

Neuroplasticity knowledge, academic self-efficacy, and school achievement in children: A co-creation and intervention study

Selma Al Makzomy

Supervisors: Dr. Rebecca Gordon, Dr. Gisele Dias

Department of Psychology and Human Development- Institute of Education, University College London



Background

This research aims to collaboratively explore the potential benefits of teaching neuroplasticity to young children aged 5-7 through a co-creation approach. This is an important developmental stage where understanding of the brain's ability to change in response to experiences has potential to influence academic attitudes and outcomes significantly.

The **co-creation** approach in this research actively involves educators, parents, and children to ensure the intervention is relevant, inclusive, and aligned with children's natural learning processes—ultimately enhancing its effectiveness, feasibility, and cultural appropriateness.

While interest in brain-based education is growing, **no studies have directly investigated the effects of teaching neuroplasticity as a standalone concept**, particularly in young children. Existing interventions, such as growth mindset programs (Aronson et al. 2002; Blackwell et al. 2007; Paunesku et al. 2015; Yeager et al. 2016), include brief brain education components but also incorporate:

- Motivation and effort-related beliefs
- Learning strategies and success tips
- Peer support

These **multi-component designs create internal validity issues**, as it is unclear whether academic improvements stem from understanding neuroplasticity or from the other elements. Additionally, the broad and abstract scope of such interventions may be developmentally inappropriate for younger children.

A meta-analysis by Sarasin et al. (2018) identified several methodological limitations in such prior research:

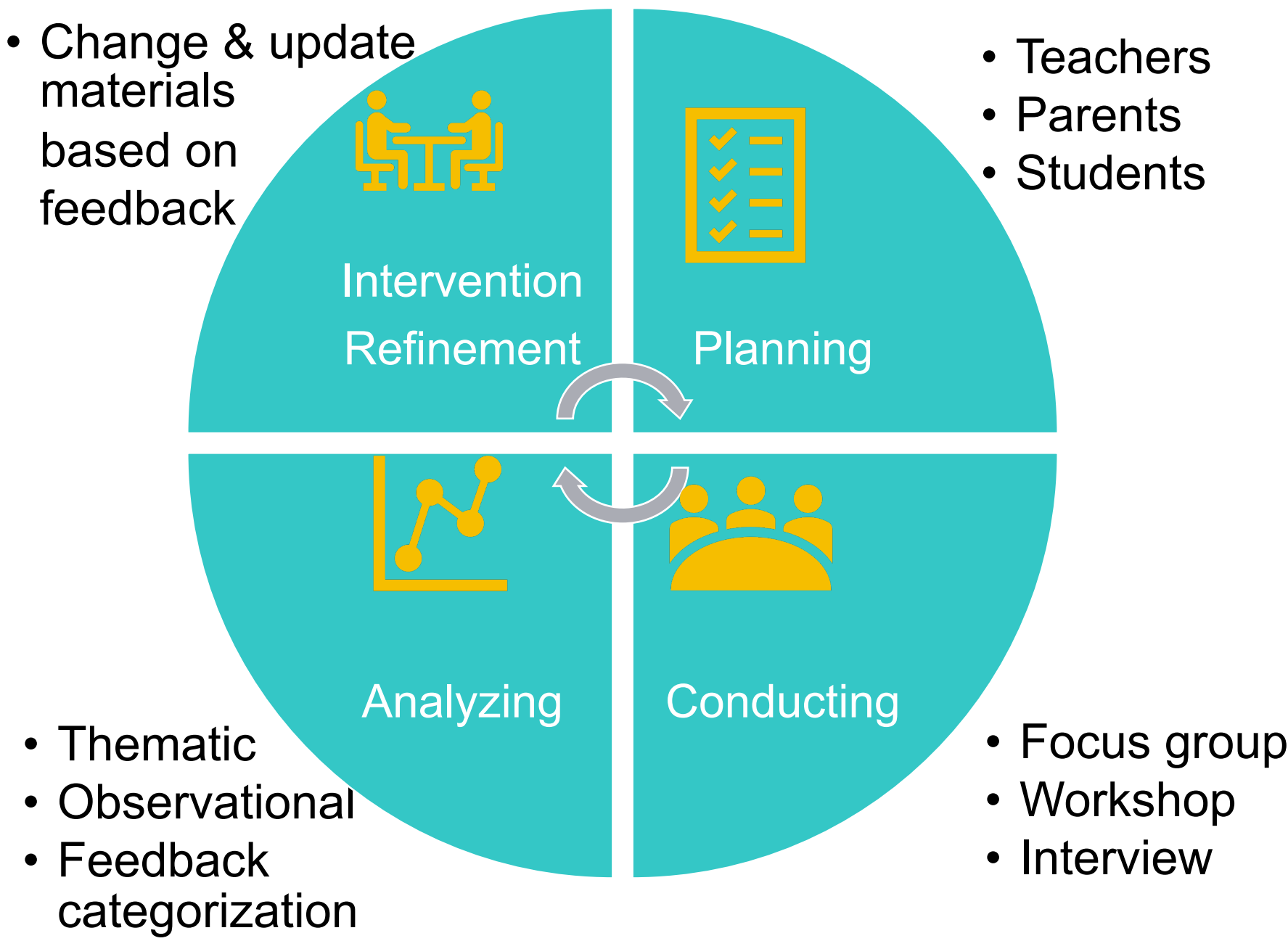
- Short intervention durations
- Ceiling effects and poor task selection
- Lack of clarity in control conditions
- Focus on older, WEIRD populations
- No longitudinal studies

Aims

This study aims to address these issues through a multi-method design, targeting younger children in a non-WEIRD (Western, Educated, Industrialized, Rich, and Democratic) sample. By focusing solely on simplified neuroplasticity education, we aim to determine if a streamlined approach is more effective for young children and how to tailor interventions for early education. It explores whether learning about the brain's malleability can improve **academic self-efficacy** (Zimmerman, 2000) and **academic achievement** in reading fluency and math.

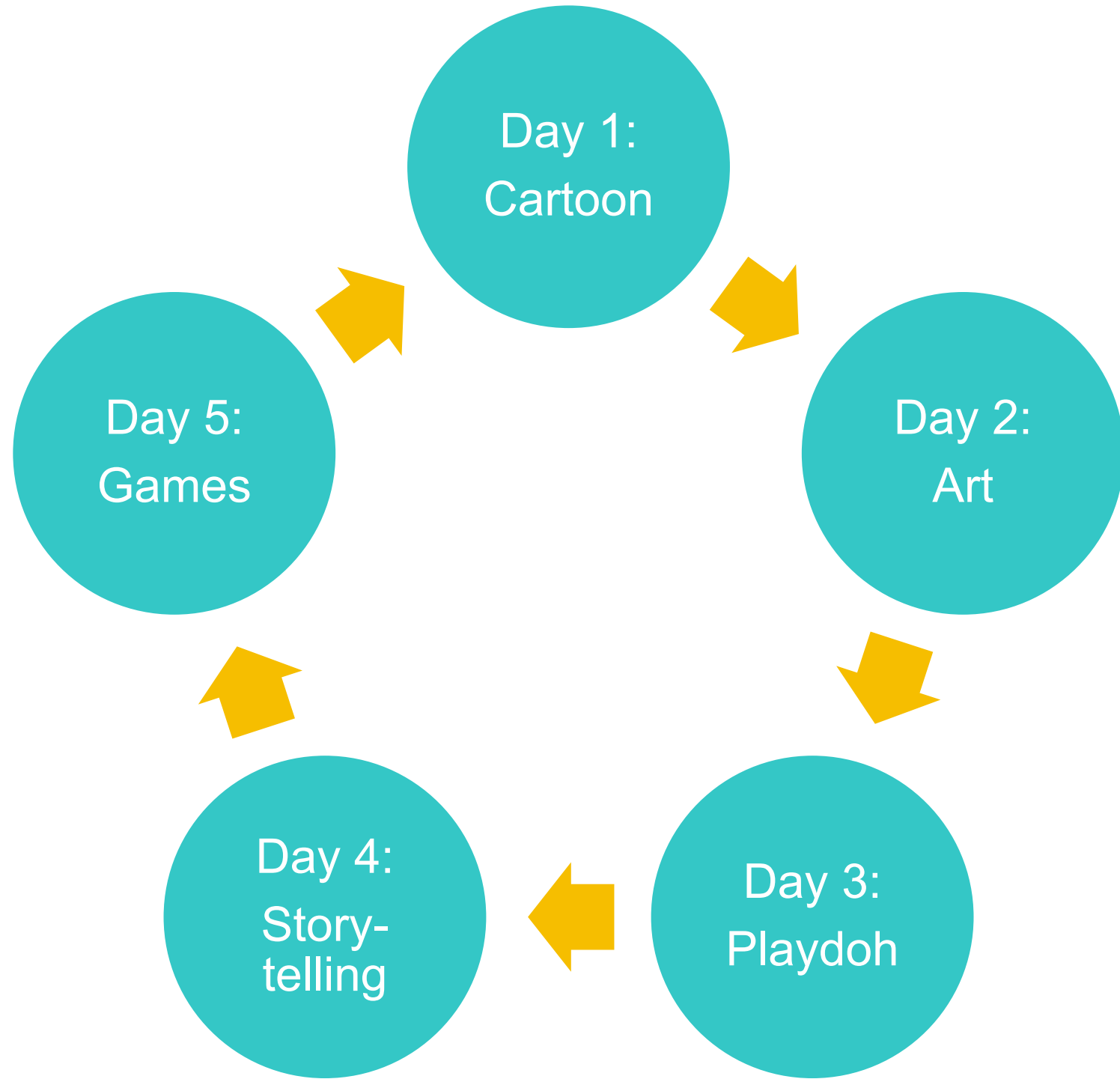
Methods

Co-creation Study 1



Intervention- Study 2

Content: in principle, five activities repeated weekly.



Intervention Design

- 6-week
- Randomized control trial
- Age 5-7
- Students from UAE schools
- Longitudinal



Research Questions

Study 1

1. How can co-creation with parents, teachers, and children contribute to the development of a neuroplasticity education intervention for 5-7-year-olds?
2. What elements of the intervention materials are engaging, clear, and appropriate for young children (ages 5-7) according to stakeholders?

Study 2

1. Can teaching neuroplasticity improve young children's academic self-efficacy (ASE)?
2. How does simplified neuroplasticity education influence academic achievement?



Expected Results

Study 1: The co-creation phase will gather qualitative insights from children and parents to ensure the intervention is age-appropriate, culturally relevant, and engaging, refining its content, delivery, and evaluation metrics.

Study 2: The intervention is expected to lead to significant improvements in ASE and academic achievement in the intervention group compared to the control group, with sustained effects observed at follow-ups.

Conclusion & Implications

By addressing current methodological challenges in neuroplasticity research, and extending this to non-WEIRD populations, this research could contribute to a global perspective on educational neuroscience.

The intervention has potential implications for inclusive educational practices to support young learners in their cognitive and emotional development and academic success.

References

Aronson, J., Fried, C.B., Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence, *J. Exper. Social Psychol.* 38(2).

Blackwell, L. A., Trzesniewski, K. H. & Dweck, C. S. (2007). Implicit Theories of Intelligence Predict Achievement Across an Adolescent Transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246–263.

Paunesku, D., Walton, G. M., Romero, C., Smith, E. N., Yeager, D. S. & Dweck, C. S. (2015). Mind- set interventions are a scalable treatment for academic underachievement. *Psychological science*, 26(6), 784-793.

Sarasin, J.B., Nenciovici, L., Foisy, L.B., Allaire-Duquette, G., Riopel, M., Masson, S. (2018). Effects of teaching the concept of neuroplasticity to induce a growth mindset on motivation, achievement, and brain activity: A meta-analysis. *Trends in Neuroscience and Education*, 12, 22-31.

Yeager, D.S., Romero, C., Paunesku, D., Hulleman, C.S., Schneider, B., Hinojosa, C., Trott, J. (2016). Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school. *J. Educ. Psychol.* 108(3), 374–391.

Zimmerman, B. (2000). Self-Efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82–91.