What is Theory of Mind?
- The ability to understand the thoughts and intentions of others (mental states)
- Perspective taking
- Determines how an individual acts and reacts

Deficits in Theory of Mind
- Social Impairment
- Poor communication skills
- Difficulty with:
  - Providing adequate information
  - Commenting on conversation
  - Organizing thoughts
- Inability to take another’s perspective, predict outcomes and decipher intentions

Rationale of Theory of Mind
- System of inferences that cannot be directly observed
- Product of experience, not direct teaching
  - Studies attempting to teach Theory of Mind were not successful
- False belief tasks created to infer child’s beliefs

Prerequisites to Theory of Mind
- Child must understand that individuals can have desires
  - Joint Attention
  - Protodeclarative pointing
- Children begin to use mental state terms such as “think,” “know,” “want,” and “remember”
- Occurs between the ages of 3 and 4 years
- Pretend play skills and metarepresentation
- The previously mentioned prerequisites to theory of mind may be absent in children with ASD and Asperger syndrome
- Thus, theory of mind development is delayed

Continuum for desire and belief understanding
1: Child talks about desires for objects and actions
2: Child talks about beliefs, thoughts and desires
3: Child realizes that individuals have their own beliefs, and this explains why an individual acts a certain way

Literature Review
- Previous research has indicated that children with specific language impairment can pass theory of mind tasks
• Language skills are not thought to be crucial for successful completion of theory of mind tasks

**First-order false belief task**
• Requires child to think about another individual’s thoughts about an external event
• Normally developing children should be able to pass these tasks at 4 years of age
• Change in location task (task #1)
• Appearance-reality task (task #2)

**Second-order false belief task**
• The child must think about a second individual’s thoughts about a third individual’s thoughts about an objective event (task #3)
• Normally developing children should be able to pass these tasks between the ages of 6 and 7
• Mary believes that John believes that the ice cream van is in the park, even if the ice cream van is not in the park

**Scoring of justification responses**
• How the child formulated the answer to the second order false-belief task
• **Score of 0:** Participant uses a zero-order strategy
  • Response that amended the story, inadequate information, reference to John’s motives
• **Score of 1:** Participant uses a first-order strategy
  • Reliance on the current location of the ice-cream man
• **Score of 2:** Participant uses a second-order strategy
  • Belief-belief (“She doesn’t know the John knows the ice-cream man is at the fire station”)
  • Belief-information (“Because she doesn’t know that John talked to the ice-cream man”)
  • Initial-location (“Because he said he would go back to the park after he got his money”)

**Theory of Mind and Autism**
• Previous literature suggests that 15% to 55% of children with autism studied can pass first order false-belief tasks
• Fewer children with autism can pass second order false-belief tasks
• Children with autism required a higher verbal ability and chronological age to pass tasks

**Theory of Mind and Asperger syndrome**
• Differences between Autism and Asperger syndrome
• Research has shown that if children can pass first and second order false-belief tasks, the justification may not be appropriate and mental state terms (know, believe) may not be used
• Difficulty generalizing tasks to everyday situations, leading to social impairment

**Is Theory of Mind unique to Autism?**
• Maybe not, but the severity of the deficit is
Research involving deaf children and the parent’s mode of communication
Research involving individuals with mental retardation
Environmental factors

Research Questions
- Do children with Asperger syndrome differ in their performance of first and second order false-belief tasks?
- Are students with Asperger syndrome able to reason sufficiently about the thoughts of a third person?

Subjects
- 8 male students
- Between the ages of 7;0 and 11;11
- Medical or educational diagnosis of Asperger syndrome
- IQ of at least 85
- Normal hearing
- Students were recruited from Radford University Speech-Language Hearing Clinic and local school districts in Southwest VA

Results
- Performance on First-order false-belief task (#1) by children with Asperger syndrome
  - Percent answered correctly: 100%
  - Justification question: 50%
- Performance on First-order false-belief task (#2) by children with Asperger syndrome
  - Percent answered correctly: 100%
- Performance on Second-order false-belief task (#3) by children with Asperger syndrome
  - Percent answered correctly: 37.5%
  - Justification question: 0%
  - Quality of Justification question: 37.5% used first order strategies, 62.5% used zero order strategies

Examples of justifications from children with Asperger syndrome
- “Mary would think John is at the fire station because that is where the ice cream man is now”
- “Mary would think John is at the fire station because he asked for some ice cream”
- “Mary would think John is at the park because the girl probably thought that the ice cream man would come back to the park after he went to the fire station”

Analysis of results
- Effect of:
• Chronological age
• IQ score
• There does not appear to be any patterns

**Why the difference in performance?**

• Linguistic factors
  • Language content: semantic information
  • Language form: syntax, morphology, phonology
  • Language use: violations of Gricean principles
  • Subjects may not have been able to self-monitor their responses
• Memory recall
• Abstract thinking
  • Children with Asperger syndrome are literal thinkers
• Metacognition
  • Ability to think about one’s thinking
  • What additional information needs to be obtained to meet a goal

**Implications for Treatment**

• Think about the thinking process
  • Outline the steps on paper
• Having the thought processes modeled by peers, adults and interventionists
• Prompts given to think about the thought process
• Managing themselves
  • Using what information they already know
  • Making pictures in their mind
  • Distinguishing point of view
  • Listening for meaning
  • Learning by doing
• Managing tasks
  • Outline problem solving
  • Organizational skills
• Cooperating with others
• Group therapy
  • Role play explanations
• Transfer of learning
  • Whether learning for one scenario will transfer to another is unknown

**References**