The Influence of Mood on Cognition: Depression and Generalized Anxiety's effect on False Memory Formation

Estelle Huskins, Steena Johnson, Adrieanna Summers, Helen White

Department of Psychology, Saint Olaf College

Author order determined alphabetically, all authors contributed equally

Introduction

Previous research suggests that those experiencing mental illness, such as depression or generalized anxiety disorder are likely more susceptible to the false reconstruction of memories from an overall generalization of an event rather than an exact replication. (Muschalla & Schönborn 2021, Dewhurst et al 2016)

We hypothesize that there will be a correlation between higher scores on the GAD-7 (Spitzer et al 2006) and PHQ-9 (Kroenke & Spitzer 2002) questionnaires, which include a set of questions used to assess anxiety and depression symptoms, and total mistakes on the Deese, Roediger, McDermott (DRM) Task, where participants are read a list of words and then asked to choose words they remember out of another list. The second list will include a critical lure intended to determine whether or not people extrapolate the presence of a word absent from the list but implied by the critical lure, resulting in a false memory.

The purpose of this experiment is …

- to build on previous research by investigating how the DRM task can be used to measure false memory.
- to lead to a better understanding of the effect of mental illness on memory.

Participants

Twenty eight participants were recruited from the Psych 125 classes at St Olaf. Each participant received course credit upon completion of the study. The mean age in years was 19.28 with the standard deviation being 5.7. There were twenty females, 6 males, 1 non-binary, and 1 participant that preferred not to answer.

Method

In order to test whether mental health has an impact on susceptibility to false memory, we employed the following methods:

- Participants completed the DRM Task using four word lists, which were audio recorded by the authors. Participants listened to the recordings and, after each one, selected words they believed to have been a part of the recording.
- Some words were "critical lures", meaning that they matched the theme of the word list, but were not actually present in the recording. Participants were presented with 7 answer choices, including 5 words that were actually present on the recording, 1 word that was the critical lure, and 1 word that was entirely unrelated.
- Participants filled out (in the same survey) the PHQ-9 and GAD-7 questionnaires (excluding questions about self-harm). These questionnaires employed a Likert scale (0-4, 4 being the highest).
- Questions included prompt "Over the last two weeks, how often have you been bothered by the following problems?", followed by symptoms of depression and anxiety. Participants were asked to answer to the best of their ability barring any social stigma.

False Memory Task Lists

DRM list #1: RIPE, CITRUS, VEGETABLE, JUICE, COCKTAIL, BANANA, ORANGE, BASKET, BOWL, SALAD, BERRY, KIWI, PEAR, APPLE, CHERRY | *Critical Lure:* FRUIT

DRM list #2: DESK, CUSHION, COUCH, BENCH, SIT, SWIVEL, SOFA, RECLINER, ROCKING, SITTING, LEGS, TABLE, SEAT, WOOD, STOOL | *Critical Lure:* CHAIR

DRM list #3: DELAY, LETHARGIC, MOLASSES, SLUGGISH, TRAFFIC, WAIT, HESITANT, SPEED, FAST, LISTLESS, STOP, SNAIL, QUICK, TURTLE, CAUTIOUS | *Critical Lure:* SLOW

DRM list #4: HAND, SMELL, TOE, WALK, KICK, ANKLE, INCH, MOUTH, SANDALS, ARM, YARD, SOCK, BOOT, SOCCER, SHOE | *Critical Lure:* FOOT

Results
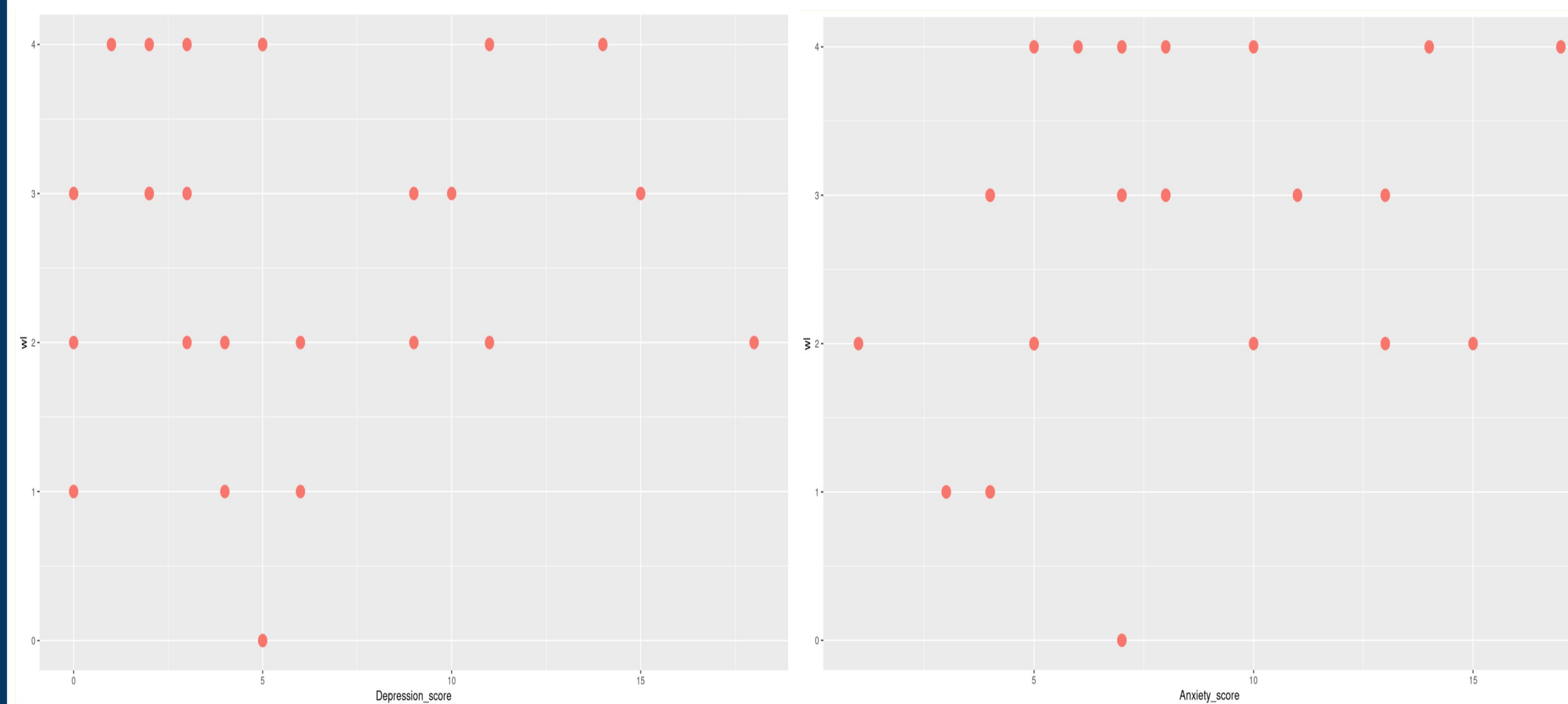
The above scatterplot graphs demonstrate calculated Depression scores and Generalized Anxiety scores on the X-axis. Critical lure words detected per participant are represented on the Y-axis. Participants who received a 0 for 'wl' didn't select any critical lure words (words like "fruit" or "chair"). Similarly, participants who received a 4 for 'wl' selected all critical lure words being shown (4 total, 1 in each DRM list presented). The mean depression score is 5.5 and the mean anxiety score is 7.4. The mean critical lure words detected is 2.5.

As anxiety scores increase, so too does the number of critical lure words selected by participants however this trend is less visible for depression. Notably, outliers are present with some participants detecting 0 lures while others detected 4.

We tested for correlation between our paired samples of mood tests against lure detection using a Pearson correlation method and noticed a moderate positive correlation between anxiety scores and critical lures, $r(26)=.39$, $p=.04$ while the relationship between depression and critical lures was non-significant $r(26)= 0.11$, $p= 0.56$.

Discussion

- There was no significant relationship between depression scores and susceptibility to critical lures, but there was a significant correlation between GAD (anxiety) scores critical lure susceptibility.
  - Our results differ from Storbeck et al. (2005) study that suggested negative mood decreases likelihood of susceptibility to critical lures.
  - Previous studies support our findings related to anxiety, depression and anxiety correlated with increased susceptibility to false memory (Toffalini et al. 2015; Dewhurst et al. 2016).
- Limitations:
  - Data of two participants was never collected and could not be used (final sample was 28 rather than 30)
- Future directions: Our experiment tested participants' moods "as is" without manipulation of mood. We propose future studies integrate conditions such as chronic anxiety and depression into similar methods of previous studies such as Storbeck et al. (2005), Toffalini et al. (2015) and Dewhurst et al. (2016) to understand how chronic emotional affect impacts false memory formation.
- Practical applications: Assess impact of mood state and mental health on memory and executive functioning through similar experiments.

References

Dewhurst, Anderson, R. J., Grace, L., & van Esch, L. (2016). Adaptive false memory: Imagining future scenarios increases false memories in the DRM paradigm. Memory & Cognition, 44(7), 1076–1084. https://doi.org/10.3758/s13421-016-0620-0

DRM False Memory Lists. https://www3.nd.edu/~memory/OLD/Materials/DRM.pdf

Kroenke, K. & Spitzer, R.L. (2002). The PHQ-9: A new depression and diagnostic severity measure. Psychiatric Annals, 32, 509-521.

Muschalla, & Schönborn, F. (2021). Induction of false beliefs and false memories in laboratory studies—A systematic review. *Clinical Psychology and Psychotherapy*, 28(5), 1194–1209. https://doi.org/10.1002/cpp.2567.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). Generalized Anxiety Disorder 7 (GAD-7) Questionnaire.

Storbeck et al. (2005). With Sadness Comes Accuracy: With Happiness, False Memory, Americal Psychological Society, 16, 785-791. https://journals.sagepub.com/doi/pdf/10.1111/j.1467-9280.2005.01615.x

Toffalini, Mirandola, C., Coli, T., & Cornoldi, C. (2015). High trait anxiety increases inferential false memories for negative (but not positive) emotional events. Personality and Individual Differences, 75, 201–204. https://doi.org/10.1016/j.paid.2014.11.029

Author Note