Evaluation of the Wisdom Enhancement Timeline Approach for Post-Stroke Depression Using a Single-Case Experimental Design

Ercan Hassan[1a], Dr Fergus Gracey[1], Dr Joshua Blake[1]

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This study will aim to answer the question: *Does enhancing wisdom through the timeline technique improve mood in post-stroke depressed individuals?* Additionally, it will examine whether enhancing wisdom restores identity continuity and improves self-esteem.

It is hypothesised that wisdom will improve first, followed by gains in identity clarity or self-esteem, as structured self-reflection fosters agency and self-worth. Finally, mood regulation is expected to improve last, aligning with findings that emotional stabilisation follows meaning-making and self-affirmation rather than occurring simultaneously (Beaumont, 2009).

Methods

Design

A single-case experimental multiple-baseline design (MBD) will be adopted. Following Christ's (2007) recommendations, the study will pre-specify hypotheses, predetermine baseline durations, and randomise allocation via Random.org. Participants will be assigned to baseline durations of 2, 3, or 4 weeks, with non-concurrent intervention introduction to enhance flexibility. The independent variable will be the intervention, and the dependent variables will be mood, wisdom, identity, and self-esteem, measured repeatedly. Blinding will not be implemented due to feasibility constraints.

Although stability is generally recommended before intervention, Krasny-Pacini and Evans (2018) suggest that five baseline data points are sufficient to distinguish natural fluctuations from intervention effects. Replication will be built into the multiple-baseline design, with each participant serving as an independent test of the intervention's effects. Initially, a one-month follow-up review will be planned; however, this may be omitted if time does not permit.

Participants

Three participants will be recruited, meeting SCED standards (Epstein et al., 2021; Kratochwill et al., 2013) through local stroke services. Inclusion criteria will require adults with post-stroke depression (PSD) who can provide informed consent and engage in therapy. Exclusion criteria will include severe cognitive or mental health impairments, medical instability, substance dependency, concurrent psychological treatment, participation in clinical trials, or newly prescribed psychotropic medication that has not yet stabilised. Participants who start psychotropic medication during the trial will remain eligible, as SCED analysis can account for medication-related changes.

NHS clinical teams will identify eligible participants, seeking permission for the researcher to contact them, while the author will conduct eligibility assessments and deliver the intervention. After the baseline phase, participants will attend six weekly sessions, either in person at a hospital or online via video conference.

Measures

Participants will receive a measure pack containing all measures, along with questions on medication use and adverse events.

Idiographic Visual Analogue Scale

The primary outcome will be assessed using a Visual Analogue Scale (VAS), a widely used measure

for tracking subjective experiences in clinical research (McCormack et al., 1988). Participants will rate their agreement with four daily statements on vertically presented 10 cm scales, with higher scores indicating stronger agreement. VAS items will be aligned with the research questions and reviewed for relevance by individuals with lived stroke experience via the university's Personal and Public Involvement (PPI) database.

The four VAS items will be:

1. Today, my mood is good (VAS_mood)
2. Today, I feel able to accept the person I am/Today, I feel like I am adapting to life after my stroke (identity; VAS_ID)
3. Today, I feel good about myself (self-esteem; VAS_SE)
4. Today, I feel that I can use the wisdom of my life to help me deal with my current problems (VAS_wisdom)

Standardised Measure

The Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) will assess pre–post clinical mood changes. This nine-item tool (scoring 0–27) reliably detects clinically significant depression and is validated for PSD screening across diverse demographic groups with minimal somatic symptom confounding (Blake et al., 2025; Katzan et al., 2021).

Intervention

Laidlaw's (2021) Wisdom Enhancement Timeline will be delivered in six structured, manualised sessions (Table 1), guiding participants through autobiographical reflection using a visual timeline of meaningful life events. To ensure accessibility and relevance, the manual will be reviewed for comprehensibility by individuals with lived stroke experience via the university's PPI panel.

Fidelity will be monitored through recorded sessions and assessed using the Revised Cognitive Therapy Scale (CTS-R; James et al., 2001), which evaluates therapeutic quality and adherence to the CBT framework. Ratings will be conducted by a Clinical Psychologist supervising the author, ensuring competence and consistency in intervention delivery.

Table 1. Overview of the Intervention Sessions and Key Objectives

Session	Focus	Key Activities
1	Information gathering, rapport-building and goal setting	Assess individual difficulties, set client-focused goals
2	Psychoeducation on stroke impact and introduction to the timeline	Discuss changes in identity, mood and self-esteem; introduce the concept of wisdom and the timeline intervention
3	Reflected on timeline events	Reflect on complex life events, promote resilience, meaning-making, self-compassion, and self-acceptance
4–5	Active change methods	Explore past coping strategies and identify significance in events of regret

Session	Focus	Key Activities
6	Review and consolidation	Reflect on learning, review new perspectives

Ethical Statement

The study will adhere to the Ethical Principles of Psychologists and Code of Conduct set by the BABCP and BPS. Ethical approval will be granted by the South Yorkshire Research Ethics Committee (24/YH/0055) and the UK Health Research Authority. The study will be registered on ClinicalTrials.gov (NCT06451965).

Analysis

Both single-case visual and statistical techniques will be used following best practices (Harrington & Velicer, 2015; Manolov & Moeyaert, 2017). Visual analysis will assess phase variability using a ±25% stability envelope (Lane & Gast, 2014). Higher percentages will indicate greater stability, and lower percentages will reflect greater variability.

To assess whether VAS ratings during the intervention phase are higher than baseline, Tau-U (Parker et al., 2011) will be implemented. It will account for baseline trends, effect sizes, and phase non-overlap. Resistant to autocorrelation, Tau-U provides strong statistical power in small datasets (Parker et al., 2014). Interpretations will follow Vannest and Ninci's (2015) guidelines, with baseline corrections applied as needed to prevent inflated effect sizes.

Piecewise regression (Center et al., 1985) will complement Tau-U findings by quantifying change over time within each phase. Level and slope changes will be examined, estimating the breakpoint for outcome improvements. This approach will model level shifts and gradual trends while considering data variability and abrupt changes (Tate & Perdices, 2018).

To address autocorrelation, lag-1 autocorrelation will be assessed, and if detected, Generalised Least Squares (GLS) regression with an AR(1) structure will be applied (Somer et al., 2022).

Reliable change in PHQ-9 will be measured via the Reliable Change Index (RCI; Jacobson & Truax, 1991), with Cronbach's $\alpha = 0.79$ (De Man-Van Ginkel et al., 2012) and a stroke sample SD of 5.1 (Strong et al., 2021). Clinically Significant Change (CSC) will not be determined due to limited non-clinical-normative data for stroke populations. Given concerns about the comparability of PHQ-9 scores between stroke and non-stroke populations (Blake et al., 2025), data from other populations will not be considered. Instead, a cut-off of 10 will be applied to approximate clinically meaningful change, based on validated studies (De Man-Van Ginkel et al., 2012; Negeri et al., 2021; Williams et al., 2005).