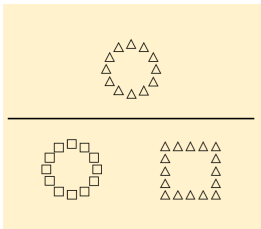


What we knew before...

Question 1

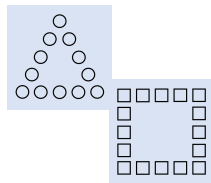
When children are presented with a picture that can be viewed at a global level (the whole) or a local level (individual parts), younger children generally respond better to the **local level**, while older children (and adults) favour the **global level**. We explored this using Navon tasks where the small shapes are the local level and the large shape the global level.

Free choice task

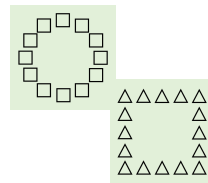


"Which of the bottom pictures is most like the top one?"

Selective attention task

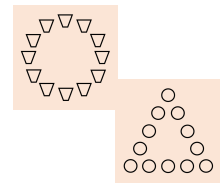


"Is the big shape a triangle or a square?"



"Is the small shape a triangle or a square?"

Divided attention task

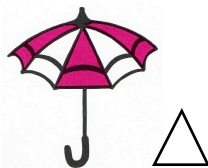


"Is the circle the big shape or the small shape?"

Question 2

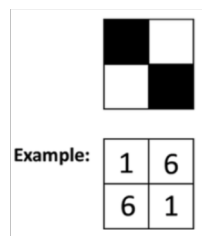
The ability to focus on a target and ignore the context is called **Field Independence**. Those who score higher on Field Independence tasks also achieve higher scores in maths and science. This is partly related to children's **working memory** and their ability to **ignore distractors**. Scores on Field Independence tasks improve as children grow older.

Hidden triangle game

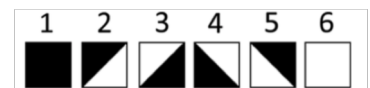


"Find the triangle shape hidden in the picture."

Jigsaw game



"Which jigsaw pieces go together to make this pattern?"



Question 3

Children often create their own ideas to explain what they experience. These ideas may be based on false assumptions and can be tricky to change. There are some ideas which might be held by lots of children and these are known as **common misconceptions**.

For example, children learn that higher numbers represent larger amounts, and then apply this incorrectly to fractions, so they might believe (incorrectly) that a quarter ($1/4$) is bigger than a third ($1/3$). We used a misconceptions task to study this.

Misconceptions task

Multiple choice science and maths questions, with:

- the correct answer,
- a common misconception,
- an uncommon error



"Do you think a dolphin is a fish, a mammal, or a bird?"

What we found...

We combined the responses from the 2016 study with the 2018 study to examine change over time.

Question 1

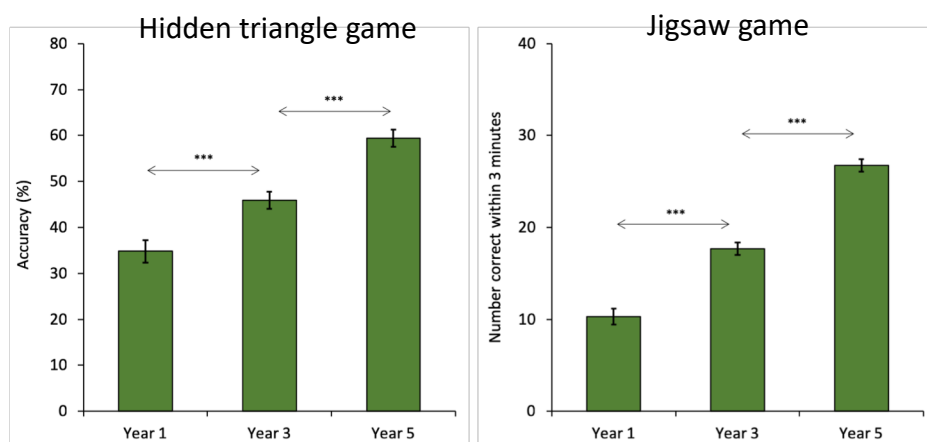
Type of Navon task	Year 1	Year 3	Year 5
Free choice	No preference	Global preference	Global preference
Selective attention	Local preference	Global preference	Global preference
Divided attention	Local preference	Local preference	Local preference

Two of these tasks show a change in preference from no/local to global between Years 1 and 3.

There are a few possible reasons for this:

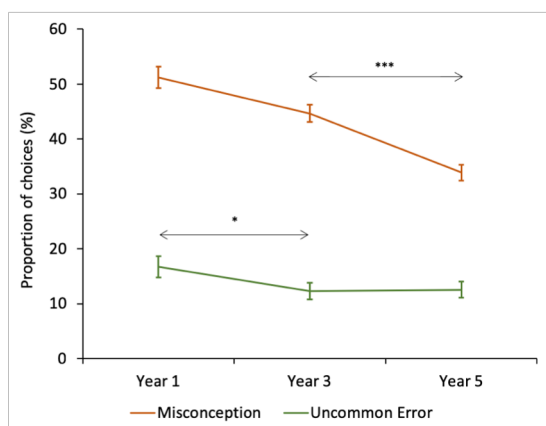
- Changes in brain development which mean global processing is more dominant
- Improvements in the control of attention and the ability to ignore distractions
- Learning to read may lead to better global processing

Question 2



We found that children improve at separating details from their context as they grow older, which may be linked to the development of working memory (keeping information in mind) and inhibitory control (ignoring distractors and resisting impulsive responses).

Question 3



We found that children make fewer uncommon errors after Year 1.

However, misconceptions take longer to overcome, with more errors made by Year 3 than Year 5 children.

Overall, these patterns support what we observed 2 years ago. By looking at change over time in the same children, these findings are much stronger. In fact, this is the *first* study to re-test the same children on global and local Navon tasks!