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Dysfunctional emotion processing may explain visual memory deficits in alexithymia

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ABSTRACT

While past research implicates weakened memory in alexithymia, the verbal nature of most memory tasks is problematic, as there is also evidence of a generalized verbal deficit underlying alexithymia. To address this confound, the current study compared groups of high- and low-alexithymic individuals on a neuropsychological memory assessment that included both verbal and nonverbal tasks. Contrary to the hypothesis, participants performed equivalently on verbal subtests, but the high-alexithymic group, relative to the low-alexithymic group, demonstrated a deficit for visual short- and long-delay memory that involves remembering pictures of people in social situations. Implications and ideas for future research are discussed.

1. Introduction

The ability to process a wide range of emotions is an important part of what makes us human. A constellation of deficits in these abilities is known as *alexithymia*, which is identified by four major traits: (a) difficulty distinguishing among emotions; (b) difficulty describing feelings; (c) a constricted imagination; and (d) a concrete, externally-oriented cognitive style (Taylor, Bagby, & Parker, 1997). Using self-report questionnaires like the Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994), prevalence is estimated at 13% of the general population, with men nearly twice as likely as women to be alexithymic (Salminen, Saarijärvi, Äärelä, Toikka, & Kauhanen, 1999). However, because alexithymia is not a diagnosable psychiatric disorder, it often goes unnoticed. This is unfortunate because the deficits that characterize alexithymia can lead to a predictable pattern of dysfunction, including reduced social skills, smaller social networks with few close relationships, and less social support (Lumley, Ovies, Stettner, Wehmer, & Lakey, 1996). Even though alexithymia is construed as an emotion processing deficit, concomitant cognitive weaknesses may partly explain these functional impairments. One cognitive domain that has received particular attention in the alexithymia literature is memory.

In the past decade, a number of studies have found evidence of a memory deficit in alexithymia; however, there is little consensus about the nature and scope of the memory impairment. In order to assess memory functioning, researchers often include an incidental memory test, typically with free recall and recognition components, as part of the experimental procedure. For instance, Nielson and Meltzer (2009) used an incidental memory task to examine the role of physiological arousal in long-term memory in alexithymia, comparing groups of high- and low-alexithymic participants for memory of neutral words. On an immediate recall task, high-alexithymic participants exhibited impaired performance compared to low-alexithymic participants. Directly following the immediate recall task, some participants viewed a physiologically arousing video, while others saw a neutral video. Interestingly, on a delayed word recognition task 24 h later, differences between alexithymia groups were not apparent. Regardless of alexithymia level, participants who had watched the arousing video had better delayed recognition performances than those who saw the neutral video, suggesting that alexithymic individuals may benefit from the consolidating modulation of emotional arousal even if not explicitly aware of the arousal state at the time.

Alternatively, Luminet and colleagues (2006) found support for a relationship between alexithymia and memory specifically for emotional information. After presentation of neutral, positive, and negative words, participants were administered a surprise recall task and asked to indicate the degree of confidence in their recollection. If participants could recall some aspect of the experience (e.g., an image, thought, or feeling state associated with the word), indicating conscious recollection of the stimulus, it was considered a "Remember" response. If they lacked conscious recollection but had a feeling of familiarity with a stimulus, it was considered a "Know" response. No differences in recall ability were found between high- and low-alexithymic individuals for neutral words. However, for valenced words, high-alexithymic participants generated fewer "Remember" responses than low-alexithymic participants. Interestingly, there were no group differences for "Know"

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responses for emotional words, which led the authors to speculate that high-alexithymic individuals have a deficit in the ability to consciously access emotional material.

The relationship between alexithymia and memory is clearly complicated, leaving ample room for further research. One problem with the studies described above is that they assess memory solely in the verbal domain. Thus, the findings of these studies are confounded by their simultaneous assessment of verbal ability. As such, it is possible that observed memory deficits are driven by an underlying verbal deficit in alexithymia. Currently, there is a small body of literature that supports a generalized verbal deficit—unrelated to memory—in alexithymia (Koven, unpublished results; Kreitler, 2002; Lamberty & Holt, 1995; Wood & Williams, 2007). For instance, in a sample of combat veterans seeking psychological services, Lamberty and Holt (1995) found that performance on neuropsychological tests that assessed verbal skills was negatively associated with level of alexithymia. The authors suggest that poorly developed verbal ability may exacerbate the emotion processing deficits that characterize alexithymia. In another study with 125 community adults, Koven (unpublished results) found a negative relationship between alexithymia score and verbal intelligence as measured by the Wechsler Abbreviated Scale of Intelligence. Finally, Kreitler (2002) concluded from performances on the Meaning Test, an instrument utilized in the psychosemantic approach, that high-alexithymic participants have difficulty with verbal output as a means of expression.

Given the evidence for a general verbal deficit in alexithymia and that most previous studies of memory and alexithymia are verbal in nature, it is important to examine memory functioning in alexithymic individuals with tools that incorporate both verbal and nonverbal modes of stimulus presentation. With prior research highlighting possible discrepancies in immediate versus delayed memory performance in this population, it is also important to choose assessment techniques that incorporate this temporal distinction. The Wechsler Memory Scale, Third Edition (WMS-III; Wechsler, 1997) was selected because it includes both verbal and nonverbal subtests of immediate and delayed memory ability. A nonclinical sample of adults was chosen for the study in order to avoid neurological and psychiatric confounds inherent in clinical samples, such as the one used by Lamberty and Holt (1995). In light of previous evidence in support of an underlying verbal deficit, we hypothesize that the high-alexithymic group will perform worse than the low-alexithymic group on immediate and delayed memory subtests of a verbal nature.

2. Material and method

2.1. Participants

A sample of 101 adults (68% female) was screened for alexithymia in order to form targeted groups for subsequent memory assessment. Participants were undergraduate students who were right-handed, had no history of psychiatric diagnoses or neurological issues, and were not taking any psychoactive substances at the time of study. Based on alexithymia score using the TAS-20, 24 (12 high- and 12 low-alexithymic) participants were invited to participate in memory assessment. Specifically, individuals comprising the high-alexithymic group scored approximately two standard deviations above the sample mean on the TAS-20, whereas individuals in the low-alexithymia group were recruited from the low end of the sample; according to established norms (Taylor et al., 1997), the average TAS-20 scores in the high- and low-alexithymic groups fall within the severely impaired range and the unimpaired range, respectively. Of this final sample, 75% ($n = 18$) were female, and participants ranged in age from 18 to 22 years ($M = 18.9$, $SD = 1.1$). Average level of completed education was 12.8 years. Participants received financial compensation or partial academic course credit for their time. The experimental protocol was approved by the local Institutional Review Board.

2.2. Questionnaires

The TAS-20 was used to measure alexithymia. This 20-item, self-report questionnaire consists of three subscales: Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally-Oriented Thinking. Participants endorse each statement using a 5-point Likert-type scale. Scores can range from 20 to 100, and an individual with a total score of 61 or higher is considered to be alexithymic (Taylor et al., 1997). The TAS-20 has been shown to have high internal reliability (alpha > 0.79) among separate groups of college undergraduates in several countries (Parker, Bagby, Taylor, Endler, & Schmitz, 1993a; Parker, Taylor, & Bagby, 1993b) and good test–retest reliability in nonpatient samples across cultures (Kooiman, Spinhoven, & Trijsburg, 2002).

Given the documented relationship between trait anxiety and alexithymia among young adults (Karukivi et al., 2010), the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was included in the assessment. The 20-item STAI-T is a widely accepted self-report measure of anxiety with high test–retest stability (0.73–0.86) in college samples (Spielberger & Sydeman, 1994).

2.3. Neuropsychological assessment

The memory assessment was comprised of eight WMS-III subtests: Logical Memory I and II, Verbal Paired Associates I and II, Faces I and II, and Family Pictures I and II. These particular subtests were selected for their ability to assess separately verbal immediate memory (Logical Memory I, Verbal Paired Associates I), verbal delayed memory (Logical Memory II, Verbal Paired Associates II), visual immediate memory (Faces I, Family Pictures I), and visual delayed memory (Faces II, Family Pictures II). Raw scores were transformed into scaled scores ($M = 10$, $SD = 3$) according to available age-related norms (Wechsler, 1997). Higher scaled scores reflect better performance.

In Logical Memory I, the participant is told two short stories, the second of which is repeated. Following each presentation, the participant retells the story from memory. Free recall is scored based on thematic and detail accuracy. Logical Memory II requires the participant to retell both stories after a 25–35 min delay.

In Verbal Paired Associates I, eight novel word pairs are orally presented to the participant (e.g., raccoon/bag). The participant is then given the first word of a pair (raccoon), and he/she has to provide the corresponding word (bag). The task involves four trials of the same list in different orders, and a score is recorded for each trial. In Verbal Paired Associates II, participants are given the same task after a 25–35 min delay.

In Faces I, participants are instructed to remember human faces presented in a series of 24 color photographs shown 2-s apart. Pictures include faces of men and women with neutral expressions of all age groups, with several ethnicity groups represented. In each instance, the photo is cropped to minimize the impact of non-face cues (e.g., hairstyle, clothing) on subsequent memory. A second series of 48 photographs of faces is then presented, and participants have to identify the faces they remember from the original series. Faces II consists of a delayed presentation of the same series of 48 photographs, and, again, participants are asked to identify the original faces.

In Family Pictures I, participants are shown a family sketch consisting of two children (a young boy and young girl), two parents (a mother and father), two grandparents (an older man and older