

Selective Attention, Memory, and Alexithymia: Performances on an Emotional Stroop Task and WMS-III Subtests

Rachel A. DiStefano, Department of Psychology

WHAT IS ALEXITHYMIA?

Greek for “an absence of words for emotion,” alexithymia is a personality construct that is characterized by deficits in emotion processing. Although it is not a psychiatric disorder, high rates of comorbidity are found in patients with depression, alcoholism, and eating disorders. There are four facets of alexithymia: (i) difficulty identifying emotions; (ii) difficulty describing emotions; (iii) a constricted imagination; and (iv) a tendency to think concretely.

Alexithymia affects a sizeable portion (13%) of the general population with a range of impairments in their everyday lives. Thus, it is important to understand the etiology. Currently, the cognitive processes underlying alexithymia remain unclear.



RESEARCH AIMS

- Study 1 examined selective attention and memory for emotional stimuli. Previous research has found that all individuals take longer to color-name emotion words as compared to neutral words, but that it takes alexithymic individuals even longer. An alternative mechanism was proposed, such that high-alexithymic individuals were expected to pay equal attention to emotional and neutral stimuli. It was also hypothesized that subsequent memory for emotional stimuli would be impaired.
- Because the tasks in Study 1 were verbal in nature, Study 2 explored an alternative explanation for differences between high- and low-alexithymic groups. Although it is possible that high-alexithymics have a deficit for verbal material, it was hypothesized that emotional processing deficits in alexithymia are in fact driven by the emotional aspect of stimuli.

Study 1: Attention & Alexithymia

METHOD

- Participants ($N = 72$) were right-handed, non-colorblind undergraduates, who completed self-report measures of alexithymia.
- Selective attention was assessed using a computerized emotional Stroop (eStroop) task measuring reaction time and accuracy. Word stimuli for the eStroop included negative, neutral, and positive words.
- An incidental memory task assessed ability to recall and recognize the eStroop word stimuli.



What is eStroop?

A modified version of the classic Stroop task, in which participants report the color of the printed word while ignoring the semantic content, the eStroop uses both emotionally relevant and emotionally neutral words. The difference in reaction time (RT) to emotion words relative to neutral words indicates degree of distraction to emotion-oriented stimuli:

- $RT \text{ neg. words} - RT \text{ neut. words} = \text{Threat Stroop Effect}$
A positive value indicates **threat interference**.
A negative value indicates **threat facilitation**.
- $RT \text{ pos. words} - RT \text{ neut. words} = \text{Appetitive Stroop Effect}$
A positive value indicates **appetitive interference**.
A negative value indicates **appetitive facilitation**.

RESULTS

- Appetitive facilitators were more alexithymic.
- Principal components analysis produced two latent factors (68% of total variance) among the alexithymia subscales: a measure of attention, *Emotional Monitoring* (EM), and a measure of comprehension, *Emotional Clarity* (EC).
- There was a trend between EM and average RT, such that high-EM individuals took longer to color-name all types of words than low-EM individuals; high-EM individuals also committed more errors than low-EM individuals.
- High-EC individuals made fewer recognition errors for incorrect negative words (i.e., distracters) as compared to low-EC individuals; there was also a trend such that high-EC individuals recognized fewer correct negative words (i.e., targets).

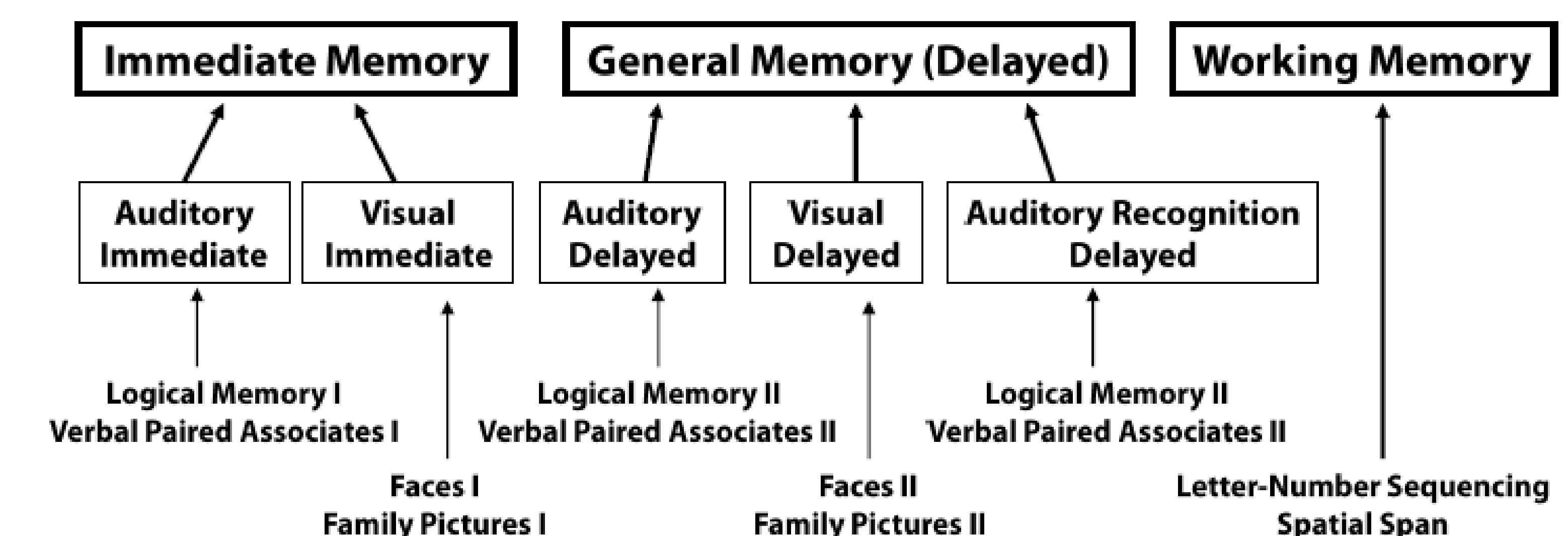
CONCLUSIONS

- Contrary to hypothesis, individuals who were more alexithymic responded more quickly when the eStroop stimulus was positive (but not negative) than when the stimulus was neutral.
- Individuals who reported a greater tendency to monitor their emotions were slower to color-name all words compared to those who do not pay as much attention to emotions, which suggests that the ability to monitor emotions requires additional time to assess a word for emotional relevance.
- Negative words appear to be especially difficult to distinguish for individuals who report an otherwise high level of comprehension and clarity of emotion as evidenced by an overall decreased tendency to endorse negative words, as compared to positive and neutral words. This suggests a relative weakness of high-EC individuals specific to negative words.

Study 2: Memory & Alexithymia

METHOD

- High- ($n = 12$) and low-alexithymic ($n = 12$) individuals were administered a neuropsychological memory assessment in hour-long, individual sessions.
- The Wechsler Memory Scale, Third Edition (WMS-III; Wechsler, 1997) was used to examine verbal and nonverbal memory.



What is working memory?

Working memory (WM) involves holding information on-line for immediate use or manipulation. WMS-III working memory subtests include:

- **Letter-Number Sequencing:** The participant hears a string of alternating letters and numbers (e.g., “F-7-2-L-5-X”) and must repeat the string by putting the numbers together in ascending order and the letters together in alphabetical order (e.g., “2-5-7-F-L-X”).
- **Spatial Span:** The experimenter uses a three-dimensional plastic board with raised blocks to present spatial patterns. The participant must then point to the same series of blocks in the same order.
- **Digit Span:** The participant hears a series of digits and must repeat the digits in the same order.

RESULTS

- High- and low-alexithymics performed equivalently on subtests of a verbal nature.
- High-alexithymics performed significantly worse on the subtests Family Pictures I and II.
- High-alexithymics performed significantly better than low-alexithymics on the Working Memory Index. High-alexithymics also performed better on the optional subtest, Digit Span, an additional measure of working memory.

CONCLUSIONS

- As predicted, evidence was found against an underlying verbal deficit in alexithymia.
- The ability to recall visual stimuli that had a strong social and/or emotional element (as in Family Pictures) was weaker in high- than low-alexithymic individuals.
- Converging evidence points to a potential working memory strength in alexithymia, which may indicate a relationship between activity in the emotion-oriented part of the brain (orbitofrontal cortex) and the WM-oriented part of the brain (dorsolateral prefrontal cortex).