

Number identification

A Unique Developmental Pathway in Mathematics?

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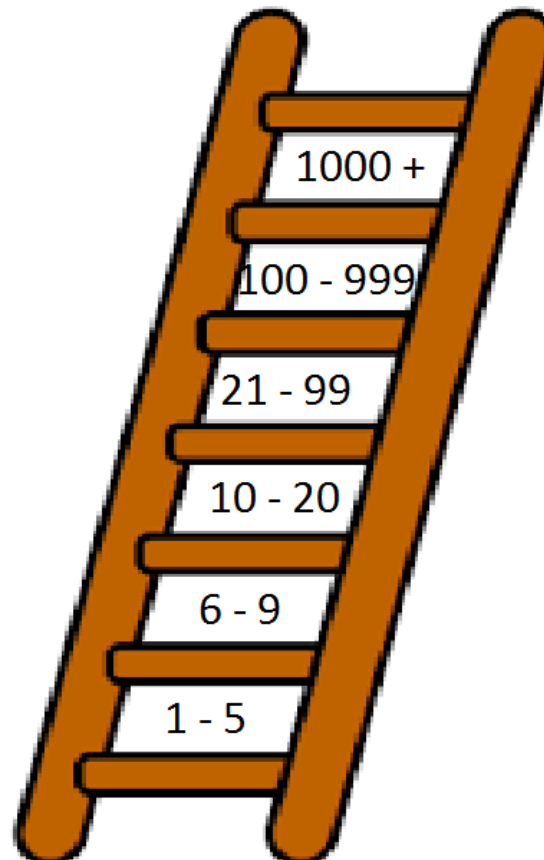
Unique Developmental Pathways?



Number Sense and Number Identification



Learning Number Symbols



Why?



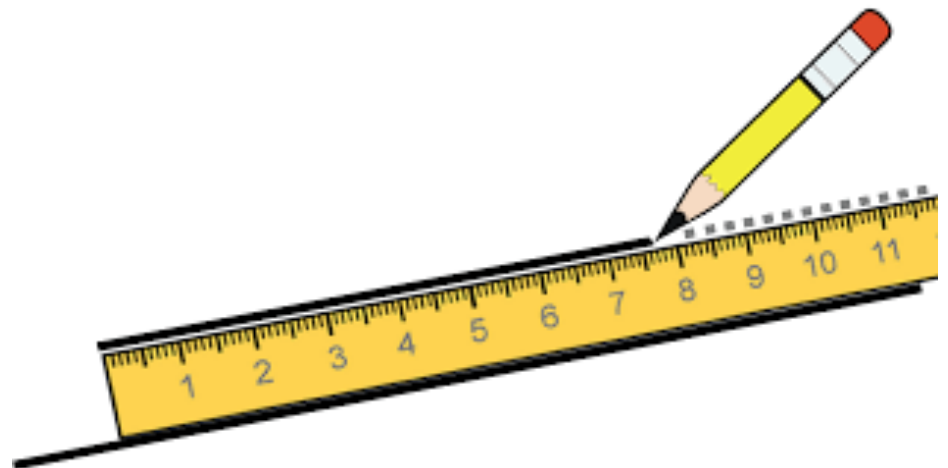
Is Number Identification a Pathway?

Identify Pathway

Dimensionality

DIF/Invariance

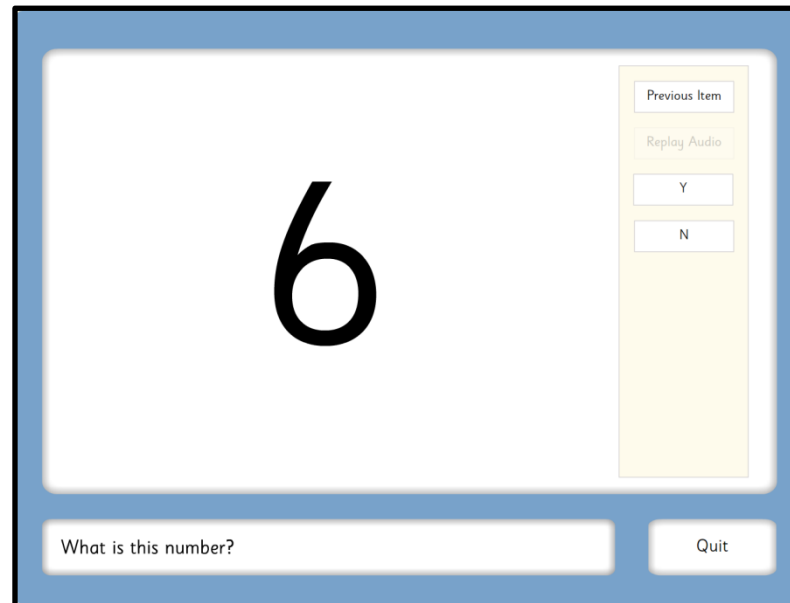
Progression



The Data

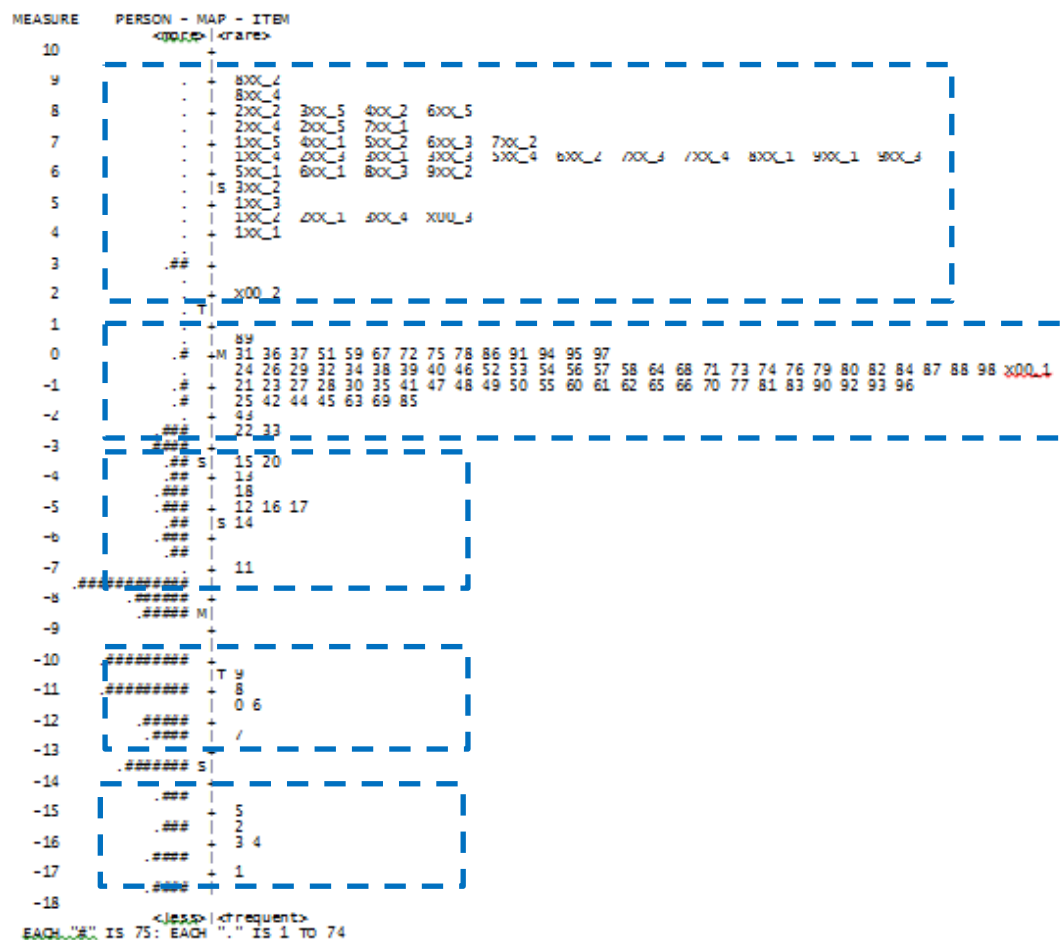
- 11,000 pupils in 2011/12
- Assessed at start and end of year using PIPS
- England and Scotland
- Gender, EAL, FSM
- Start of year ages:
 - England 4.5 years on average
 - Scotland 5.0 years on average

Assessing Number with PIPS



A screenshot of a PIPS (Pictorial Identification and Production) assessment interface. The interface is enclosed in a blue border. In the center, a large black number '6' is displayed on a white background. To the right of the number, there is a vertical yellow panel containing five buttons: 'Previous Item', 'Replay Audio', 'Y', and 'N'. At the bottom of the interface, there is a white input field with the text 'What is this number?' and a 'Quit' button to its right.

Rasch measurement – start of year



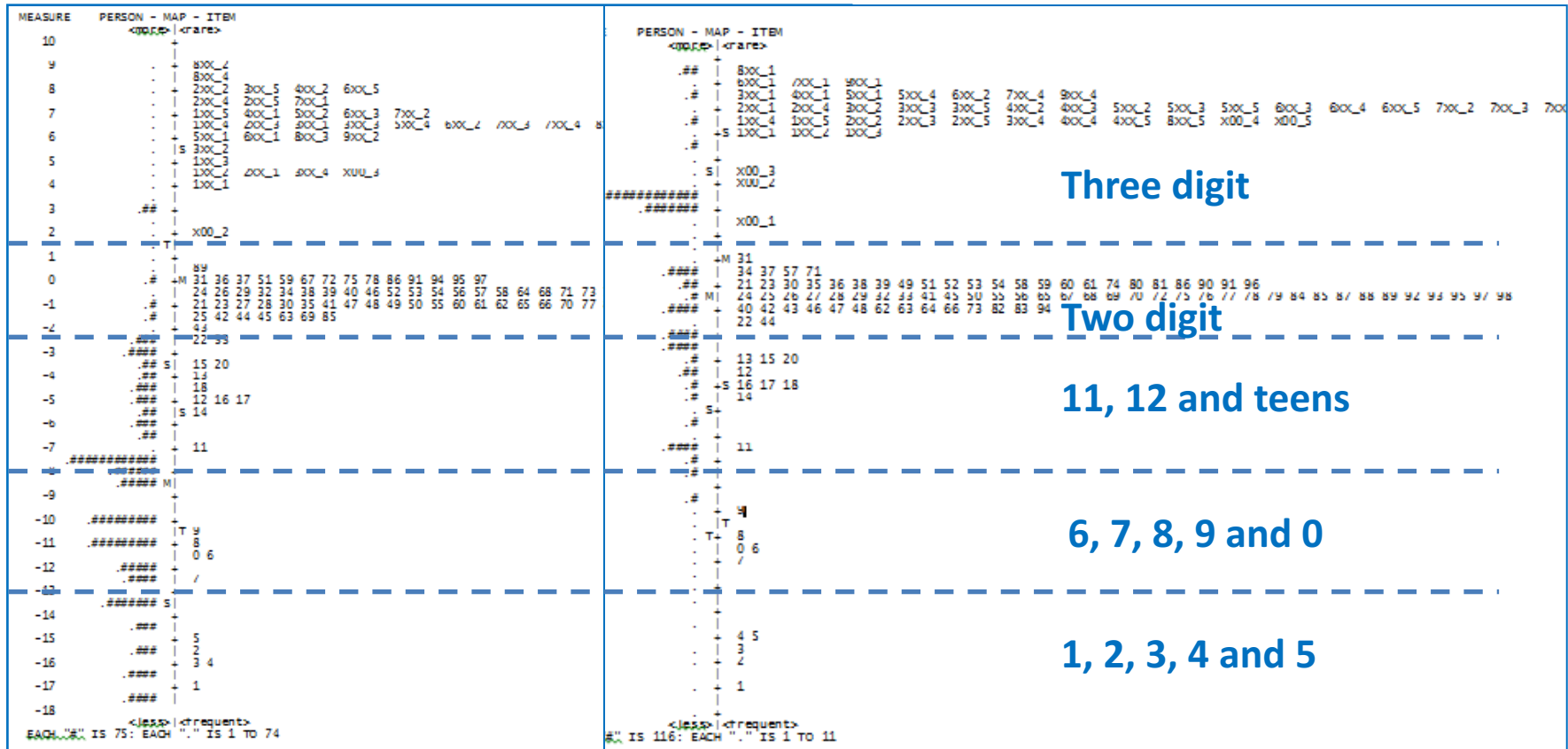
Three digit

Two digit

11, 12 and teens

6, 7, 8, 9 and 0

1, 2, 3, 4 and 5



Dimensionality

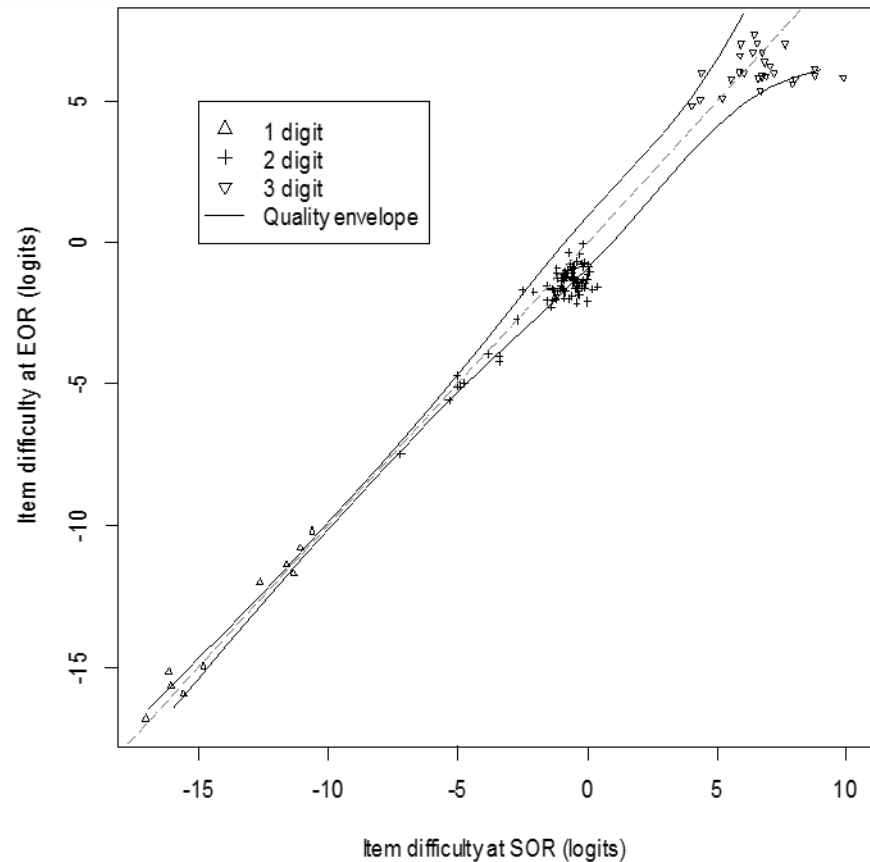
PCA

- SOY - 74.2% of variance explained by measures
- EOY - 80% of variance explained by measures

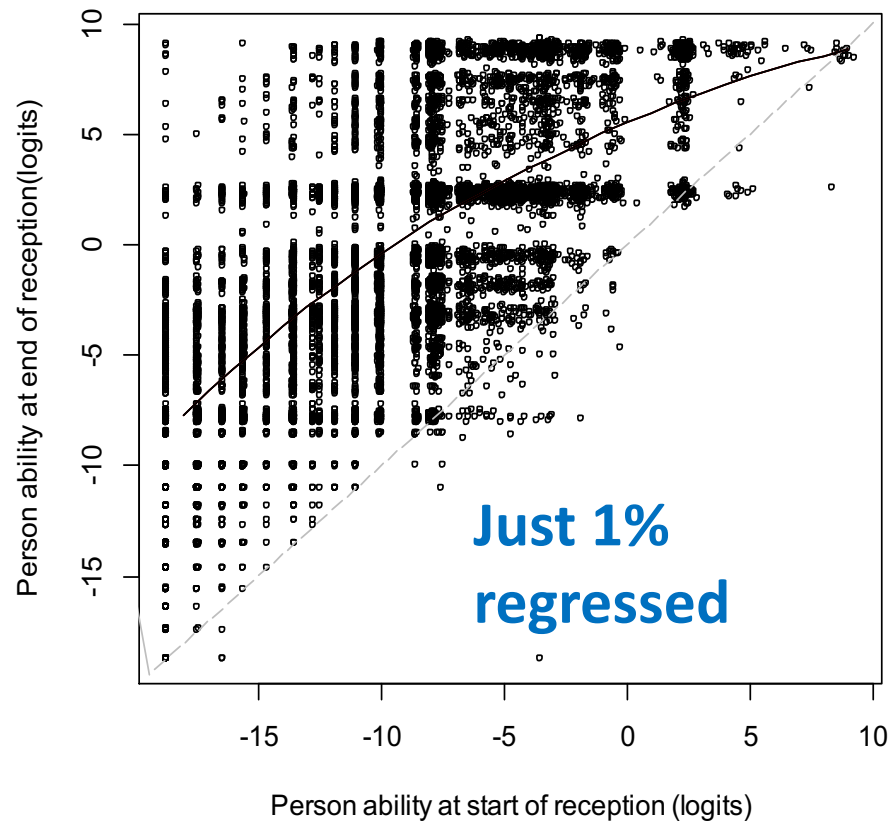
Invariance

Invariant across....

- Location
- Gender
- Age
- FSM
- EAL



Progress



Conclusion

Number Identification shows clear evidence of...

- a distinct pathway.
- unidimensionality.
- invariance.
- progression.

Implications for practice

- Need to establish each child's level very early
- Need to work on the next stage in groups
- Need to reassess regularly

Further questions

- Age?
- Cultures?
- Higher numbers?
- Other constructs?



Questions?

Thank you for listening.

Cramman, H., Gott, S., Merrell, C., Tymms, P. & Copping, L.T. (Under Review). A Unique Developmental Pathway in Mathematics? *Assessment in Education: Principles, Policy & Practice*.

Further Questions – email Lee.Copping@cem.dur.ac.uk