

Update on research at the Cerebra Centre for Neurodevelopmental Disorders

Over the past three years, researchers at the Cerebra Centre for Neurodevelopmental Disorders have been conducting research examining preference and reinforcement in Angelman syndrome. Two projects, led by Prof Chris Oliver, Dr Dawn Adams and Mary Heald, were designed to further explore the reported heightened sociability and preference for certain sensory experiences often associated with Angelman syndrome. This article is a summary of the main research findings from both studies.

Study 1: Preference and reinforcement in Angelman syndrome

Background

Previous research has suggested that some children with Angelman syndrome may find learning new behaviours difficult or challenging. It is thought that this may be related to a loss of the UBE3A gene implicated in Angelman syndrome (Jiang et al., 1998).

Often, items that children prefer or enjoy (e.g. a favourite toy) can be used as effective rewards to help teach children new behaviours and increase their speed of learning. Several behaviours frequently described in parental report and the current literature suggest that children with Angelman syndrome may find both social interaction and sensory experiences extremely enjoyable. For example:

- Children with Angelman syndrome laugh and smile more in the presence of adult social interaction (Oliver et al., 2002) and compared to children without Angelman syndrome (Oliver et al., 2007).
- Some children show frequent social approach behaviours towards both familiar and unfamiliar adults (Mount et al., 2011).
- Children are often reported to have a ‘fascination’ with certain sensory stimuli, including water and shiny/reflective objects (Didden et al., 2006).

Together, the literature suggests that social interaction and sensory experiences may function as highly effective reinforcers to increase children’s speed of learning.

Aims

The main aim of the study was to examine the use of social interaction and sensory toys as rewards to increase children’s speed of learning.

What did we do?

- We visited 22 children with Angelman syndrome at their school or home (14 children with a deletion, 7 children with Angelman syndrome caused by other genetic mechanisms)
- We asked children to complete a simple task e.g. ‘can you put the block in the bucket’. If children completed the task, they were given a reward.
- We alternated the type of reward (social/sensory/no reward), to see if this would affect the number of times children completed the task.



Task

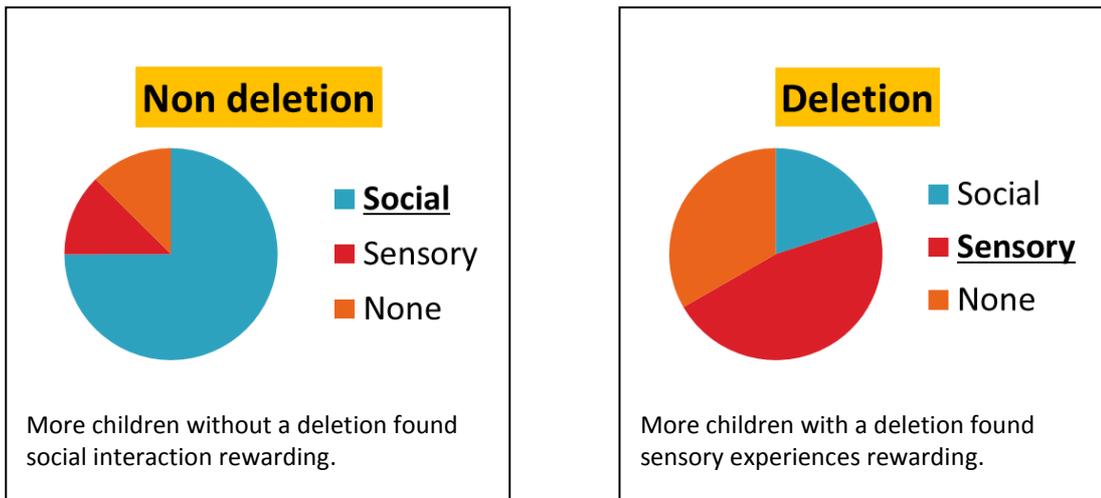


Reward (five seconds)

What did we find?

- All children completed the task more often in the presence of a social reward

- Social and sensory rewards were equally rewarding across all children.
- There were striking differences in the type of reward children found reinforcing when we compared across children with a deletion, compared to children without a deletion:



What does this mean?

- The use of social and sensory experiences as rewards with children with Angelman syndrome may increase children's speed of learning.
- The type of reward given may need to be **targeted for each child**; some rewards resulted in almost zero levels of task completions for some children.
- Children with Angelman syndrome not caused by a deletion (UBE3A mutation, Imprinting Centre Defect, UPD) may show **increased motivation for adult social interaction**.

Study 2: Teaching children when to approach for attention

Background

Both parental reports and research conducted within our team suggests that some children with Angelman syndrome find adult social interaction extremely enjoyable, and will often approach both familiar and unfamiliar adults to gain access to attention.

Parents have reported that sometimes children will approach for attention even when it is not available e.g. if a parent is busy doing something else. This can be frustrating for both the parent and the child.

Aims

The main aim of the study was to teach children to discriminate between times of adult availability. We used a bright orange jacket as a signal to children that attention was not available.

What did we do?

Four children with Angelman syndrome were visited at their school by Mary. Each child was visited for three days.

In order to teach children to associate the orange jacket with times when attention was not available, Mary alternated her responses to children's social approaches:



What did we find?

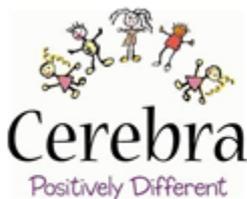
After three days of training, all four children began to show lower rates of social approach behaviours when Mary wore the coat.

What does this mean?

- The results suggest that all four children were beginning to learn that if the researcher wore the coat attention was not available.
- This means that using a cue in this way might be a good way to make the environment more predictable for children.

Reference for full text:

Heald, M., Allen, D., Allen, D., & Oliver, C. (2013). Discrimination training reduces high rate social approach behaviors in Angelman syndrome: Proof of principle. *Research in Developmental Disabilities, 34*, 1794-1803.



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