

Introduction

Important Concepts

- **Theory of mind (ToM)** is the capacity to attribute beliefs, intentions, and emotions to oneself and others.
- **Working memory (WM)** is a limited-capacity system for maintaining and manipulating information

Current Literature

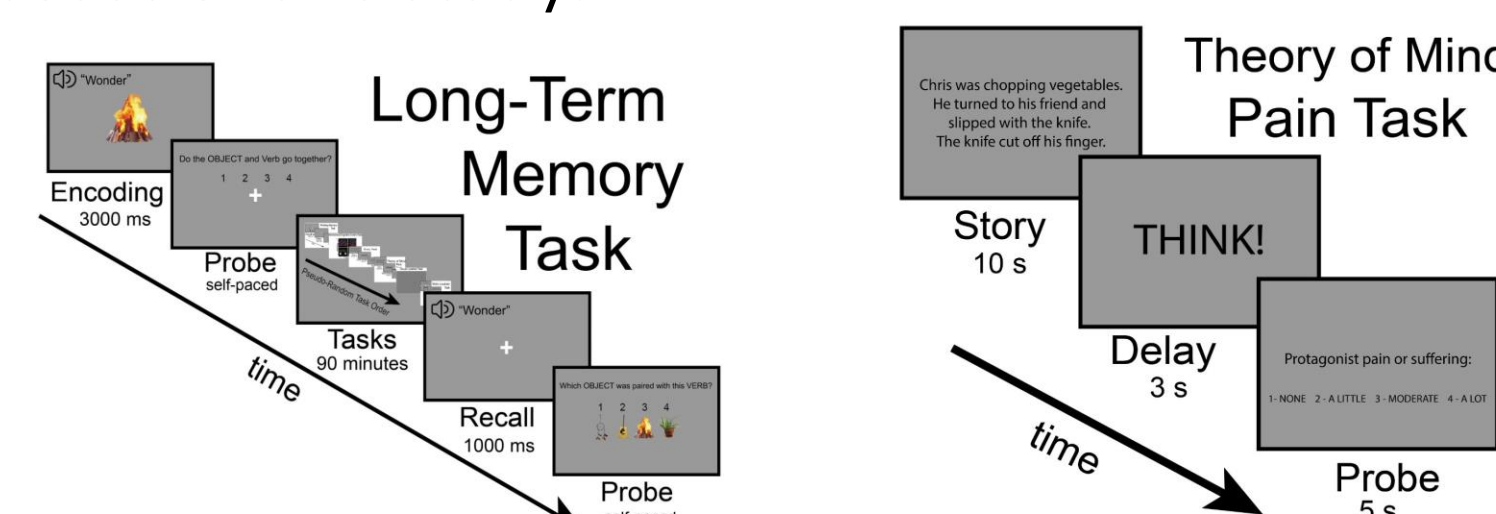
- ToM and WM have been linked because both rely on **executive processes** such as updating, inhibition, and controlled attention (Schneider et al., 2005; Oberauer, 2019; Tsujimoto, 2008).
- Longitudinal work in young children shows that individual differences in WM predict later gains in ToM (Schneider et al., 2005).
- WM, executive control, and language jointly contribute to higher-order false-belief reasoning and advanced ToM skills, though these relations are typically examined before adulthood (Schneider et al., 2005; Devine & Hughes, 2014).
- The use of ToM continues to mature into late adolescence and can differ from adult performance when tasks heavily tax WM and inhibitory control (Henry et al., 2014; Symeonidou et al., 2023)

Knowledge Gap

- Prior research has largely been concentrated early childhood, with little information regarding how WM supports advanced ToM in late adolescence and emerging adulthood, a period marked by ongoing executive development and changing social contexts (Devine & Hughes, 2014; Henry et al., 2014; Symeonidou et al., 2023).
- The present study addresses this gap by examining associations between performance on a ToM/false-belief task and a WM task in individuals aged 18–22, when core ToM concepts are established but coordination of multiple, potentially conflicting mental states may still be consolidating (Devine & Hughes, 2014; Ma et al., 2014; Symeonidou et al., 2023).

Methods

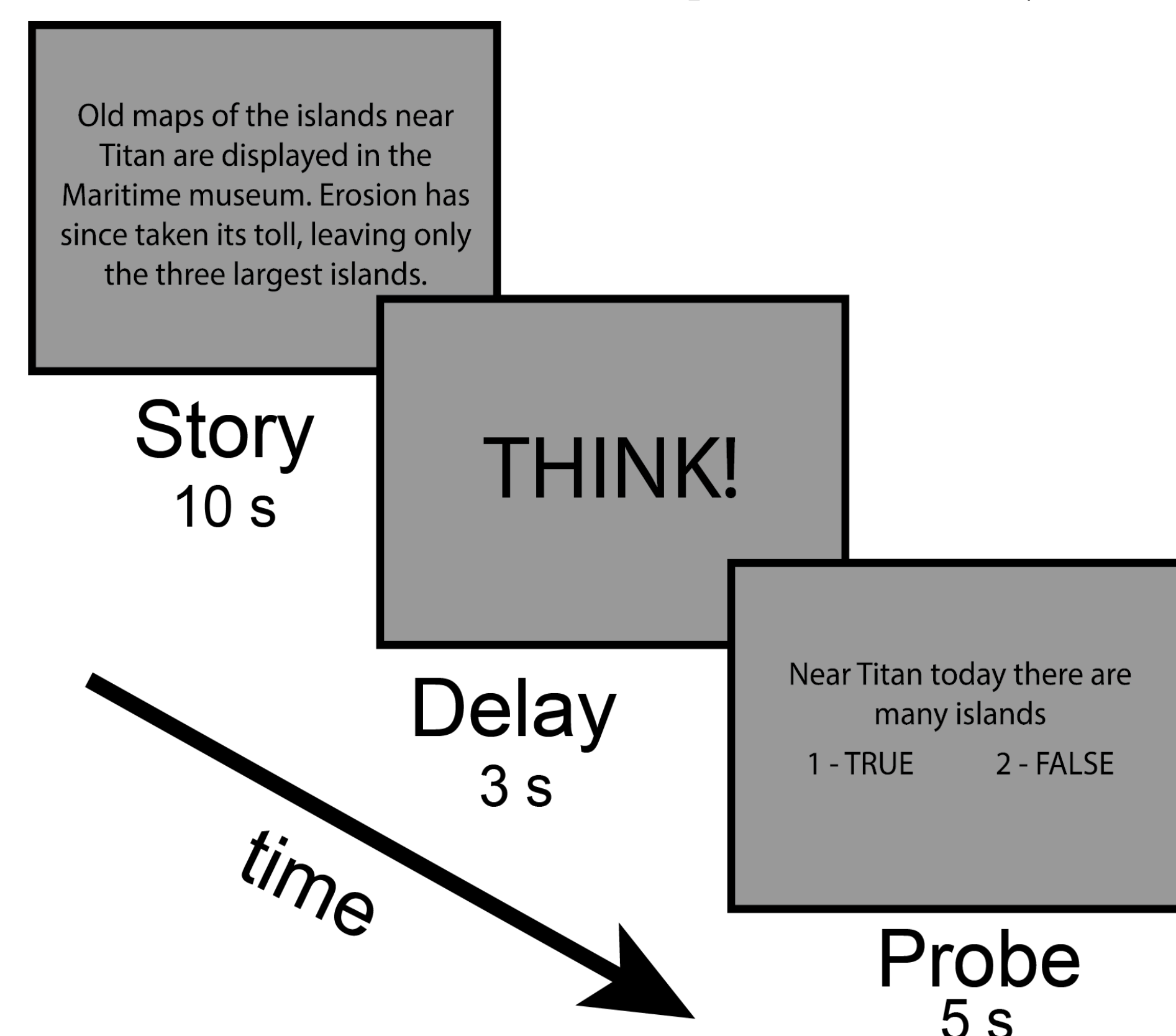
- Participants completed a series of eight tasks while though only two of the tasks, ToM and WM, were included for the purposes of this study.



- Task data was collected with high-density EEG data on a 96-channel Acti-Champ Plus system.

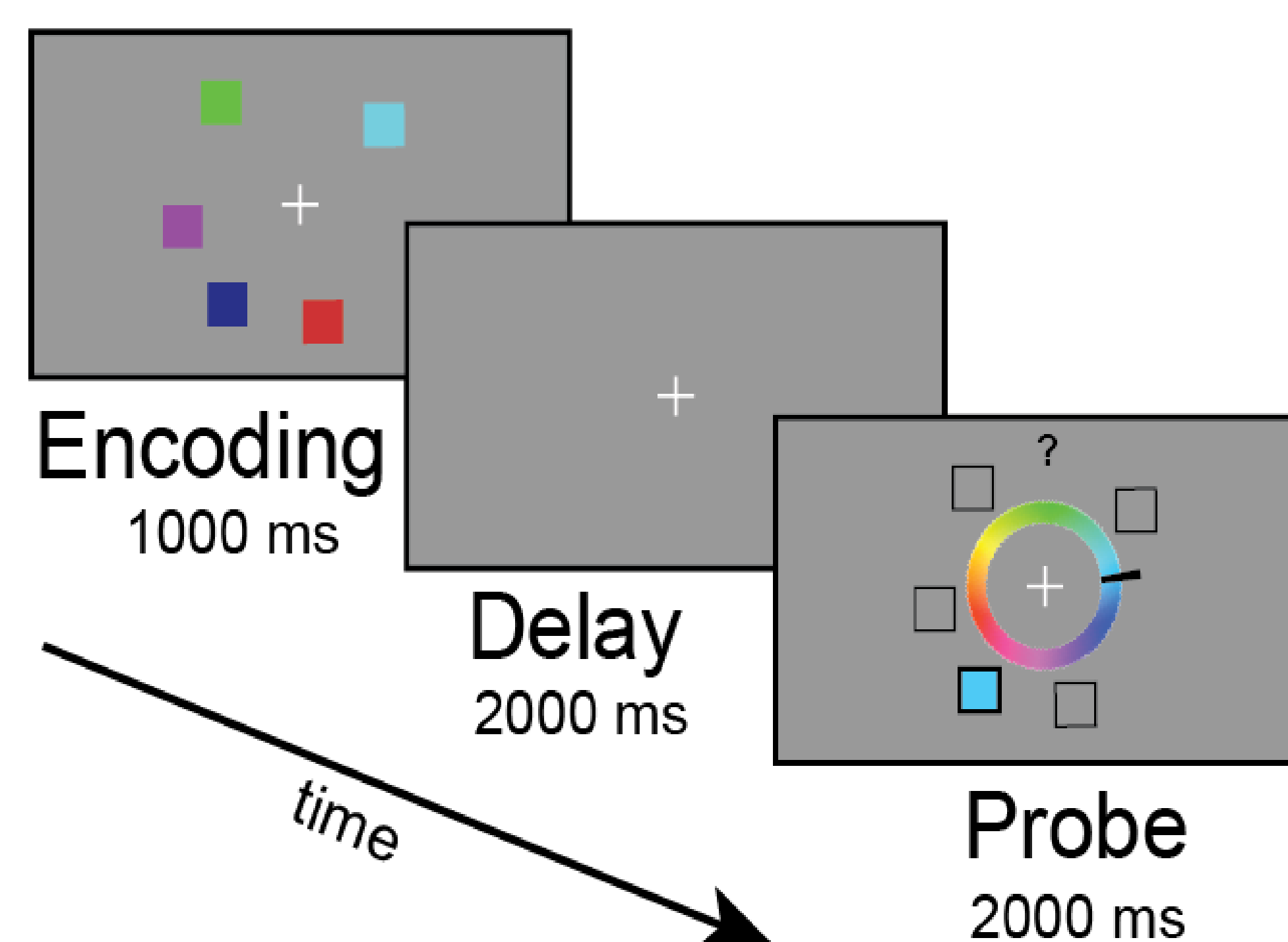


Theory of Mind (ToM) Task



- **This task presented participants with a short story**
- **Each story presented a scenario wherein one person acted without the knowledge of another**
- **The participants were given a forced choice true/false response to a question regarding the beliefs of one of the individuals**

Working Memory (WM) Task



- **This task presented participants with a pattern of colored squares**
- **The number of squares, their location, and their color all varied as did the orientation of the color wheel**
- **The participants were directed to select the color of the indicated square after encoding from the color wheel**

Hypothesis

Based on child, adolescent, and neurocognitive findings, it is expected that stronger WM will be positively related to accuracy on advanced ToM tasks that require tracking several competing beliefs (Schneider et al., 2005; Devine & Hughes, 2014; Ma et al., 2014).

Expected Results

- Participants with stronger working memory capacity will show higher accuracy on the advanced ToM/false-belief task.
- Specifically, individuals who can efficiently maintain and manipulate multiple pieces of information should be better able to track competing beliefs and resolve conflicting mental states, leading to better performance under cognitive load.
- This pattern would mirror longitudinal evidence from childhood and adolescent work showing that WM predicts later ToM gains,
- These findings would extend these associations into emerging adulthood by demonstrating that even when core ToM is already established, executive resources still meaningfully support performance on complex mental-state reasoning tasks.

Societal Relevance

- Understanding how WM supports advanced ToM reasoning in emerging adults has meaningful societal implications, particularly in domains that rely on complex social cognition.
- Late adolescence and early adulthood include major transitions such as entering college, the workforce, or new social environments, where accurately interpreting others' beliefs, emotions, and intentions is essential for collaboration, conflict resolution, and forming healthy relationships.
- If stronger WM enhances the ability to track multiple, competing mental states, this knowledge can guide educational practices that support executive development, and help identify individuals who may be at risk for social-cognitive difficulties.
- Clarifying how core social-reasoning processes continue to develop into adulthood can lead to better support structures in both academic and occupational settings.

References

- Devine, R. T., & Hughes, C. (2014). Relations between false belief understanding and executive function in early childhood: A meta-analysis. *Child Development, 85*(5), 1777–1794.
- Henry, J. D., Phillips, L. H., Ruffman, T., & Bailey, P. E. (2013). A meta-analytic review of age differences in theory of mind. *Psychology and Aging, 28*(3), 826–839.
- Ma, N., Vandekerckhove, M., Baetens, K., Overwalle, F. V., Seurinck, R., Fias, W., & Brass, M. (2014). Distinct neural networks support the inference of beliefs and intentions in mentalizing. *NeuroImage, 91*, 165–176.
- Oberauer, K. (2019). Working memory and attention – A conceptual analysis and review. *Journal of Cognition, 2*(1), 36.
- Schneider, W., R. Schumann-Hengsteler, & B. Sodian (Eds.), *Young children's cognitive development: Interrelationships among executive functioning, working memory, verbal ability, and theory of mind* (pp. 259–283). Lawrence Erlbaum Associates.
- Symeonidou, I., Dumontheil, I., Chow, W. Y., & Breheny, R. (2023). Developmental changes in online theory of mind use from late childhood to adulthood. *Child Development, 94*(4), 1319–1337.
- Tsujimoto, S. (2008). The prefrontal cortex: Functional neural development during early childhood. *Neuroscientist, 14*(4), 345–358.