ORIGINAL ARTICLE

DEPRESSION AND OVERGENERAL AUTOBIOGRAPHICAL MEMORIES: A RANDOMIZED CONTROL TRIAL

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Submitted: September 18, 2018
Accepted: October 05, 2018

ABSTRACT

OBJECTIVE
To assess overgeneral autobiographical memories (OGMs) and specific autobiographical memories (SAMs) in depressed patients and controls. by cueing them by words, images and olfactory cues.

STUDY DESIGN
Between-subject randomized experimental design.

PLACE AND DURATION OF THE STUDY
The study was conducted in the department of Psychology, Government College University Lahore from February 2016 to June 2016.

SUBJECTS AND METHODS
35 participants were employed in the study. The experimental sample for the study included 18 depressed participants (nine males and nine females), while control group included 17 healthy controls (nine males and eight females). Level of depression was assessed by Beck Depression Inventory II. The participants were presented with the images, words and odor cues and were asked to produce specific memories using the Autobiographical Memory Test (AMT), and later they were rated as being specific or generalized by two judges. Response time estimates were also taken on these variables.

RESULTS
Depressed participants retrieved significantly ($t = 3.22$, $p < .005$) more OGMs collapsed for different cues ($M = 3.38$, $SD = 1.14$) than controls ($M = 2.11$, $SD = 1.23$). However, control group retrieved significantly ($t = -4.72$, $p < .001$) more SAMs collapsed for cues ($M = 3.83$, $SD = 1.09$) in comparison to depressed participants ($M = 2.22$, $SD = .09$). We found depressed participants took significantly longer response time ($M = 13.94$, $SD = 4.03$) to respond to cues compared with controls ($M = 4.61$, $SD = 2.35$). Separate analyses for cues revealed the same pattern of results. Multiple regression analysis found, depression significantly ($B = 4.97$, $p < .01$) predicted response time in participants, R2 for OGMs model was 43%, indicating that depression can impair memory function as delay and content of memories.

CONCLUSION
The study found a significant association between depression and OGMs. Depressed individuals have an inability to retrieve more specific memories in comparison to OGMs. In addition, depressed individuals had lower response times compared to controls, indicative of a general cognitive slowing down of response in depressed individuals compared to healthy controls and that depression predicted OGMs.

KEY WORDS
Cognitive slowness, Words, Images, Olfactory cues.

INTRODUCTION

Autobiographical memory (AM) is primarily concerned with personal events and episodes from our lives, however, different terms interchangeably describe autobiographical memories and can include episodic memory and event memories[1]. Research has shown that AM is adversely effected when an individual experiences psychopathological conditions such as depression. One phenomenon that has been identified across a number of studies is over generality in the retrieval of AM-[2,3]. These memories of the depressed patients are primarily of a general nature and do not contain any specific details about the event or target being recalled, for example, if an individual is asked to recall a happy event from her life she is likely to say "I was on vacation", without giving much details on what made her happy at that vacation. This is a typical example of overgenerality in AM retrieval.[4]

Depression is a leading form of psychopathology which includes symptoms and states of experiencing negative mood, hopelessness and aversion with different activities which can cause severe impact on a person's thoughts, behaviors, emotions and level of psychological wellbeing[5]. A number of studies have established that there is an association between depression and OGMs. Individuals with major depression are more likely to display overgenerality in their autobiographical memories (AMs) in comparison with healthy controls. There is also an evidence to show that not only depression but also other clinical disorders like bipolar disorder, postpartum depression and post-traumatic stress disorder (PTSD) also show similar effects on AM[6]. However, there is a lack of evidence on whether an association exists between OGMs and depression[7]. The present study aimed to assess the association between depression and OGMs and to fill in the gap in literature on this area.

We predict depressed patients will report greater OGMs than healthy controls and that controls will retrieve SAMs. Depressed patients will retrieve more OGMs for all cue-types, and would take longer respond in their retrieval than controls.

SUBJECTS AND METHODS

Participants

35 participants were employed in the study. The experimental sample for the study included 18 depressed participants (nine males and nine females), while control group included 17 healthy controls (nine males and eight females). We used purposive sampling in the study and included depressed patients from mental health clinic outpatient facilities; and undergraduate and graduate students as healthy controls. Block randomization was used to assign the participants to different treatment blocks. For the present study, the researcher had used Microsoft Excel (2013) for block randomization[8]. First, the experimenter had divided the subjects into gender blocks and then randomly assigned them to three treatment conditions to them for word, picture and odor cues.

Instruments

Beck Depression Inventory II

For assessing depression of participants before and after the experiment, Beck Depression Inventory II (BDI II) was used, which contains 21-questions. It is a widely used tool for assessing depression[9]. This version is designed for individuals aged 13 years or older and is effective in targeting multiple symptoms of depression. Each items for this instrument is rated on a 0 to 3 scale. Higher composite scores indicate severe depressive symptoms. Research suggests that BDI II is positively correlated (r = .71) with Hamilton Depression Rating Scale and the test has a high internal consistency (α =.91)[10].

Autobiographical Memory Test (AMT)

We used AMT for data collection in response to word cues. A number of studies on OGMs have used this test[11-12]. It involves asking the participants to produce specific memories to specific cue words with a response time that ranges from 30 to 60 seconds. Half of the ten cue words have positive valence and the other half have negative valence. The word cues used in the experiment were drawn from relevant research evidence[13]. A total of 3 positive cue words and 3 negative cue words were used. Positive word cues included: happy, successful and surprised. The negative word cues were angry, lonely and sorry. The original ten word cues weren't used due to the overall length of the experiment which included the presentation of olfactory and visual cues as well.

In addition, six pictures related to the words in AMT were used (three pleasant and three unpleasant. The images had been selected from the International Affective Picture System (IAPS) and elicited positive responses included (e.g. a couple, teenagers having fun in a park and a happy man standing on a cliff in a happy mood; the negative images included: a fighting couple, a scene from a funeral and an image of a man in a state of depression[14]). The participants were asked to produce specific memories in response to these images. Sufficient time was given to them in order to be able to response to these visual cues.

The olfactory cues used in the experiment were: tobacco, soap, camphor, roses, jasmine and lavender. The olfactory cues were presented using essence bottles obtained from a local market. The quantity of essence presented to each participant in a bottle was 1 ml size. The same quantity was used for all forms of essence that were used. It was also ensured that the inter-trial gap between the presentations of cues was about 15 minutes in order to avoid lingering odor effects.

It is important to note that studies have identified jasmine, lavender and smell of roses as being effective in aromatherapy and in relieving depressive and traumatic symptoms while tobacco, soap and camphor have been associated with depressive and traumatic mood states.[14]

Response Time Estimates

For the purpose of measuring response time DMDX AUTOMODE software was used, which a widely used tool for obtaining accurate and precise response time. It is well-suited for experiments using word and visual cues and can be adjusted for other forms of cues.[15]

Procedure

The participants were asked to complete informed consent and were insured that their personal information will remain confidential. Participants had the right to refuse participation at any time during the study. The participants in the experimental and control group were provided with standardized instructions.

"I am interested in knowing your memory of events that happened during the different phases of your life. I am going to present you with some words (condition 1), pictures (condition 2) and smells (condition 3). In response to each cue you will be expected to think of a memory. This memory could be from last week, last month or last year. One more thing---the memory you recall should be from a specific event and not general in nature. For example, if you see the word "good" you will need to specifically link this word with a memory of a past event or occurrence. It is important for you to try to retrieve a different memory for each cue. Let us now use some cues for practice"[13].

Score on BDI II were recorded before their memories were recorded.. The word cues and image cues were presented using a computerized display through a projector. For the olfactory cues, the participants were simply asked to take a sniff from the 1ml essence bottles of the smells and then try to identify memories evoked by these smells. A panel of two psychologists (the researcher and another psychologist) rated the memories reported by the participants as being specific or over general. The same procedure was used for all the three cues. The response time was recorded using DMDX AUTOMODE software. The response time was recorded once the participant started to report his or her memory in response to the cues and stopped when the response was over. Here are some examples of OGMs to the word cue surprised. One participant with depression said "I am no longer surprised by anything in life", compared with a control participant who stated "I was surprised a few weeks back when I heard about my selection in Punjab Police".

RESULTS

Mean depression in the depressed group (M =36.33, SD = 15.38) was significantly higher than control group (M =10.55, SD = 6.54), t =

6.54, p < .01. Interrater agreement (kappa coefficient) between the two judges were positively significant, for OGMs the correlation was 0.70 (p < .01) and for SAMs 0.61 (p < .01) respectively. These values indicated a moderate range of agreement between the raters. Scores on depression, OGMs and reaction time showed a positive correlation with on another. SAMs showed a negative relationship with reaction time (see table 1 for details).

Table 1
Inter-Correlation among Scores on Depression, Cue Types, Reaction Time, Specific Autobiographical Memories and Overgeneral Autobiographical Memories (N=36)

	Variable	1	2	3	4	5
1	Scores on Depression	—	-.10	.46*	-.08	.65*
2	cuetype		—	-.058	.21	-.11
3	Overgeneral AMs			—	-.21	.49*
4	Specific AMs				—	-.48*
5	Reaction Time					—

Note. *p< .01, AMs=Autobiographical Memories

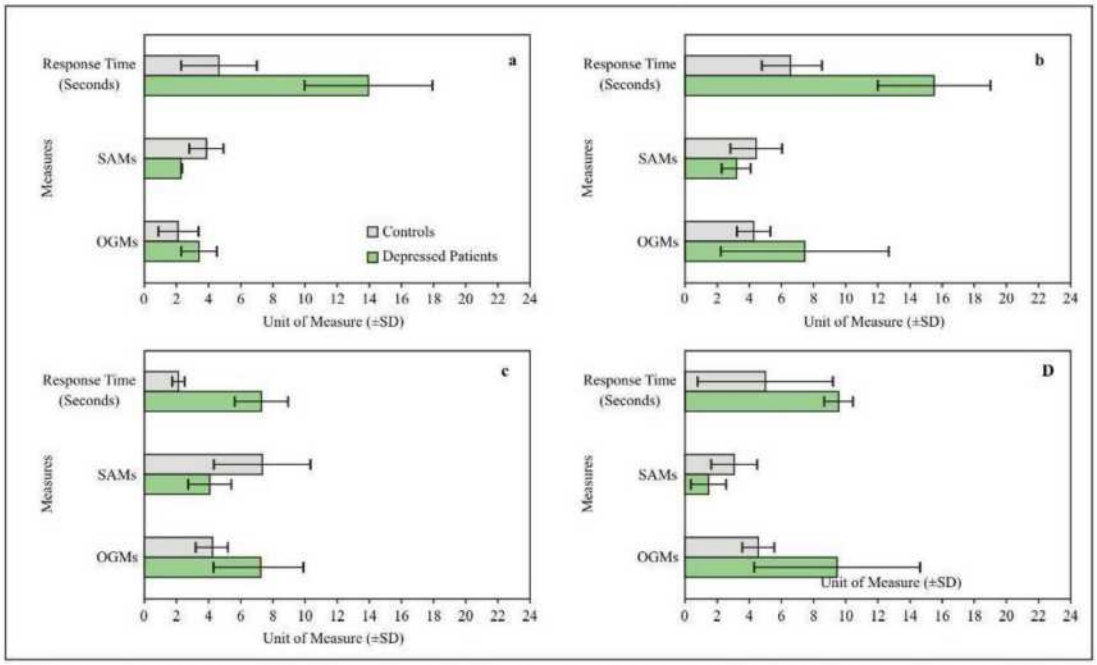
Depressed participants retrieved significantly (t = 3.22, p < .005) more OGMs for different cues (M = 3.38, SD = 1.14) than controls (M = 2.11, SD = 1.23). However, control group retrieved significantly (t = -4.72, p < .001) more SAMs for cues (M = 3.83, SD = 1.09) in comparison with depressed participants (M = 2.22, SD = .09). In addition, we found that depressed participants took significantly (t = 8.47, p < .001) longer response times (M = 13.94, SD = 4.03) in comparison with the controls (M = 4.61, SD = 2.35) see Figure 1a.

Separate analyses were carried out for all three cues; for words, depressed patients (M = 7.55, SD = 5.16) retrieved significantly (p < .05) more OGMs than controls (M = 4.32, SD = 1.04). However controls (M = 4.50, SD = 1.64) recalled significantly (p < .05) more SAMs than depressed patients (M = 3.19, SD = 1.04), and controls (M = 6.66, SD = 1.86) were significantly at retrieving memories than depressed patients (M = 15.50, SD = 3.56) see Figure 1b.

For pictures, depressed patients (M = 7.22, SD = 2.81) recalled significantly more OGMs than controls (M = 4.19, SD = 1.04). However controls(M = 7.33, SD = 2.96) retrieved significantly more SAMs than depressed patients (M = 3.99, SD = 1.44), and controls (M = 2.11, SD = .40) were significantly faster at retrieving these memories than depressed patients (M = 7.22, SD = 1.72) see Figure 1c.

For odors, depressed patients (M = 9.50, SD = 5.16) recalled significantly more OGMs than controls (M = 4.55, SD = 1.04). But controls (M = 3.11, SD = 1.47) retrieved significantly more SAMs than depressed patients (M = 1.50, SD = 1.04) and controls (M = 5.00, SD = 4.21) were significantly faster at recalling these memories than depressed patients (M = 9.54, SD = 1.01) see Figure 1d.

Figure 1
OGMs, SAMs, and response time for cues (panel a for all cues, panel b for words, panel c for pictures and panel d for odors



Multiple regression analysis revealed that depression was significant predictor of OGMs (B = .46, p < .01), R^2 for the OGMs model was 21 %, though cue-types did not significantly predicted OGMs. Multiple regression analysis also showed that depression scores significantly predicted response time of participants (B = 4.97, p < .01), R^2 for the OGMs model was 43%.

DISCUSSION

The study was carried out to determine relationships among depression, OGMs and SAMs and to assess if retrieval of these memories was slower in depressed patients. Results revealed depressed patients retrieved more OGMs than healthy controls who retrieved more specific memories than depressed patients. Depressed patients responded slower in response to the words, pictures and odor cues than controls when retrieving their memories. Regression analysis suggested that the level of depression of participants significantly predicted retrieval of OGMs and response times.

The results of the study are in accordance with the previous evidence that depression does have an impact on the retrieval of autobiographical memories and that OGMs was strongly associated with intrusive ideas, thoughts and memories about stressful and depression[15-16].

This finding, that depression has an impact on autobiographical memories is supported by the trauma hypothesis model. Williams and Broadbent (1986) offer an account of overgenerality in the memories of participants with other psychological disorders. Research evidence has shown that that lower levels of AM specificity and a higher number of overgeneral memories were associated with a higher possibility of being diagnosed with depression. In other words, OGMs were reported as being significant predictors of recurring depression[16]. The reporting of OGMs and inability to recall specific memories might also be a coping mechanism used by depressed individuals, which might be due to the neurological changes observed in depression and due to impairments in executive functioning of individuals[16-17].

The role of depression in influencing AM retrieval was seen in generally longer response times taken by depressed individuals in comparison to healthy controls. These findings indicate a general cognitive slowing in individuals with depression. It is also critical to note that this cognitive slowing might be due to the tasks that make substantial demands on processing resources. Responding to these tasks is more difficult when there are restrictions in working memory capacity which is often seen in depression.[16]

CONCLUSION

The above findings indicate depression may be associated with general cognitive slowing in retrieving autobiographical memories among patients with depression as compared with healthy controls. However, the exact underlying brain mechanisms behind the reduction of OGMs is unclear which raises the need for further investigations.

LIMITATIONS AND SUGGESTIONS

One limitation of the study was methodological in nature where we used 1ml bottles for smells and the participants were asked to sniff at the smells. This procedure was not well controlled, many other studies have used special equipment for delivering controlled amounts of odor smells to assess differential impact of smells on memory functioning. Another limitation of the study is ecological validity, largely due to a small sample size. The small sample limited our randomization abilities which did allow for balancing age, gender, SES, and other factors.

We need to conduct experimental studies in this area to address considerable gap in cognitive neuroscience literature and in countries like Pakistan. Clinical psychologists can assess OGMs in patients to link them to psychopathological disorders helping these professionals with effective therapeutic outcomes.

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