

Anarchic paw slide – Video of dog with alien paw. Discuss but don't explain what it's shown.

In order to be able to function in society we need to be able to our understanding of the world around us.
What might happen if we don't? – Inappropriate behaviour, unable to show restraint, poor social relationships.

What is Executive Function slide

An example of the distinction between automatic and controlled actions is of going upstairs to change clothes, and then find yourself getting into bed instead. This is called a slip of action where something that was meant to be done is overridden by an automatic, habitual behaviour.

What examples can people think of?, – e.g. mean to phone one person but dial another friend's; writing last year's date at the beginning of a new year; etc..

What is the game Simple Simon teaching a child? – Teaches executive control.

How does it teach this? – By learning to inhibit habitual responses when they are told to do something, but Simon didn't tell them.

What other games might be played with children to help them develop executive function? – e.g. pass the parcel.

What is Working Memory?

It is related to the planning aspect of executive function – **Tower of London slide**

On a day-to-day basis what do we naturally inhibit? – e.g. when we focus on something we can block out a lot of other stimuli, e.g. background sounds, etc..

How differently would you behave? – e.g. impossible to achieve a task, constantly flitting from one thing to another.

What would life be like if you couldn't block these stimuli?

Stroop Test slides - Use the stroop test to explore people's ability to inhibit.

What earlier part of the course looked at a child's ability to inhibit? Think of Piaget. Think of the A-not-B error. Think of when the infant saw an object being hidden under A and then moved to be under B, yet they looked under A first. However this could be due to an inability to switch search strategy, i.e. cognitive inflexibility, rather than inhibitory control, i.e. they look where they have previously found the object.

Discuss the dog video at the beginning of this section.

Discuss the concept of a jug of water and a glass.

Discuss the concept of alien hand.

Wason's selection problem slide. Do it for fun but get them to consider what abilities/skills are used to solve it.

Chapter 6 – Understanding minds

Premack & Woodruff (1978) showed an adult chimpanzee a series of videotaped scenes in which an actor struggled with problems of different kinds. Some of the problems appeared simple, such as trying to get hold of bananas that were out of reach. Others were more complex, such as trying to escape from a locked cage. For each scene the chimp was presented with two photographs that showed different actions, only one of which was an effective solution to the problem. So, for the scene in which the actor was locked in a cage, the chimp was presented with a photograph of a key and a photograph of a solution to a different problem, for example, a stick to get the out-of-reach bananas. On the overwhelming majority of occasions the chimp selected the 'correct' solution.

What does this tell us?

They concluded that the chimp 'understood' the actor's purpose and therefore 'understood' the contents of the actor's mind.

Dennet (1978) suggests that the chimp doesn't have an understanding of other people's intentions, desires or knowledge. The chimp could've shown that level of success on the task without reflecting on the actor's mental states at all. Instead, the chimp could've solved the problem by drawing on her knowledge of the association between objects in the real world, what is sometimes called external contingencies of objects.

Theory of Mind Definition slide

A distinction needs to be made between reflecting on what a person is thinking or relying on common connections in the world to predict the behaviour. Dennett suggests that the way to make this distinction is to use situations where someone's knowledge about the world is different to the actual state of the world. The Sally/Anne task, which is an *unexpected transfer task*, attempts to do this.

By reducing the linguistic demands of a task, research has found that more younger children got demonstrate a theory of mind.

Sally/Ann Task slide

4 years seems to be the critical age at which children are able to understand the Sally/Ann task. Why?

Because they begin to hold representations of people's mental states. Until then they would rely on the current state of reality.

Do you think different cultures develop Theory of Mind at the same age?

Yes - Avis & Harris (1991) looked at another culture's ability to resolve unexpected transfer tasks. They found similar results.

At about 4 years children begin to be able to meta-represent in that they are able to hold a number of representations concerning a specific situation in their mind at the same time.

If children understand other's false beliefs, can they understand their own inaccurate beliefs of the world?

The Smarties task has been used to test this.

Gopnik & Astington (1988)

- children older than 4 years appreciated that the other person would hold a false belief about the contents of the tube.
- Younger children who are reality-based were not able to appreciate this and would answer 'pencils'.
- When asked about their own, previous false beliefs, i.e. what they thought was inside the tube when they first saw it. The 4 year olds and older reflected on their mental states and answered 'smarties', the younger children said 'pencils' as they remain reality-based and are unable to reflect on their own, previous false beliefs.

Wimmer & Hartl (1991) used a puppet with the Smarties test to ensure that it wasn't embarrassment that caused the younger children to give the incorrect answers. They got the same answers.

Why do we need a theory of mind?

JOKES - With the development of theory of mind, children can then begin to understand jokes that have a double meaning in that they can be *explicit* and also only be understood by reflecting on the teller's *intended* meaning. The same occurs in sarcasm and irony in that by reflecting on an individual's mental state can the true meaning of a sarcastic or ironic comment be identified.

The understanding of jokes, sarcasm and irony requires a *second-order theory of mind*.

First-order theory of mind is the ability to appreciate and reflect on the contents of another person's mind. Second-order theory of mind involves attributing *beliefs about beliefs* or *beliefs about intentions*. An example of this is person B standing with an apple between persons A and C. A is thinking about stealing B's apple. B is thinking that A intends to steal the apple (first-order theory of mind skills). C realises that he can steal the apple from B, because he believes (correctly) that B is preoccupied with thinking about A's intention to steal the apple. C is using second-order theory of mind.

Second-order theory of mind skills are thought to develop at about 6 to 8 years.

Sullivan *et al.* (1995) looked at whether children needed second-order theory of mind skills in order to be able to distinguish lies from jokes. Children aged between 5 and 9 were read four brief stories. Two of the stories looked at their second-order ignorance, e.g. does John know that Mary knows X?, and second-order belief understanding, e.g. what does John think Mary thinks?. The other two stories assessed their ability to tell the difference between a lie and a joke.

They were only able to distinguish a lie from a joke if they could attribute second-order ignorance, but before they could attribute second-order false belief. Therefore, in order to be able to tell the difference between a joke and a lie children need to be able to appreciate and reflect on what different people know or do not know, rather than being able to reflect on the knowledge that people have about other people's minds.

Do enhanced theory of mind skills lead to an improvement in social interactions, or are children who are more socially skilled more likely to develop a theory of mind before those who are less socially skilled?

Jenkins & Astington (2000) explored this question with a longitudinal study of 3 and 4 year olds in 3 sessions over a period of 7 months. They used a series of false-belief understanding tasks. They were also observed in play sessions to assess the amounts of pretend play, joint proposals and explicit role assignments were used. Their performance on theory of mind understanding tests taken during the first recording session predicted joint proposals and role assignment during play in the second session. There was no evidence that social behaviours predicted theory of mind. Therefore it appears that the development of theory of mind skills results in a change in the quality of interactions.

How can the development of ToM be useful to bullies?

It will allow the bully to have an understanding of the victim's mind and therefore be able to target specific weaknesses with more specific strategies.

Sutton *et al.* (1999) examined the level of children's understanding of the emotional and cognitive content of other people's minds and related this to their role in bullying. 'Ringleader' bullies scored higher on both of these measures than 'follower' bullies (those who helped or supported the bully), victims and defenders of the victim.

In addition to the Sally/Anne task and the Smarties task there have other ways in which theory of mind development has been explored:

- Children's everyday behaviour can be observed to look for indications of theory of mind
- The cognitive skills that provide the foundation for theory of mind development can be examined, e.g. joint attention and understanding of intentions
- The relationship between theory of mind development and the environmental factors that might affect this, both positively and negatively

Repacholi & Gopnik (1997) looked at 14 and 18 month olds ability to respond to the desires of an experimenter who preferred either broccoli or biscuits. The experimenter demonstrated the preference and then placed her hand between the bowls and asked 'Can you give me some?'

How do you think 14 month and 18 month olds would respond?

The 14 month olds responded by offering the food they preferred, whereas the 18 month olds gave the experimenter the experimenter's preferred food.

Why? What does this tell us about ToM?

The 14 month olds responded egocentrically, by offering the food they preferred, whereas the 18 month olds correctly inferred that the experimenter wanted the experimenter's preferred food which the child provided even if it did not correspond to the child's preferred food. The older children inferred that the experimenter held a desire and that desires are related to emotions and their expression.

From a Vygotskian viewpoint, why is T-o-M important?

From a Vygotskian perspective, the development of the ability to attribute mental states to others is a fundamental social skill and is seen as being inextricably linked to a child's social world.

How is T-o-M affected by siblings and primary carers?

Children's false belief understanding scores increased with the number of siblings they had (Jenkins & Astington, 1996). They also found that where children have no siblings there appears to be a relationship between their level of language ability and their competence at theory of mind tests – those with lower language ability do less well. The presence of siblings appears to compensate for lower language development in developing false belief understanding.

Ruffman *et al.* (1998) found that the number of theory of mind tests that the children passed increased with the number of older siblings they had. There was no link between their success on the test and either the number of younger siblings or the gender of the siblings (whether older or younger). The researchers suggested that pretend play, deception, teasing and talking about feelings were the reasons for the benefits of having older siblings.

Lewis *et al.* (1996) looked at the effect that adults might have on developing theory of mind. They found that the greater the available adult kin and the greater the number of adults the child interacted with on a daily basis the better the theory of mind tests were completed.

Ruffman *et al.* (1999) looked at whether mothers facilitate false-belief understanding in their children and, if so, what behaviours facilitate this. They found that the child's age, the number of older siblings and the number of times mothers said they would respond to disciplinary situations by asking the child to reflect on the victim's feelings related to the children's belief understanding. There was no effect if the mother engaged the child in general discussion or exploration of the disciplinary issues or if they were reprimanded without discussion.

Woolfe *et al.* (2002) looked at deaf children's development of theory of mind, especially in relation to their 'impaired' communication which means they may not be exposed to the general discussions about mental states. Children who did not develop signing till late on had a less well developed theory of mind than children who had grown up in a signing environment (their parents signed from birth) or who had normal hearing.

Mothers tend to talk to their 2 year old daughters about emotions more than they 2 year old sons (Dunn *et al.*, 1987). Older siblings tend to mention feeling states more frequently to girls than boys (Brown *et al.*, 1996). Girls tend to use words that signify emotional states earlier and more frequently than boys (Cervantes & Callanan, 1998).

People with autism appear to experience an unusual sensory world - **DISCUSS**

Do these accounts give a good understanding of autism?

There is debate about whether these first-hand accounts are a pre-requisite for a scientific understanding of autism. Surely they are merely 'anecdotes' – illustrative, human interest stories – not a basis for science?

- How could scientists describe the unusual sensory world without autistic people explaining what they were experiencing? If they didn't all they would see is the behaviour and what would that tell them?
- Traditionally research has been based on outside accounts, but this is a case for using both first-hand and observer (outside) information.
- If one person with autism says something about their experience, this does not mean that another person with autism will necessarily have the same experience – will they all be tarred with the same brush?

Autistic Spectrum slide

TRIAD OF IMPAIRMENTS

- 1. Impairment of social interaction**
- 2. Impairment of social communication**
- 3. Impairment of imagination**

Diagnosis

DSM-IV:

- A qualitative impairment in social interaction
- Qualitative impairments in communication
- Restricted repetitive and stereotyped behaviours, interests and activities

Which are evident by the age of 3.

TRIAD OF IMPAIRMENTS

Vary with the severity. Different behaviour patterns are more obvious at different ages.

Impairment of social interaction

- Aloofness & indifference to others.
- Some physical contact and attachment
- Some can passively accept social contact.
- Some approach others spontaneously in an odd, inappropriate, repetitive way and pay little or no attention to their responses.
- Social impairment may evolve into an inappropriately stilted and formal manner of interaction with anyone.
- Probably lack ability to see that others have thoughts & feelings - theory of mind.

Impairment of social communication

- Lack of appreciation of the social uses and the pleasure of communication.

- Often a lack of understanding that language is a tool for conveying information to others.
- May ask for their own needs but have difficulty in talking about feelings or thoughts and in understanding the emotions, ideas and beliefs of other people.
- Many are unable to convey or comprehend body language, intonation, facial expression, etc..
- May have a pedantic, concrete understanding and use of words, an idiosyncratic, sometimes pompous choice of words and phrases, and limited content of speech.
- May be fascinated with words and word games but do not use their vocabularies as tools of social interaction.

Impairment of imagination

- Tendency to attend to minor or trivial aspects instead of an imaginative understanding of the meaning of the whole scene, e.g. attending to one earring instead of the whole person, a wheel instead of the whole toy train.
- Some display a limited range of imaginative activities, which may be copied, e.g. from TV programmes, but they pursue these repetitively and cannot be influenced by suggestions from others. Such play may seem very complex, but it has a rigid and stereotyped nature. Some watch soap operas or read certain books, e.g. science fiction, but the interest is limited and repetitive.
- Some confuse fiction and reality and tell rambling stories they seem to believe are true. Some don't know the difference between dreams and reality.
- Results in a very narrow range of repetitive activities or special interest. These can take simple or complex forms. Children of higher levels of ability tend to show more complex routines.

Additional Autistic characteristics:

Stereotyped activities:

Complex stereotyped activities involving objects:

Complex stereotyped activities involving routines:

Complex verbal or abstract repetitive activities:

Why do you think autistic children tend not to get involved in pretend play?

- They interpret the world in concrete, literal sense and may not want to entertain alternative understandings, rather than they are not able to pretend.
- They may have difficulty in initiating and executing the behaviours that are used in pretend play.
- It appears that they might be able to understand pretend play but are not good at doing it.
- Imagination is linked to pretend play which is linked to the development of language.

Thomas the Tank Engine slide

In 2001, The National Autistic Society conducted a survey of. The survey confirmed our assumption that children with autism spectrum disorders associate far more strongly with Thomas the Tank Engine than with other children's characters.

Summary Findings

- Children on the autism spectrum associate with Thomas before any other children's character (57%).
- These children maintain their association with Thomas longer than for other characters, commonly two years longer than their typically developing siblings.

- Around a third of parents consider that their children have an 'obsessive' relationship with Thomas.
- Thomas serves an important role as a comfort blanket / friend in a friendless world for many children with autism.
- Thomas can be a point of entry to the world of communication and learning.
- For some children, Thomas can inspire previously unthinkable leaps of emotion, imagination and symbolic play.

Why Thomas?

- The calm and clear narration which exaggerates and 'signposts' changes clearly.
- The easy to follow storylines, where something usually goes wrong but it is resolved by the end of the episode.
- The still background and scenery. (Children with autism can be easily distracted by detail and small changes either in sound or movement.)
- The easily recognisable and bold colours.
- The 'friendly' faces whose expressions are exaggerated and are set for some time and so can be understood.
- The accuracy of the models. Most interestingly, copies of the licensed toys are recognised instantly as being less accurate by some children and are rejected as 'not being Thomas'.
- The predictability of the roles played by different characters.
- The suitability of Thomas for identification, listing and collecting, all common characteristics of many children with autistic traits.

Theory of Mind and Autism

Baron-Cohen et al (1985) 80% of 6-16 year old autistics couldn't do false belief task (Sally/Anne task).

What does this infer about their minds?

Have difficulty in understanding other people's minds.

Other research has replicated these findings therefore indicating reliability. Other methods have been looked at to check validity – the findings mean what they appear to mean.

Why might the Sally/Ann test be invalid?

- They can't attribute any kind of belief to a doll (cos its not real)

This has been disproved by using real people.

How else could you test for theory of mind with autistic children to show validity?

Compare with language impaired children

Compare with children with learning difficulty who are shown a doll who touches a box and another one who looks inside and then asked which one knows what's in the box. Autistic children perform worse.

Would someone on the Autistic Spectrum recognise which person is thinking slide

Would an autistic person recognise the thinker?

Autistic children do not recognise which person is thinking. 4 year old 'normal' children could make this judgement

Imaginative understanding components required for TOM

Self-awareness – Being aware of their own mental states

Capacity for pretence – Being able to escape from their own identity into other roles, or make one thing represent something else

Know the reality & pretence difference – Being able to switch comfortably between make-believe feelings and behaviour to real feelings and behaviour in self and others

Imagine someone's feelings – Able to incorporate a representation of other people's mental states within their own mental state, so that they can imagine someone's feelings, desires and beliefs without necessarily sharing them

Autistic children and executive dysfunction

- Difficulty disengaging from a strand of thought or behaviour
- An apparent mental rigidity
- Problems with switching attention flexibly from one thing to another
- Problems with planning and delivering intended actions

Could be the reason they have difficulty with planting a false belief in the mind of another. Children shown two boxes with windows they could see and told that they had to point to the box without chocolate in so the other person opened that box and got nothing. Autistic children tended to point to box with chocolate.

Why?

- Possibly 'cos the chocolate was drawing their attention and they were unable to inhibit a response to it (by pointing away). Further research seems to support this.

How do you think this inability to inhibit a response may affect their behaviour?

- Unable to use joint attention – share a toy with another person and share the interaction
- Unable to do joint play.

They have difficulty with Wisconsin Card Sort Test and Tower of London task.

Central Coherence

Autistic people often have strengths to pick out detail.

Diagram slide

Which diagram is it easier to recognise the shape?

We tend to see the whole shape (central coherence) whereas people on the autistic spectrum see the shapes a lot easier than we do because they see a series of shapes.

With regards to language we tend to use central coherence to look at all that is being said whereas it appears that autistic children tend to look at individual words.

Diagram slide

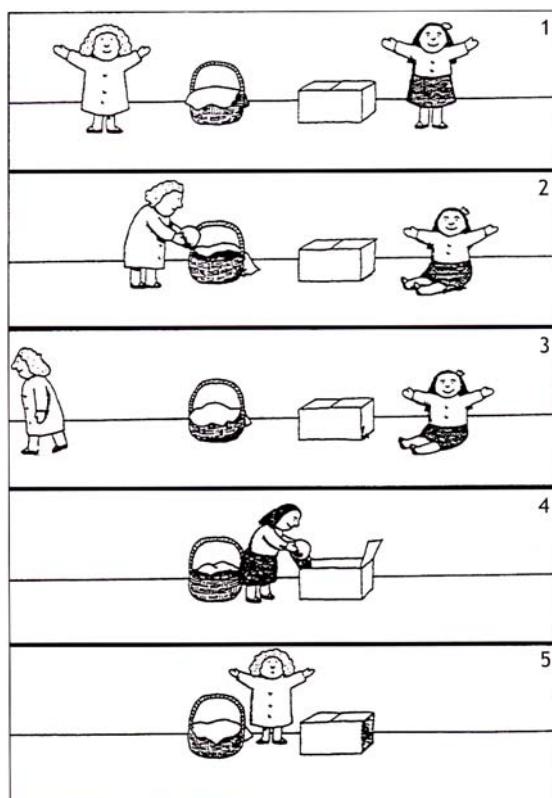
How should it be pronounced?

“Mary took the dog for a walk. She went to fetch the lead”

We know that there are two possible pronunciations of lead but we tend to give the one that is inferred, whereas autistic children tend to give a mixture of both.

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Premack & Woodruff (1978) showed an adult chimpanzee a series of videotaped scenes in which an actor struggled with problems of different kinds. Some of the problems appeared simple, such as trying to get hold of bananas that were out of reach. Others were more complex, such as trying to escape from a locked cage. For each scene the chimp was presented with two photographs that showed different actions, only one of which was an effective solution to the problem. So, for the scene in which the actor was locked in a cage, the chimp was presented with a photograph of a key and a photograph of a solution to a different problem, for example, a stick to get the out-of-reach bananas. On the overwhelming majority of occasions the chimp selected the 'correct' solution.



QUOTES

“A toilet being flushed may sound like an express train coming to run me over.”

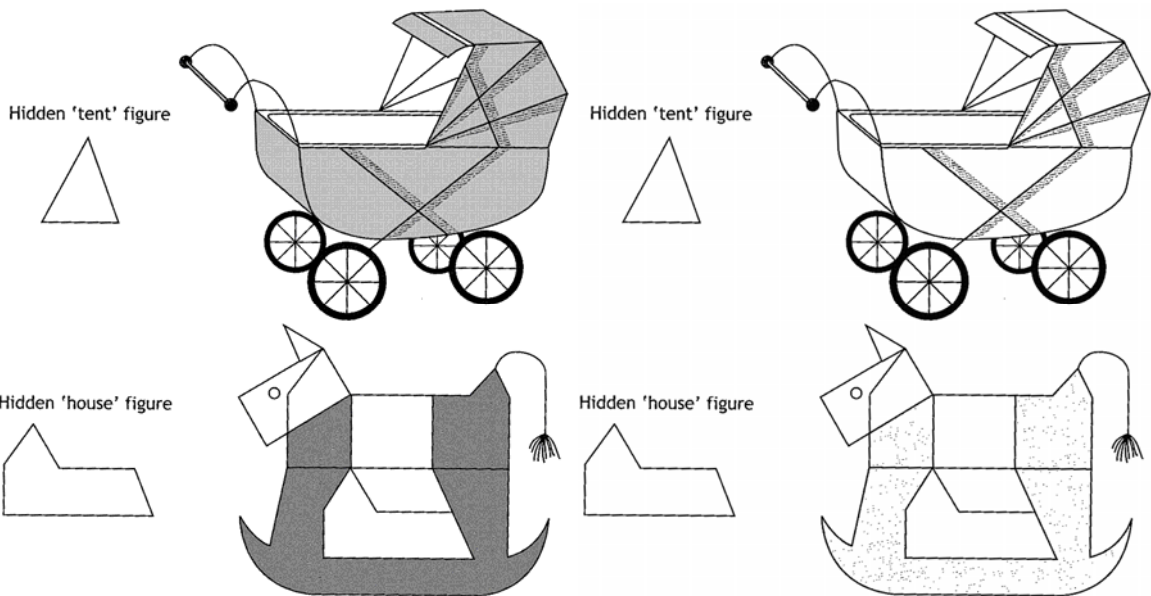
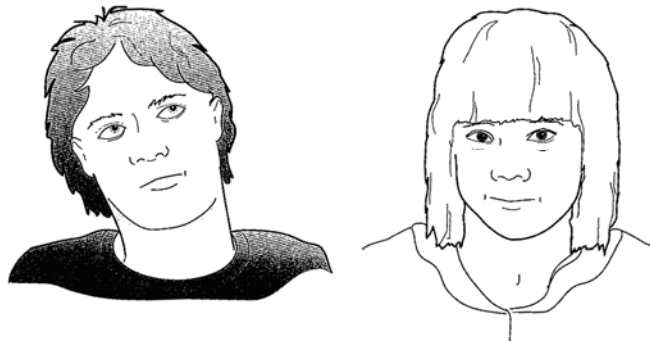
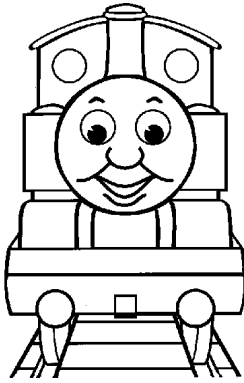
“Light touch can be very painful, all the nerves on my body fire off like a cattle prod. I may feel the discomfort of scratchy clothes up to a fortnight after taking them off.”

“I am frightened of so many things that can be seen, particularly faces. People have absolutely no idea how painful it is for me to look at them.”

“I spend all my life trying to work out the pattern of what is happening.”

“As a child, speech had no more significance to me than any other sound. It was an age before I realised that people speaking might be demanding my attention.”

“When I switch the light on and off, I know what I am doing. It gives me a wonderful sense of security. It is exactly the same each time.”



“Mary took the dog for a walk. She went to fetch the lead.”

AGENDA

- How's the course going?
- Feedback from practical TMA
- Executive function and the frontal lobe
- The mind
- Anything else



Happy Holiday Win Sun Smile
 Smile Win Holiday Happy Sun
 Happy Smile Sun Win Holiday
 Holiday Win Sun Smile Happy
 Sun Happy Holiday Smile Win
 Smile Win Holiday Win Happy
 Win Holiday Happy Smile Win

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What does this tell us?

EXECUTIVE FUNCTION & FRONTAL LOBE

STROOP TEST

Purple Yellow Red Blue Green
 You will be shown a series of words.
 Out loud and as quickly as possible,
 call out the colour that the words are
 written in.

Red Purple Green Blue Yellow
 Black Green Red Purple Blue
 Green Blue Purple Red Yellow
 Purple Blue Yellow Red
 Red Yellow Blue Green Purple

Wason's selection problem

What cards should you turn over to test the proposition that if a card has a vowel on one side, it has an even number on the other?



- Most subjects select card E or cards E & 4
- A few select cards E, 4 and 7

Theory of Mind

"An individual has a theory of mind if he imputes states to himself and others."

(Premack & Woodruff, 1978)

The ability to understand that other people have beliefs, desires and intentions that are different from one's own.

(http://www.timeforafuture.com.au/fact_sheets/glossary.htm)

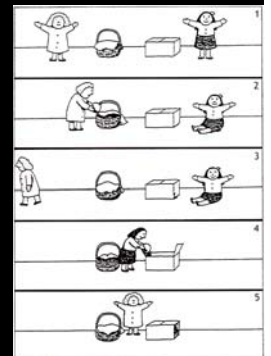
What is Executive Function?

- It is the high-level cognitive functions that enable people to plan, initiate and carry through goal-directed behaviour in an organised and thought out way.
- It is required for:
 - The learning of new skills
 - Planning and decision making
 - Error correction or troubleshooting
 - Initiating novel sequences of actions
 - Danger or technical difficulty
 - Conscious moment-to-moment control of behaviour
 - The need to overcome a strong habitual response

Yellow Red Purple Green Blue
 Purple Yellow Red Blue Green
 Green Blue Purple Red Yellow
 Red Yellow Blue Green Purple
 Red Purple Green Blue Yellow
 Yellow Green Red Purple Blue
 Purple Blue Green Yellow Red

THE MIND

Sally / Anne Task



Quotes from people on the Autistic Spectrum

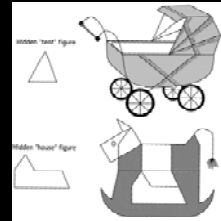
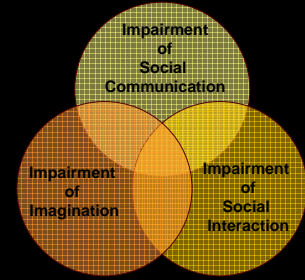


- "A toilet being flushed may sound like an express train coming to run me over."
- "Light touch can be very painful, all the nerves on my body fire off like a cattle prod. I may feel the discomfort of scratchy clothes up to a fortnight after taking them off."
- "I am frightened of so many things that can be seen, particularly faces. People have absolutely no idea how painful it is for me to look at them."
- "I spend all my life trying to work out the pattern of what is happening."
- "As a child, speech had no more significance to me than any other sound. It was an age before I realised that people speaking might be demanding my attention."
- "When I switch the light on and off, I know what I am doing. It gives me a wonderful sense of security. It is exactly the same each time."

Would someone on the Autistic Spectrum recognise which person is thinking?



Autistic Spectrum



- How do you pronounce this?
– "Mary took the dog for a walk. She went to fetch the lead."