

Neural and Cognitive Effects of Structured Narrative Reconstruction on Autobiographical

Identity Coherence in Adolescents

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Research Problem & Introduction

Adolescence is a critical and transformative developmental period in which individuals enact their ability to construct their personal, stable sense of identity through the simplistic yet intricate integration of autobiographical memory, emotional experience, and through constant social feedback. Cognitive neuroscience research has developed to the capability of identifying the Default Mode Network (DMN); additionally, the medial prefrontal cortex and hippocampal regions are central to the self-referential thought processes and autobiographical memory retrieval (Buckner et al., 2008; Svoboda et al., 2006).

In parallel, psychological research that has been founded within narrative identity theory suggests that individuals organize their life experiences into unique internal “life stories” that act to shape their sense of identity coherence and emotional regulation (McAdams, 2001). Structured reflective writing interventions have demonstrated their effectiveness in improving emotional processes and psychological well-being (Pennebaker & Seagal, 1999), further suggesting that narrative reconstruction may act as a primary factor in identity formation.

However, a key gap exists between these corresponding fields: while narrative-based interventions are widely studied within psychology, there is a prevalent limitation within the understanding of how structured narrative reconstruction can act in relation to measurable changes in cognitive organization and neural self-referential processing. Specifically, it has remained unclear whether changes in autobiographical narrative structure conform in response to alterations in brain network activity, commonly associated with self-processing.

This study will address this perceived gap by examining the active relationship between structured narrative reconstruction, autobiographical narrative coherence, and self-referential cognitive processes that tend to emerge within adolescents.

Literature Review

The Default Mode Network (DMN) has been consistently identified as a set of core neural systems in self-referential cognition, autobiographical memory retrieval, and internal narrative construction (Buckner et al., 2008). Within this intricate network, the medial prefrontal cortex is associated with an individual's self-evaluation and identity processing, while the hippocampus supports memory integration and fleeting organization of personal experiences (Svoboda et al., 2006).

Psychological theories that have been uncovered of narrative identity propose that individuals construct their own personal sense of meaning through internalized life narratives, which provide continuity across past, present, and future selves (McAdams, 2001). Narrative coherence has been consistently linked to psychological well-being and adaptive emotional functioning (Adler et al., 2016).

Expressive writing research that has been built upon demonstrates that structured reflection on emotional experiences can aid in improving cognitive organization of memories and support psychological adjustment (Pennebaker & Seagal, 1999). However, these studies

primarily focus on the behavioral and clinical outcomes, without directly displaying connectivity to narrative reconstruction of the underlying neural mechanism of self-referential processing.

This in turn creates a gap between cognitive neuroscience and narrative psychology: while both fields independently study different aspects of identity, few studies have integrated behavioral narrative structure with neural-level self-processing systems over spans of time.

Research Question

How does structured narrative reconstruction influence autobiographical narrative coherence, and how is this change associated with self-referential cognitive processing over time in adolescents?

Methodology

Study Design

A longitudinal mixed-method design that spans over 8-10 weeks will be implemented to examine changes within autobiographical narrative coherence and self-referential cognitive processing.

Participants

Participants will be adolescents aged 15-18, randomly assigned into:

- **Experimental Group:** Structured narrative reconstruction intervention.
- **Control Group:** Neutral journaling (daily activity description without reflection or interpretation)

Procedure

Phase 1: Baseline Assessment

Participants will complete:

- Autobiographical narrative interviews (recorded and transcribed).
- Narrative coherence assessment employing a structure sequenced rubric.
- Self-report measures of identity clarity and emotional regulation
- Memory recall tasks (behavioral measures of self-referential processing).

Phase 2: Intervention (6-8 weeks)

Experimental Group:

Participants respond to clear, structured prompts that are designed to encourage narrative integration, such as:

- “Describe a significant life event and explain how it influenced your understanding of yourself.”
- “How has this experience shaped your current identity and future goals?”

Control Group:

Participants describe the daily activities of these individuals without reflective or imperative content in contrast.

Phase 3: Post-Assessment

All baseline measures are repeated, including:

- Narrative Interviews
- Coherence Scoring

- Psychological Assessments
- Memory Recall Task

Measures

1. Autobiographical Narrative Coherence Index

Narratives will be coded across:

- Temporary Integration (linking past, present, and future self)
- Casual-Based Reasoning (explaining how events shaped identity)
- Identity Consistency (stability of self-description over time)

2. Cognitive Self-Referential Processing (proxy measure)

Rather than primarily requiring direct neuroimaging access, this study will implement:

- Validated behavioral tasks or self-referential memory retrieval.
- Comparisons with findings from existing DMN literature datasets (e.g., Human Connectome Project).

3. Psychological Measures

- Identification of Clarity Scales.
- Emotional Regulation Questionnaires.

Data Analysis

- Paired t-tests to assess pre/post changes within each group.
- Independent t-tests between the individual groups.
- Correlational analysis between the narrative coherence and cognitive performance measures.
- Qualitative contextualized analysis of narrative identity shifts.

Research Topic Significance

This research addresses an important interdisciplinary gap between neuroscience and psychology by investigating how structured narrative reconstruction relates to changes in autobiographical identity, coherence, and self-referential cognitive processing.

Unlike previous research that exists, examining narrative identity or brain networks separately, this study will successfully integrate behavioral narrative analysis with cognitive neuroscience frameworks to better understand how identity is progressively constructed and potentially reshaped through structural reflection.

This finding may have implications that will be in correspondence to educational psychology, developmental psychology, and therapeutic interventions that aim to support an individual's identity development and emotional well-being in adolescents.

Conclusion & Feasibility

This study is viable within a school-based or mentored research context due to its relevance to behavioral data collection and ability through established psychological coding frameworks. While direct neuroimaging (such as fMRI) may not be particularly accessible, the study leverages validated cognitive tasks and existing applicable neuroscience literature to infer the relationships between narrative structures and self-referential processing systems.

Through the means of combining structured narrative intervention with measurable cognitive and psychological ramifications, this research provides a realistic yet conceptually developed approach to studying adolescent identity formation over a period of time.

References

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