Trauma-Related Memory Disturbance: Are the Origins Rooted in Maladaptive Encoding or Maladaptive Metamemory?

Andrew M. Sherrill, M.A.
Phyllice Lim, M.A.
Center for the Study of Family Violence and Sexual Assault
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Overview

- Background of PTSD:
  - DSM-5 symptom criteria
  - Trauma-related memory disturbance

- Current literature:
  - Clinical theories
  - Empirical evidence and (surprising) limitations

- Two dissertations:
  - Andrew:
    - Peritraumatic Encoding Disruption Hypothesis
  - Phyllice:
    - Metamemory Hypothesis

DSM-5 PTSD Criteria

- (A) Exposure to actual or threatened death, serious injury, or sexual violence
  - Direct exposure (direct infliction, in-person witnessing), or...
  - Indirect exposure (professional duties, learning about violent events inflicted upon a close relative or close friend)

- The following characteristics must be present for more than one month after the event has occurred:
  - (B) persistent and unwanted intrusions or re-experiencing
  - (C) persistent effortful avoidance of trauma-related stimuli
  - (D) negative alterations in cognitions and mood
  - (E) alterations in arousal and reactivity

PTSD-Related Memory Disturbance

- Trauma-Related Memory Problems:
  - Strong involuntary memory (i.e., flashbacks/re-experiencing)
    - Criterion B1: Experience of recurrent, involuntary, and highly emotional and intrusive recollections of the traumatic event
  - Weak voluntary memory (i.e., fragmentation/disorganization)
    - Criterion D1: The inability to remember critical details of the traumatic event
PTSD-Related Memory Disturbance

- **Peritraumatic Encoding Disruption Hypothesis:**
  - Premise:
    - Memory disturbance is caused by a stress-induced disruption during encoding whereby perceptual processing is "decoupled" from conceptual processing.
    - Or encoding becomes more "shallow" or "data-driven"
  - Highly influential to empirically-supported clinical treatments:
    - Prolonged Exposure
    - Cognitive Processing Therapy
  - Surprisingly weak evidence:
    - Poor ecological validity of experimental tasks
    - No moment-to-moment data
    - Retrospective/subjective reports of peritraumatic encoding
  - **Okay...**
    - *But how can you measure moment-to-moment peritraumatic encoding? (Later)*

- **An alternative:** The Metamemory Hypothesis
  - Metamemory: "people’s knowledge of, monitoring of, and control of their own learning and memory processes"
  - One facet of metamemory is perceived memory confidence
    - The internal subjective estimation of the accuracy of one’s recollection
    - A "calibration" process, resulting in under- or over-confidence
  - The phenomenon of memory underconfidence is informative with respect to trauma research and PTSD
    - Paradoxical effect of retrieval on perceived memory completeness
    - Misinformation effects
    - Metamemory is inducible and may impact memory
PTSD-Related Memory Disturbance

- **An alternative: The Metamemory Hypothesis**
  - Premise:
    - In self-reports, memory disturbance may reflect *subjective beliefs* about their memory functioning rather than actual memory performance
  - Methodological concerns
    - Limited trauma studies
    - Metacognitive theory of PTSD
  - Contradicts major clinical theories/therapies of PTSD
  - Okay...
    - *But how can you tease apart “objective memory” from “subjective memory”?

Two “Sibling” Dissertations

- Andrew’s Dissertation
  - Aim: To test the *peritraumatic encoding disruption (PED) hypothesis* by assessing a novel marker of *moment-to-moment encoding* within the context of the stressful film paradigm.

- Phylice’s Dissertation
  - Aim: To test the *metamemory hypothesis* by assessing *objective memory performance* and *subjective memory performance* within the context of the stressful film paradigm.

Andrew’s Dissertation:

*But how can you measure moment-to-moment encoding?*

- **One** method: **Event Segmentation**
  - Emerging field with cognitive psychology
  - Time as the “4th Dimension of Perception”
  - Just like we segment *spatial units* as a chunking mechanism...
  - We also segment *temporal units.*
Andrew’s Dissertation:
Brief Introduction to Event Segmentation

- Event segmentation:
  o Definition: Process of identifying boundaries between smaller events that make up a larger event

- How do you measure it?
  o Indicating “meaningful units of activity”

- Memory Implications:
  o Unsystematic segmentation linked to poor recall
  o Why?
    • Event boundaries = memory anchors

Andrew’s Dissertation:
Segmentation as Context to test “PED Hypothesis”

- Why is event segmentation an encoding process that can be disrupted during a stressful experience?
  - Overt attentional avoidance: 
    o If you look away, encoding will not profit from visual input

  - Insufficient event knowledge: 
    o If you are unfamiliar with the event, encoding will depend more on changes in physical activity, which might not be useful

  - Affect-related attentional interference: 
    o If you experience affective responses, encoding can be biased toward perceptual info and away from conceptual info

Andrew’s Dissertation:
Overview of Study

- Participants:
  “Healthy” PSYC 102 Students (N = 176)

- Hybrid design:
  o Event Segmentation Task + Stressful Film Paradigm

- Predictor:
  o Changes in state anxiety

- Mediator:
  o Systematicity of event segmentation (next slide)

- Memory outcome:
  o Free recall (seven minutes)

- Control variables:
  o Level of attentiveness to film (self-report)
  o Prior knowledge (i.e., rape scripts)

Systematic Segmentation vs. Unsystematic Segmentation
Andrew’s Dissertation:
Prediction based on PED Hypothesis

Phylice’s Dissertation:
Memory and Metamemory in Predicting Trauma Outcomes

- **Purpose:**
  - To investigate the associations between memory and metamemory, as well as their unique contributions to posttrauma negative affect.
- **Participants:**
  - 80 “healthy” PSYC102 students
- **Design:**
  - Between-subjects design (metamemory belief manipulation – positive and negative)

Phylice’s Dissertation:
Measures

- **Prescreening:**
  - PTSD Checklist for DSM-5 (PCL-5) 23
- **Main variables of interest:**
  - Objective memory fragmentation: Verbal Recall Task 24, 25
  - Subjective memory fragmentation: TMQ 24
  - Actual memory ability: Wechsler Memory Scales-IV (WMS-IV) 26
  - Perceived memory ability: MACCS 27

Phylice’s Dissertation:
Analogue trauma and memory assessment

- **Subjective memory fragmentation:**
  - Trauma Memory Questionnaire (TMQ) 24
- **Objective memory fragmentation:**
  - Verbal free recall task 24, 25 for eight minutes
  - Audio recorded and transcribed
  - Scoring rules 24 - 26, 28
Phylice’s Dissertation: Procedures (~90 Minutes)

1. Informed consent
2. Initial measures
   (Demographic questionnaire, Preference for Distressing Films, MDI, MACCS)
3. Administration of Wechsler Memory Scales-IV
4. Bogus feedback (+ve and –ve) on WMS-IV performance
5. Post-Feedback Questionnaire
6. T1 PANAS
7. Trauma Film
8. Peritraumatic Dissociation Experience Questionnaire
   ++ Distracter arithmetic task (5 mins) ++
9. Sequential memory task
10. Trauma Memory Questionnaire
11. T2 PANAS
12. Life Events Checklist for DSM-5
13. Debriefing and probe for suspicion

Phylice’s Dissertation: Aims and Hypotheses

- **Aim 1**: Examine the impact of metamemory on objective trauma memory fragmentation

- **Hypothesis 1.1** Manipulating an individual to believe that their memory abilities are poor will adversely impact their objective memory fragmentation scores.

- **Aim 2**: Examine effects of memory ability and metamemory belief on trauma memory fragmentation (objective and subjective).

- **Hypothesis 2.1** Memory ability will negatively predict objective memory fragmentation above and beyond metamemory belief (i.e., WMS-IV feedback).

- **Hypothesis 2.2** Metamemory belief will predict subjective memory fragmentation above and beyond memory ability.

The End

- **Questions**:
  - Trauma-Related Memory Disturbance?
  - Andrew’s Dissertation?
  - Phylice’s Dissertation?
Supplementary Slides

- Stimuli Notes
  - Phylice's stimulus: Traffic Accident Scene
- Event Segmentation Theory
- References

Andrew's Dissertation:
Stimuli: *Irréversible*

- Summary:
  - A woman is brutally raped; her boyfriend murders the rapist
- Reviews:
  - Unrated; Tomatometer: 57%; 2002 Best Film in Stockholm Film Festival
- Useful stress inducer 29
- Is it useful for the dissertation's purpose?
  - No continuity editing; one continuous shoot (with some zooms)
  - Closer to the actual phenomenon (i.e., rape is a common traumatic event)
  - Individual differences in event knowledge can be assessed (as continuous variable) using rape scripts literature 30
    - Irreversible = "real rape script" (knowledge structure)

Phylice's Dissertation:
Stimuli: Traffic Accident Scene

- Trauma video stimulus
  - 5-minute traffic accident safety video
  - Contains distressing graphic scenes of the aftermath of a fictional traffic accident, including images of severe injuries and dead bodies
  - Projected on a 20 x 10 inch laptop screen
  - Effective in inducing short-term distress 35

Event Segmentation Theory 31