



Predictors, priorities, and playful pedagogy for early years mathematics:

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What research tells us

What predicts maths success?

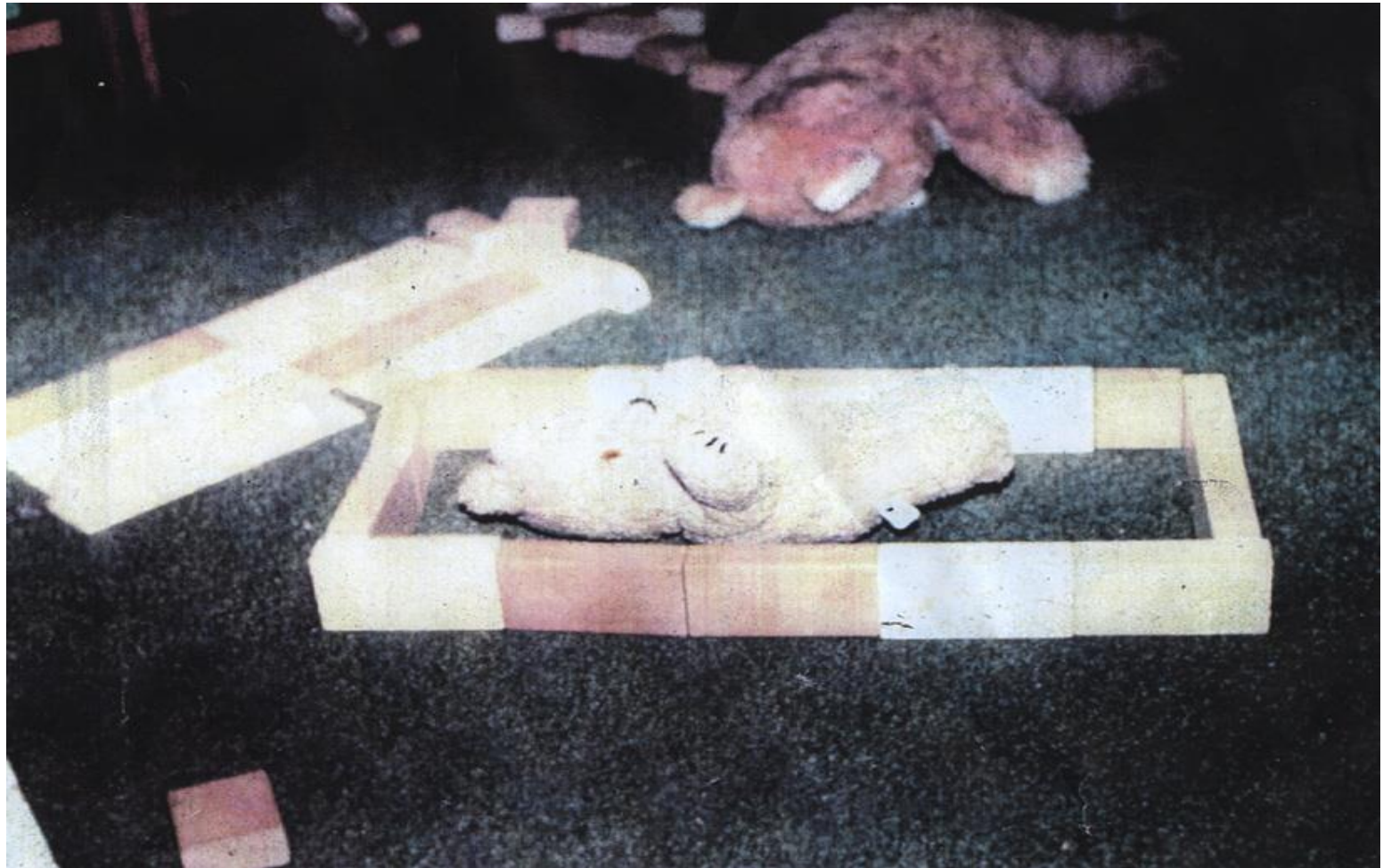
in the early years:

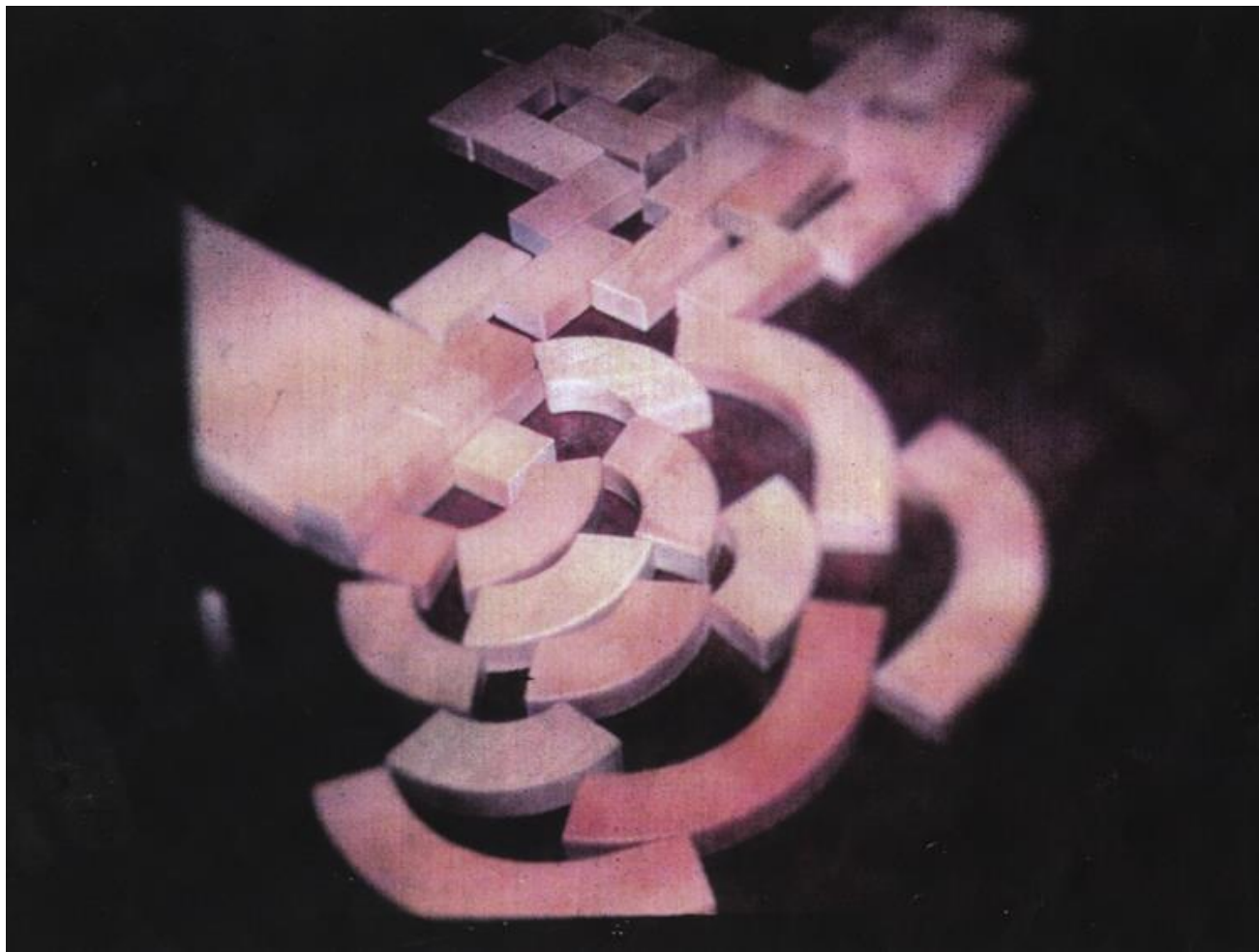
- parents' education and home learning (EIF 2018)
- a balance of adult and child-led activities (Ofsted 2018)
- early number sense (Nunes & Bryant 2009)

at primary school:

- mathematical reasoning (Nunes, Bryant et al 2012)
- a growth mindset (Dweck 2006, PISA 2012)
- an autumn birthday (DfE)

Child-led activities





mathematical reasoning

Adult initiated: *Faster than Usain Bolt*

If you go slower you'll get a bigger number.

If you go faster you'll get a smaller number.



Mastery: generalising mathematical relationships

Class teacher: Georgina Harries, Marlborough Primary School,
Falmouth.

Researcher: Dr Helen Williams

What research tells us: *How to produce children with maths difficulties*

Anxiety blocks working memory space

-acceleration rather than understanding

-anxious teachers and parents create anxiety



Fixed mindsets

- ‘no good at maths’
- ability grouping (Bradbury, NEU, 2017)



Grouping in Early Years
and Key Stage 1

“A Necessary Evil”?

Those who start behind stay behind

Children's *understanding of number* during preschool is consistently associated with their mathematical achievement in primary and secondary school.

Mathematical achievement in turn is consistently found to be the *strongest predictor of children's overall school achievement* and their success in entering the workforce.

The ages of *3 to 5* are therefore considered an ideal time to rectify income-related learning gaps in children's understanding of numbers.

(Early Intervention Foundation 2018)

Mathematical predictors for 5 year olds: the evidence

- **understanding counting** (EIF, 2018)
- **understanding numerals** (EIF, 2018)
- **comparing numbers** (Lyons et al, 2014)
- **patterning** (Rittle Johnson, 2016; EIF, 2018)
- **spatial thinking** (Verdine et al, 2017; Young et al, 2018)

Number sense

a feeling for numbers

Counting -sequence & synchronicity

Cardinality - *the eightness of 8*

Comparison - relative size

Composition- *numbers hidden inside
numbers*

[NCETM: Main areas of early years maths](#)

Developing counting with cardinality takes a long time

- **number sequence**

numbers to 20- takes 4 years
crossing boundaries 29/30

- **tagging:** saying one number for each thing
synchronising words & actions

- **cardinal principle:** last number is 'how many'

Counting

What helps Anna
count?

http://prek-math-te.stanford.edu/counting/anna-counts#full_video



Counting and number patterns



Aubree counts bears



Which aspects of counting is Aubree not yet / confident with?

The cardinal principle

The last number you say tells you the number of
the group

Key teaching strategy:

*One, two, three, four, **five**- there are five!*

Key assessment:

Counting out a number from a larger group

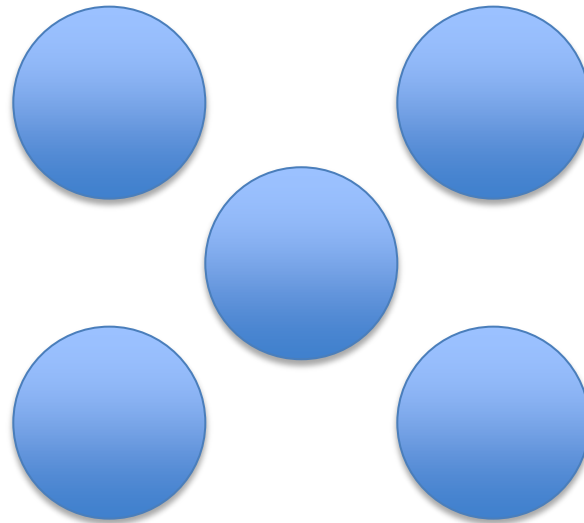
Can you get me 9?

When do children use counting because they really want to find *'How many'*?

- getting a number of things *'Give me nine'*
- counting to share and compare
- counting to check

Cardinality: 'how manyness' the number of things represented by the number

5



Key teaching strategy-

whenever possible, say the number of objects:

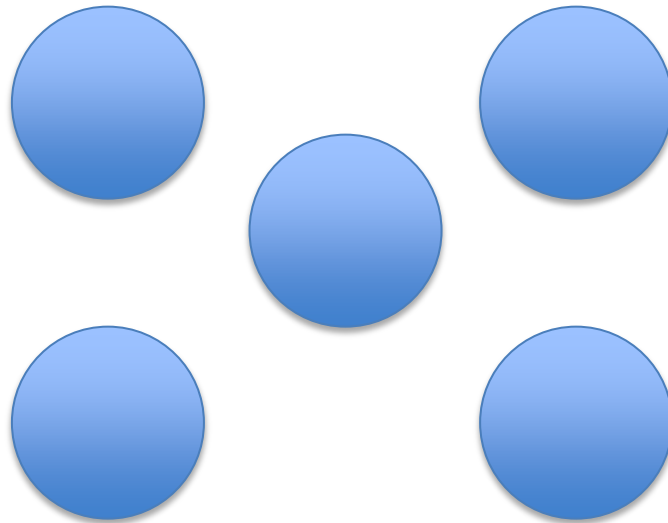
There are 5 dogs / 12 apples / 23 children... (EIF, 2018)



**All-at-once
finger numbers**

Subitising

recognising a number without
counting



How do you develop subitising?



Do it huge –
and
outdoors!

Subitising: Hide and reveal games

www.learningtrajectories.org

