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False Memory and Mood in Female Adolescents

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ABSTRACT: Extensive researches has been performed on the influence of mood disorders, particularly depression on memory indicating some probable defects in memory function among depressed patients. The present study attempted to determine association of personality attitudes and mood characteristics with false memory in female adolescents. The study population consisted of female adolescents aged 15 to 17 years with non-clinical depression studying in the first year of high school. Depression was measured using R-Beck Depression Inventory. For assessment of verbal false memory, a standard form of the Deese-Roediger-McDermott (DRM) model was considered. Personality traits were measured by the short version of the NEO- FFI tool. Depressed group was more susceptible to have false memory related to threat than non-depressed group (mean score: 0.80 ± 0.75 versus 0.52 ± 0.65, p = 0.049), however two groups had similar states regarding false memory in recalling neutral words (2.42 ± 1.14 versus 2.44 ± 1.03, p = 0.923). In this regard, the mean score of confidence to memory was statistically similar in healthy and depressed students (89.30 ± 18.17 versus 83.18 ± 26.61, p = 0.182). Comparing different personality traits between depressed and healthy groups showed higher mean score of Neuroticism in depressed group, while higher mean score of Extraversion and Flexibility in non-depressed group compared without depressed ones. Also, compared to depressed group, healthy subjects had higher mean score of agreeableness and Conscientiousness. Depression is usually accompanied with falsely recalling threat-related material, indicating the higher propensity for false recall in depression state.
Keywords: False Memory, Personality, Depression, Adolescents, Mood, Student

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INTRODUCTION

Memory as a physiological process refers to a dynamic mechanism that is associated to maintain and retrieve information about past experiences. Cognitive psychologists have identified three operations known as memory encoding, storage and retrieval for this process that each of them is one of the components of recalling as the main objective of the research in human memory [1]. Unlike the old theory of memory as proposed by Ebbinghaus in 1885, memory is not a single system but is a combination of several forms of learning and retrieval that have different operating characteristics and neuroanatomical infrastructures [2]. Identifying different aspects of memory errors can have an important role in increasing our understanding of human memory. One of the most interesting issues in the field of memory errors is false memory phenomenon [3]. False memory is to recall facts and events that have never been experienced or distorted recall an experience. In this phenomenon, people often remember some events in details that never occurred [4]. Physiologically, the methods of presentation and interpretation of the data can affect quality and integrity of data recording in the memory may result in memory errors [5]. Thus, an important objective of the study on false memory has been to identify ways to minimize memory errors and distortions.

The findings on association between mood and memory have been developed since 1970. Along with cognitive psychologists, clinical psychologists and social psychologists have realized effects of emotional states on memory and its importance that dominant approach in researches associated with emotion has been cognitive approach. Extensive researches has been performed on the influence of mood disorders, particularly depression on memory indicating some probable defects in memory function among depressed patients [6]. Moreover, psychiatrists and cognitive psychologists have expressed that personality is formed by the experiences stored in memory. Even, personality characteristics may be associated with individual differences in memory structure [7]. Since most performed studies on false memory have focused the individual differences in the clinical condition or special abilities such as mental imagery, the present study attempted to determine association of personality attitudes and mood characteristics with false memory in female adolescents.

MATERIAL AND METHODS

Study population:

In this cross-sectional study, the study population consisted of female adolescents aged 15 to 17 years with non-clinical depression studying in the first year of high school that were selected using the stratified random sampling from all high schools in the city. In selected high schools, the Beck Depression Inventory was tested that

148 depressed students were identified. Among these, 50 students with the lowest depression score and 50 cases with the highest depression score were finally selected to test final study endpoints. The diagnosis of depression was confirmed according to DSM-IV-R criteria. None of the selected subjects had previous history of psychological disorders or treated by psychological or psychiatric medications.

Measures:

Depression was measured using R-Beck Depression Inventory (BDI), which is the Iranian modification of the 13-item version of BDI rating on a four-point scale from 0 (mild depression) to 4 (severe depression). The BDI has been shown to be a valid measure for detecting depression among adolescents in different population. In various population, the Cronbach's coefficient α was ranged 0.73 to 0.93 and the internal consistency of 0.48 to 0.86 based on test retest analyses [5]. In Iranian adolescents, the Cronbach's coefficient α for this questionnaire was estimated 0.87 with internal consistency of 0.83.

For assessment of verbal false memory, a standard form of the Deese-Roediger-McDermott (DRM) model was considered and used. DRM contains 24 lists that in the present study, 6 lists were used including 4 lists of "needle", "doctor", "foot", and "chair" as DRM paradigm sub-lists and also 2 lists of "sorrow" and "death" consisting of related words which considered the threat components related words for depressed patients. All 6 used lists consisted of 17 words that were semantically associated with together and also with the word of the bait [8]. The lists were presented to participants to remember. Then, after about a minute to give the last word, the subjects were asked to recall words of the list. The subjects often recall absent key term (named critical bait) at a rate equal to mean of the presented words.

Personality traits were measured by the short version of the NEO. The NEO-FFI consists of 60 items that are rated on a five point scale (1–5: totally disagree, disagree, neutral, agree and totally agree) and gives a score for the traits neuroticism, agreeableness, conscientiousness, extraversion and openness to experience. For each trait 12 items are summed to obtain a total score. Regarding its validity, a good correlation was revealed between this tool and other global personality traits assessment tools such as The California Psychological Inventory (CPI) and the Minnesota Multiphasic Personality Inventory (MMPI) with the correlation coefficient of 0.86 and 0.88, respectively.

In a study on university students in Iran, The results showed that the reliability (internal consistency) of the subscales of conscientiousness and neuroticism were 0.83 and 0.80, respectively, and that the subscales of agreeableness and extraversion were acceptable at 0.60 and 0.58, respectively. For the data collecting, the BDI test was first presented to the students and the two depressed and no depressed students were categorized. Then, personality traits were assessed in students groups using the NEO-FFI tool and finally the subjects were asked to express rate the confidence to her memory.

Statistical analysis:

Results were presented as mean ± standard deviation (SD) for quantitative variables and were summarized by absolute frequencies and percentages for categorical variables. Continuous variables were compared using t test or non-parametric Mann-Whitney U test or whenever the data did not appear to have normal distribution or when the assumption of equal variances was violated across the groups. Categorical variables were, on the other hand, compared using chi-square test or Fisher's exact test when more than 20% of cells with expected count of less than 5 were observed. For the statistical analysis, the statistical software SPSS version 20.0 for windows (SPSS Inc., Chicago, IL) was used. P values of 0.05 or less were considered statistically significant.

RESULTS

The mean age of the participants was 10.5 years and all were single. The mean age of the mothers' was also 39.46 years ranged 30 to 55 years and most of them were house wife and had diploma. Age, the mean of the fathers was 43.28 years (ranged 34 to 60 years) and most of them were self-employed and also had diploma degree. Comparing different personality traits between depressed and healthy groups showed higher mean score of Neuroticism in depressed group (37.64 ± 5.93 versus 33.28 ± 7.27, $p = 0.001$), while higher mean score of Extraversion(42.52 ± 3.66 versus 37.58 ± 6.35, $p < 0.001$) and Flexibility (36.02 ± 4.55 versus 33.84 ± 6.06, $p = 0.044$) in non-depressed group compared without depressed ones. Also, compared to depressed group, healthy subjects had higher mean score of agreeableness (36.84 ± 4.80 versus 34.72 ± 6.50, $p = 0.045$) and Conscientiousness (43.84 ± 3.65 versus 38.52 ± 6.05, $p < 0.001$). Assessing false memory status based on DRM model in both depressed and non-depressed groups showed that depressed group was more susceptible to have false memory related to threat than non-depressed group (mean score: 0.80 ± 0.75 versus 0.52 ± 0.65, $p = 0.049$), however two groups had similar states regarding false memory in recalling neutral words (2.42 ± 1.14 versus 2.44 ± 1.03, $p = 0.923$).

In this regard, the mean score of confidence to memory was statistically similar in healthy and depressed students (89.30 ± 18.17 versus 83.18 ± 26.61, $p = 0.182$).

DISCUSSION

The current study was performed to examine whether non-clinical depression among female students is associated with increased false recall of threat-related and also neutral material. Compared to control non-depressed participants, depressed cases falsely recalled a higher proportion of negative threat-related lures. Importantly, no group differences were obtained for recall of neutral lures, indicating that the higher propensity

for false recall in depression does not reflect a general deficit, but instead, is specific to the processing of negative or threat-related material. These findings are in consistent with most previous studies. In a study by Howe and Malone [9], participants with major depressive disorder falsely recognized significantly more depression-relevant words than non-depressed controls. Joormann et al. [10] using DRM paradigm examined the impact of clinical depression on erroneous recall of neutral and/or emotional stimuli and showed that compared with control participants, major depressive disorder participants recalled fewer words that had been previously presented but were more likely to falsely recall negative lures; there were no differences between major depressive disorder and control participants in false recall of positive or neutral lures. Yeh and Hua [1] revealed more negative false memories in the clinical depression group than in the normal control group; however, they did not find more negative false memories than positive ones in depressed patients. Moritz et al. [12] showed that depressed patients learned emotionally charged material equally well as healthy participants but forgot significantly more neutral material. Moreover, relative to healthy controls, patients with depression committed more false recognition errors for emotionally charged words, particularly for depression-relevant items. Hertel [13] presented evidence indicating that depression-related impairments were not observed in all components of memory, but were found primarily in free recall tasks and in other unstructured memory tasks in which attention was not well controlled. In total, these results suggest that, with respect to memory deficits, depressed people can have the ability to perform at the level of non-depressed people in recalling neutral lures but have problems doing this in unconstrained situations such as threat-related lures.

Mood states can affect memory in various ways. Some studies have indicated that affective mood states is associated with increased accuracy in retrieval, while positive mood states are associated with decreases in processing capacity and reduced processing motivation, resulting in less accurate recall. Research on mood-congruency also suggests that affective states increase the accessibility of mood-congruent material. Understanding this complex interaction of mood and memory is important given its critical role in emotion regulation and emotional disorders. Importantly, the effects of mood on memory may help explain why depressed people are caught in a vicious cycle of increasingly negative mood and enhanced accessibility of negative material that maintains or exacerbates negative affect and hinders emotion regulation.

We should note two potential limitations of the current study. First, According to existence of mood disorders in both men and women and also some potential differences in mood state between the two genders, assessing effect of depression on recalling ability and recognition is necessary. Another limitation of the study was to apply some limited tests for assessing both personality traits and memory state. In this regard, the assessment of confounding effect of gender variable on association between false memory and mood state is recommended. Also, to assess vulnerability to false memories associated with materials-related threats, in addition to the list of related words, the use of other images or scenarios associated with threat is also recommended.

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