in this picture?	X		
3-2	How does this boy feel (boy in background)? *(sad, etc.)*	X		
3-3	How does this boy feel (one of boys in foreground)? *(surprised, ashamed, etc.)*	X		
4-1	What has happened in this picture? *(girl has fallen down and hurt his knee)*	X		
4-2	How do you feel when you hurt yourself? *(in pain, sad)*	X		
4-3	Can you see from the girl's face how she really feels? *(she looks happy, laughing, etc.)*		X	
4-4	Is it possible to look happy, when you have hurt yourself? *(no)*		X	
5-1	Which box will Ben open to play with his bricks (blocks)?	X		
5-2	Which box will Tim open to play with his bricks (blocks)?		X	
5-3	Do you know where the bricks (blocks) really are?		X	
6-1	What does father mean? *(sarcasm)*			X
6-2	Why does father say: "It's a pleasure to be here!" *(sarcasm, saying opposite)*			X
7-1	Pretend to comb your hair.	X		
7-2	Pretend to brush your teeth.	X		
7-3	Pretend to act as if you are feeling cold.	X		
7-4	How can I see that you are feeling cold?		X	
7-5	Pretend that you drinking something that tastes nasty.	X		
7-6	How can I see that you think it tastes nasty?		X	
7-7	Pretend that you are scared.	X		
7-8	How can I see that you are scared?		X	
	Total of correct (circled) responses for each TOM stage for Items 1-7.			

Continue to next page for questions to Items 8 and 9.

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Student name_____ **Date**_____ **School**_____ **Evaluator**_____

Present the questions below to the student. The test administrator decides if student answers are appropriate/complete.

Question#	**If the student has answered correctly, circle the X under the TOM stage.**	TOM 1	TOM 2	TOM 3
8-1	Is John able to touch the bike that he dreams about?	X		
8-2	Does John really see these shadows with his eyes?	X		
8-3	Can somebody else see the shadows or the bike of John's dreams?	X		
9-1	What does the man mean?			X
9-2	Is it true what the man says?			X
9-3	Why does the man say: "Wow, we have nice weather today!"			X
	Total of correct responses for each TOM stage for Items 1-7. Assign 0 for incorrect and 1 point for correct.			
	Transfer total of correct (circled) responses for each TOM stage for Items 1-7 from prior page.			
	TOTAL OF EACH TOM STAGE			
	Add the totals of each TOM stage together for the TOTAL TOM TEST SCORE			

The Theory of Mind Test (TOM Test) Interpretation

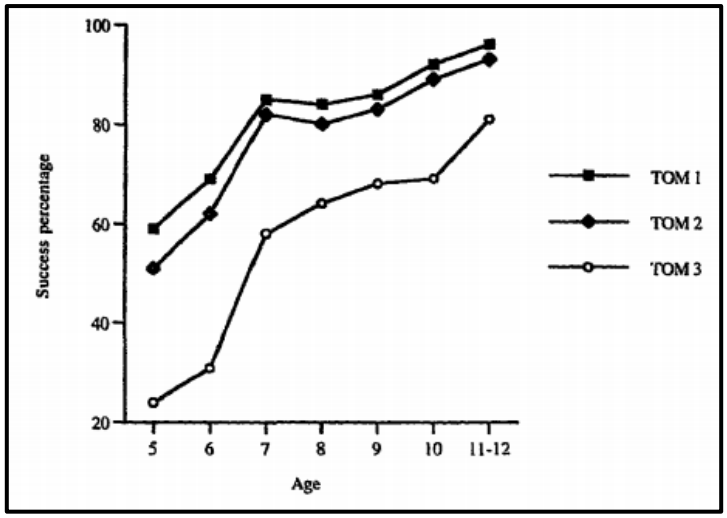
Total all questions answered correctly. Score range = 95% confidence interval. A child with typical development of theory of mind will have scores that fall into the specified score range for their age group.

Age 5-6		Age 7-8		Age 9-10		Age 11-12	
Mean	Score Range	Mean	Score Range	Mean	Score Range	Mean	Score Range
32	28 - 36	47	45-50	50	47-53	53	50-56

Score range of typically developing children of the student's age is_____

Student's score is_____ **The student's score is in the appropriate development range: YES NO**

Plot the students score for each TOM stage on the graph as a visual comparison of student theory of mind as compared to typically developing age peers. Using the test examples of each item missed and the descriptions of the TOM stages, integrate TOM activities in the delayed skills areas into conversations with students.



The success percentage by age chart was based on 10 typically developing children at each age range. The original TOM Test had acceptable psychometrics for use as an assessment to indicate relative performance of a child in comparison to typical age peers. Refer to the article for more information. The score range for examples provided and 95% confidence levels were calculated based on the information provided.

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