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Behavioural evidence of suppression-induced forgetting and its interaction with psychological traits

10 Jun 2022

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Outline

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- Suppression-induced forgetting
- Study-1: T/NT-Extension
- Study-2: T/NT-Traits

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Deliberate attempts to suppress certain thoughts actually make them more likely to surface.

Introduction

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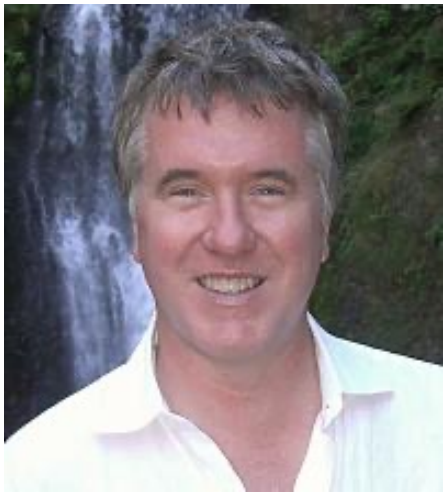
- Mechanisms of forgetting: passive, interference, motivated forgetting
- Motivated forgetting: during encoding, during retrieval (Anderson & Hanslmayr, 2014)
- The Think/No-think Paradigm (T/NT) (Green & Anderson, 2001)
- Used to investigate whether people can *actively* suppress unwanted memories and the degree to which such suppression can affect subsequent recall.



Prof Michael Anderson

The T/NT phases

Phase 1 (Learning): 50 associated **cue-response** word pairs such as "ORPHAN – LAMB"

Cue	Response
ORPHAN	LAMB
LEVER	STEEL
VITAMIN	LEMON
BROOM	HOUSE
CLUSTER	NECKLACE
RIM	GRANITE
VICE	CIGAR
MOSS	NORTH

Feedback

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ORPHAN –

Phase 2

- Manipulation: 15 No-Think, the rest Think

- ORPHAN – LAMB (No-Think)
- LEVER – STEEL (Think)

- 0 (Baseline), 1, 8, and 16

Phase 3

- Phase 3 (Recall):
  - Same-cue test (SCT)
  - Independent-cue test (ICT)
- The rate is compared with the baseline

SCT

For ORPHAN – LAMB

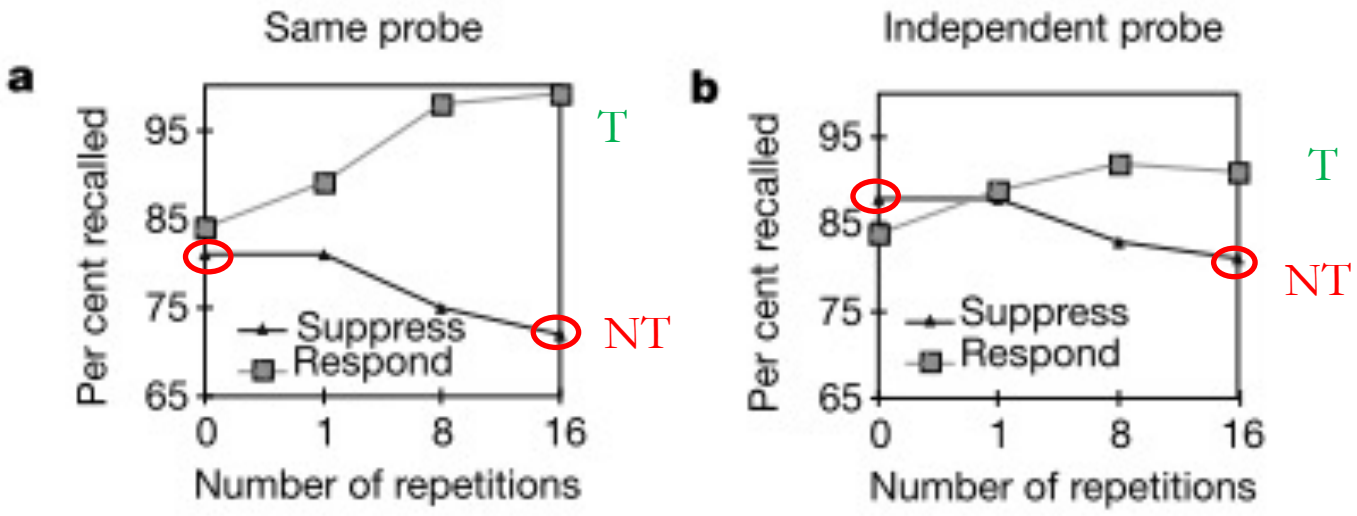
ORPHAN -

ICT

For ORPHAN – LAMB

ANIMAL - L

T/NT Results



(Green & Anderson, 2001)

T/NT continued

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- Active process of response inhibition, uses executive function systems
- The executive deficit hypothesis
- Works well with direct suppression:
  - Direct suppression: ORPHAN – LAMB
- Thought-substitution: Generating new thoughts to occupy working memory (Levy & Anderson, 2002): ORPHAN – BOB
- T/NT instructions make sure this does not happen. See the next slide:

Controlling for suppression vs. substitution

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Guidelines: You should accomplish this by trying to block thinking of the Response word, but NOT by replacing it with any other thoughts, like another word, image or idea. To repeat: do not think of anything else other than the Cue word while you are blocking the Response word. Just keep paying attention to and looking at the Cue word the entire time.

During experiment: Diagnostic questionnaire and post-experimental questionnaire

Uses of T/NT

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1. The relationship between suppression ability and traumatic memories
2. Countermeasure of Brain Fingerprinting (BFP)

Interaction between TNT and traumatic memories

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- Trained on cue-response pictures
- fMRI of prefrontal regions, emotional control areas, and visual processing areas were recorded while conducting the TNT task
- Results demonstrated that neural activity increased in the mentioned brain centres during the NT trials – suggesting these areas were involved with the control of emotional memories
- We can exert cognitive control over emotionally distressing memories in conditions such as PTSD and OCD

Depue et al. (2007)

- Is deficiency in retrieval suppression (NT) a potential risk factor for subsequent PTSD?
- Participants went through a TNT procedure, then watched either a *mild traumatic* or a *neutral* clip, and were asked to register any ruminating thoughts of that clip
- Those who had deficit in the ability to perform NT had higher registration of ruminating thoughts
- Participants with better NT performance reported fewer intrusive distressing memories than participants with lower retrieval suppression abilities

Streb et al. (2016)

TNT study at UC

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- $n = 24$
- 63 word pairs: 15 fillers and 48 remaining were divided into *Baseline*, *Think* and *No-Think*
- Frequency: 12 vs. Baseline
- Collected PCL-C (PTSD) and YBOCS (OCD) scores
- Both recall types: SCT and ICT

Our findings:

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- SCT:
  - Baseline and T recall were not significantly different, $F(1,23) = 1.26$, $p = .273$
  - Baseline and NT recall were not significantly different, $F(1,23) = 0.98$, $p = .332$
- ICT:
  - Baseline and T recall were not significantly different, $F(1,23) = 2.79$, $p = .108$
  - Baseline and NT recall **were significantly different**, $F(1,23) = 6.46$, $p = .018$ (Baseline recall $M = 13.17$ and NT recall $M = 12.25$)

Controlling for YBOCS and PCL-C

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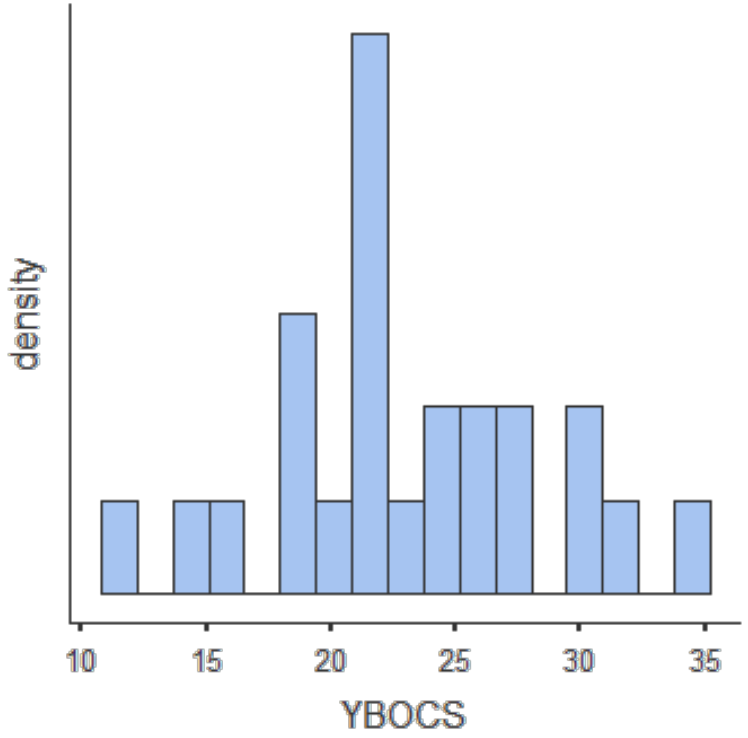
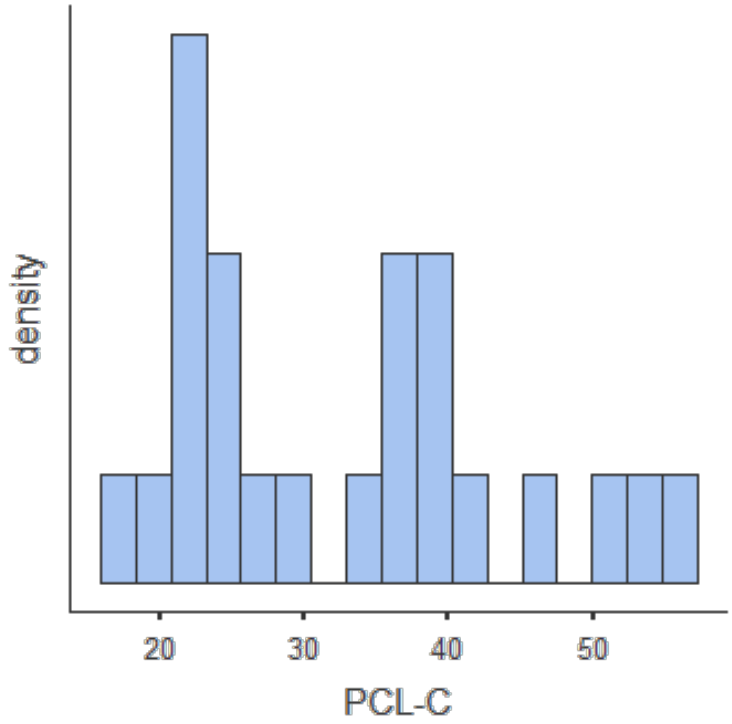
- SCT:
  - Baseline and T recall **were significantly different**, $F(1,21) = 7.56$, $p = .012$ (Baseline recall $M = 12.90$ and NT recall $M = 13.27$)
  - Baseline and NT recall were not significantly different, $F(1,21) = 0.41$, $p = .527$
- ICT:
  - Baseline and T recall were not significantly different, $F(1,21) = 0.99$, $p = .332$
  - Baseline and NT recall were not significantly different, $F(1,21) = 0.39$, $p = .54$

What is happening?





Conclusions:

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- Is TNT not working to begin with?
  - Previous studies had neuroscience components
  - Minimum frequency of suppression
  - Is it due to high PCL-C and YBOCS scores?
- Or is it that BFP is a robust technique that cannot be countered with TNT
- Back to the Pink Elephants:
  - ORPHAN – Pink Elephant (No-Think)

References

- Green, C., & Anderson, M. C. (2001). Suppressing unwanted memories by executive control. *Nature, 410*(6826), 366-369. https://doi.org/10.1038/35066572
- Levy, B. J., & Anderson, M. C. (2002). Inhibitory processes and the control of memory retrieval. *Trends in cognitive sciences, 6*(7), 299-305.
- Depue, B. E., Curran, T., & Banich, M. T. (2007). Prefrontal Regions Orchestrate Suppression of Emotional Memories via a Two-Phase Process. *Science, 317*(5835), 215-219. https://doi.org/10.1126/science.1139560
- Streb, M., Mecklinger, A., Anderson, M. C., Lass-Hennemann, J., & Michael, T. (2016). Memory control ability modulates intrusive memories after analogue trauma. *Journal of affective disorders, 192*, 134-142.

Before you leave...

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Please collect your final lab quiz slips from Cam!