



Rumination and depression in Chinese university students: The mediating role of overgeneral autobiographical memory



Tianzhu Kong^a, Yini He^a, Randy P. Auerbach^b, Chad M. McWhinnie^b, Jing Xiao^{a,*}

^a Beijing Key Laboratory of Learning and Cognition and Department of Psychology, Capital Normal University, Beijing 100048, China

^b Harvard Medical School, Boston, MA, USA

ARTICLE INFO

Article history:

Received 14 August 2014

Accepted 21 September 2014

Available online 16 October 2014

Keywords:

Overgeneral autobiographical memory

Rumination

Depression

Mediating effect

Structural equation modeling

ABSTRACT

Objective: In this study, we examined the mediator effects of overgeneral autobiographical memory (OGM) on the relationship between rumination and depression in 323 Chinese university students.

Method: 323 undergraduates completed the questionnaires measuring OGM (Autobiographical Memory Test), rumination (Ruminative Response Scale) and depression (Center for Epidemiologic Studies Depression Scale).

Results: Results using structural equation modeling showed that OGM partially-mediated the relationship between rumination and depression ($\chi^2 = 88.61$, $p < .01$; RMSEA = .051; SRMR = .040; and CFI = .91). Bootstrap methods were used to assess the magnitude of the indirect effects. The results of the bootstrap estimation procedure and subsequent analyses indicated that the indirect effects of OGM on the relationship between rumination and depressive symptoms were significant.

Conclusion: The results indicated that rumination and depression were partially mediated by OGM.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

In the past decade, there has been increased interest in examining negative thinking processes, such as rumination, as cognitive risk factors for depression (Rood, Roelofs, Bögels, Nolen-Hoeksema, & Schouten, 2009). In the context of depressive mood, Nolen-Hoeksema (1991) conceptualizes rumination as repetitive and passive thinking about one's symptoms of depression as well as the causes and consequences of those symptoms. A large body of research has attempted to understand the relationship between rumination and depression more fully (Spasojević & Alloy, 2001; Takano & Tanno, 2009; Watkins & Brown, 2002). A particularly robust finding indicates that rumination is associated with depression (Broderick & Korteland, 2004; Papageorgiou & Wells, 2003). As rumination plays a significant role in the promotion of depression, an understanding of its underlying mechanisms is essential (Watkins & Brown, 2002).

Twenty years of research using the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) has shown that overgeneral autobiographical memory (OGM) is a vulnerability factor for depression (Gibbs & Rude, 2004). In the AMT, respondents are

asked to retrieve specific autobiographical memories of events in response to word cues. Each specific autobiographical memory refers to a particular personal event that did not last longer than one day (e.g., “my grandmother’s funeral last year”). In contrast, overgeneral autobiographical memories are less specific, representing a summary of repeated events, and they are normally elicited using emotion cue words (Anderson, Goddard, & Powell, 2010). Key findings have suggested that individuals with depression are characterized by more OGM than nondepressed controls (Williams et al., 2007), and OGM has been proposed as a vulnerability factor for the onset (Mackinger, Loschin, & Leibetseder, 2000) and course of depression (Brittlebank, Scott, Williams, & Ferrier, 1993; Sumner, 2012). In addition, Dalgleish et al. (2007) stated that OGM indexes one or more of the fundamental cognitive processes that are closely linked to the onset, maintenance, and recovery from a variety of clinical and subclinical states.

Given that OGM is a vulnerability factor for depression, researchers have been interested in better understanding the factors that contribute to this cognitive phenomenon. Previous research findings suggest that rumination may not only confer vulnerability to depression, but it may also be associated with OGM. Empirical data suggest that individuals who exhibit tendencies for both rumination and OGM would be more likely to have more severe depressive episodes (Park, Goodyer, & Teasdale, 2004).

* Corresponding author. Tel./fax: +86 10 65104047.

E-mail address: xiaojingcnu@163.com (J. Xiao).

Kao, Dritschel, and Astell further proposed that individuals who exhibit rumination should be at higher risk for OGM (Kao, Dritschel, & Astell, 2006). Watkins and colleagues showed that by experimentally reducing rumination, autobiographical memory retrieval becomes more specific in depressed participants (Watkins & Teasdale, 2001). In addition, Sumner (2012) stated that two components of ruminative processing appear to be especially maladaptive for autobiographical memory specificity. These include: (1) adopting an abstract, analytical, and evaluative processing style that focuses on the causes, meanings, and consequences of one's experience, and (2) processing negatively valenced self-related material (Sumner, 2012). These findings were supported the hypothesis that rumination may have a role in the development of OGM (Sumner, 2012).

Together, the results of these studies suggest that more repetitive and passive thinking has a causal effect on OGM (e.g., Raes, Watkins, Williams, & Hermans, 2008; Sumner, 2012; Watkins & Teasdale, 2001). However, the hypothesis that OGM is a mediator between rumination and depression has not been fully tested, especially in nondepressed samples. Therefore, the aims of this study were (a) to examine the replicability of the associations between OGM, rumination, and depression, and (b) to investigate the hypothesis that OGM mediates the association between rumination and depression in a large sample of Chinese university students.

2. Methods

2.1. Participants

The participants were 323 undergraduates (74% female) at a university in Beijing. The mean age of the participants was 18.91 years (standard deviation [SD] = 1.35).

2.2. Materials

2.2.1. Ruminative Response Scale (Nolen-Hoeksema, 1991)

The Ruminative Response Scale (RRS) is designed to assess ruminative coping responses to depressed mood. The RRS has been shown to have good internal consistency and validity (Nolen-Hoeksema & Morrow, 1991). The scale contains 22 items, and the responses to each item are scored from 1 ('almost never') to 4 ('almost always'). The scores on all of the items are added to obtain the total score, which ranges from 22 to 88, with higher scores indicating higher levels of ruminative coping responses.

2.2.2. Center for Epidemiological Studies Depression Scale (Radloff, 1977)

The Center for Epidemiological Studies Depression Scale (CES-D) is a 20-item self-report measure designed to assess depressive symptoms in the general population. For each item, participants are asked to indicate how often they experienced the particular symptom over the last week. Responses range from 1 (rarely or none of the time) to 4 (most or all of the time). The scores on the CES-D range from 20 to 80, with higher scores indicating higher levels of depressive symptoms.

2.2.3. Autobiographical Memory Test (Williams & Broadbent, 1986)

In our study, the AMT was administered in an oral format (Raes, Hermans, de Decker, Eelen, & Williams, 2003). Participants were shown 12 cue words and 2 practice words (car and fridge) printed on flash cards. The test cues consisted of six negative (painful, horrible, sad, lonely, angry, and guilty) and six positive (proud, successful, honest, happy, funny, and brave) emotional

cue words. The participants were asked to memorize one specific memory for each cue word (i.e., a particular event that lasted for no more than one day that happened on a particular day at least 1 week ago). Each cue word was presented for 60 s, and when the time limit was reached, the experimenter proceeded to the next cue word. The experimenters recorded the responses.

For each cue, the response was coded as either a specific memory or a nonspecific memory. Responses that described a particular event that lasted less than 1 day (e.g., "The moment I won the game") were coded as specific. Overgeneral memories were qualified as a categorical memory (e.g., "Having math class on Monday mornings"), an extended memory (e.g., "My holiday in Senegal last year"), no memory, or no response. Consistent with previous studies (Stange, Hamlat, Hamilton, Abramson, & Alloy, 2013), we report analyses in the current study using the total number of overgeneral memories to all cue words. We used the number of overgeneral memories as our focal predictor variable (minimum = 0; maximum = 12).

2.3. Procedures

After giving written informed consent, all participants were tested individually. The AMT was administered face-to-face in a quiet testing environment. Then participants completed the CES-D and RRS.

2.4. Statistical analyses

The mediation effect for OGM was tested using the two-step structural equation analysis procedure recommended by Gerbing and Anderson (1988). Firstly, the measurement model was tested to assess the extent to which each of the latent variables was represented by its indicators. If the measurement model was accepted, then structural equation modeling (SEM) with the maximum likelihood estimation in the AMOS 8.0 program was used.

The goodness of fit of the model was evaluated by using the following indices (Hu & Bentler, 1999; Quintana & Maxwell, 1999): chi-square statistics; root-mean-square error of approximation (RMSEA); standardized root-mean-square residual (SRMR): best if below .06; and comparative fit index (CFI): best if above .95. In addition, Sobel tests were conducted (Preacher & Hayes, 2004) to test the effect sizes and significance of the mediation effects for OGM directly.

The bootstrap estimation procedure in AMOS 8.0 was used to test the significance of the mediating effects of OGM. The basic principle for the bootstrapping approach is that the standard error estimates and confidence intervals (CIs), which are calculated based on the assumption of a normal distribution, will usually be imprecise because the indirect effect estimates generally do not follow a normal distribution (MacKinnon, Lockwood, & Williams, 2004). MacKinnon et al. (2004) have suggested that the bootstrap method yields the most accurate CIs for indirect effects. They recommended use of the percentile bootstrap, which provides a CI and has been shown to provide both reasonable control of type 1 errors and good statistical power. When examining a mediation effect using the percentile bootstrap method, the statistical package draws a large number of bootstrap samples (i.e., 1000). Then, for each sample, the indirect effect is estimated, yielding a bootstrap distribution of the estimates of the indirect effect. A null hypothesis can be rejected if zero is not included in the 95% CI of the bootstrap distribution. In subsequent analyses, the indirect effects and their associated 95% bias-corrected CIs were tested.

3. Results

3.1. Structural model

The measurement model involved three latent constructs (rumination, OGM, and depressive symptoms) and eight observed variables. An initial test of the hypothesized mediation model resulted in a good fit to the data from the Chinese university students: $\chi^2 = 79.31$, $p < .01$; RMSEA = .054 (90% CI: .03–.07); SRMR = .07; and CFI = .92. All of the factor loadings for the indicators on the latent variables were significant ($p < .001$), demonstrating that all the latent constructs were well represented by their indicators. In addition, all the latent constructs were significantly correlated in conceptually expected ways ($p < .001$).

In subsequent analyses, the structural model was tested using the maximum likelihood estimation in the sample of Chinese university students. The direct path coefficient from the predictor (rumination) to the criterion (depressive symptoms) in the absence of mediators was significant ($r = .41$, $p < .001$). A partially mediated model with a mediator was a good fit to the data: $\chi^2 = 88.61$, $p < .01$; RMSEA = .051; SRMR = .040; and CFI = .91. For the final model, all of the structural paths are presented in Fig. 1.

3.2. Percentile bootstrap test of the mediation effect

The results of the bootstrap estimation procedure and subsequent analyses indicated that the indirect effects of OGM on the relationship between rumination and depressive symptoms were significant. The results from 1000 bootstrap samples indicated that the mean indirect effect was .16, which was significantly greater than zero. The 95% CI ranged from .12 to .19.

4. Discussion

Our research aimed at testing the mediator effects of OGM on the relationship between rumination and depression. As hypothesized, the best model from our research implied that the relationship between rumination and depression was partially mediated by OGM. Our finding suggests that individuals who tend to use ruminative coping styles have more OGM, which may be due to

their severer depressive symptoms, and in turn, the reduction in autobiographical memory specificity enhances their depressive symptoms.

As numerous studies have shown, individuals who are more inclined to use ruminative coping styles are likely to have more OGM (e.g., Kao et al., 2006; Kuyken & Dalgleish, 2011; Watkins, Teasdale, & Williams, 2000). These results suggest that rumination not only confers a vulnerability to depression, but also is associated with OGM. Researchers have suggested that rumination monopolizes the executive capacity required to reconstruct specific autobiographical memories (Raes et al., 2005, 2006).

The findings of the current study reveal that OGM is significantly associated with depression, which also means that OGM is a vulnerability factor for depression. This result is consistent with previous research (Gibbs & Rude, 2004; Hamlat et al., 2014). Difficulty in retrieving specific autobiographical memories is one of the features of depression, and individuals with lower levels of autobiographical memory specificity had a higher level of depression (Hermans et al., 2008).

The present study tested the mediating role of OGM on the association between rumination and depression in a large sample of Chinese university students. The results indicate that OGM partially mediates the relationship between social support and loneliness. For counselors and psychologists, these results are important. To cope with and prevent depressive symptoms, OGM and ruminative coping styles could be taken into consideration.

There are some limitations of the current research. First, we collected the data using self-report questionnaires. Future research can make use of multiple instruments and methods without this limitation. Second, one assumption of a mediation model is that the independent variable is a causal factor of both the mediator and the dependent variable (Baron & Kenny, 1986). However, a causal relationship cannot be determined by a cross-sectional study. Future studies with more time points would be beneficial to explore the effect of OGM on the relationship between rumination and depression more thoroughly. Lastly, the current study investigated a sample of university students, which consequently affects the generalizability of our findings. Future research would benefit from examining the role of OGM in samples that are more representative of the general population.

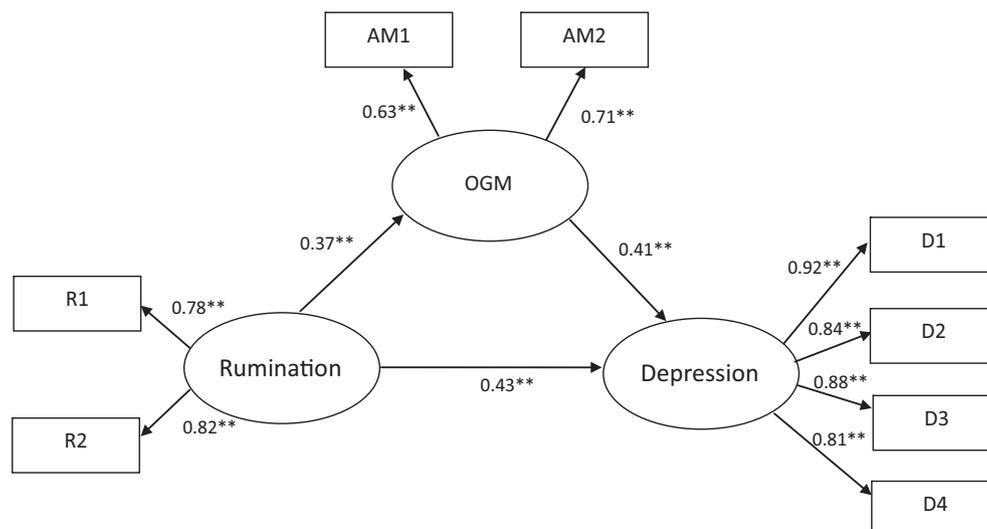


Fig. 1. Final structural model. Note: Factor loadings are standardized. R1 = brooding subscale of rumination; R2 = reflection subscale of rumination; AM1 = negative overgeneral autobiographical memory; AM2 = positive overgeneral autobiographical memory; D1 = depressed affect subscale of CESD; D2 = positive affect subscale of CESD; D3 = somatic complaints subscale of CESD; D4 = interpersonal relations subscale of CESD; * $p < .05$, ** $p < .01$, *** $p < .001$.

Acknowledgments

The research reported in this article was supported by Beijing Key Laboratory of Learning and Cognition, and the National Natural Science Foundation of China (Grant No. 31200790) awarded to Dr. Jing Xiao and was partially supported by the Beijing Philosophy and Social Science Planning Project (Grant No. 13JDJYC006) awarded to Dr. Jing Xiao.

References

- Anderson, R. J., Goddard, L., & Powell, J. H. (2010). Reduced specificity of autobiographical memory as a moderator of the relationship between daily hassles and depression. *Cognition & Emotion*, *24*(4), 702–709.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173–1182.
- Brittlebank, A., Scott, J., Williams, J. M., & Ferrier, I. (1993). Autobiographical memory in depression: State or trait marker? *The British Journal of Psychiatry*, *162*(1), 118–121.
- Broderick, P. C., & Korteland, C. (2004). A prospective study of rumination and depression in early adolescence. *Clinical Child Psychology and Psychiatry*, *9*(3), 383–394.
- Dalgleish, T., Williams, J. M. G., Golden, A.-M. J., Perkins, N., Barrett, L. F., Barnard, P. J., et al. (2007). Reduced specificity of autobiographical memory and depression: The role of executive control. *Journal of Experimental Psychology: General*, *136*(1), 23.
- Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 186–192.
- Gibbs, B. R., & Rude, S. S. (2004). Overgeneral autobiographical memory as depression vulnerability. *Cognitive Therapy and Research*, *28*(4), 511–526.
- Hamlat, E. J., Connolly, S. L., Hamilton, J. L., Stange, J. P., Abramson, L. Y., & Alloy, L. B. (2014). Rumination and overgeneral autobiographical memory in adolescents: An integration of cognitive vulnerabilities to depression. *Journal of Youth and Adolescence*, 1–13.
- Hermans, D., Vandromme, H., Debeer, E., Raes, F., Demyttenaere, K., Brunfaut, E., et al. (2008). Overgeneral autobiographical memory predicts diagnostic status in depression. *Behaviour Research and Therapy*, *46*(5), 668–677.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55.
- Kao, C. M., Dritschel, B. H., & Astell, A. (2006). The effects of rumination and distraction on over-general autobiographical memory retrieval during social problem solving. *British Journal of Clinical Psychology*, *45*(2), 267–272.
- Kuyken, W., & Dalgleish, T. (2011). Overgeneral autobiographical memory in adolescents at risk for depression. *Memory*, *19*(3), 241–250.
- Mackinger, H. F., Loschin, G. G., & Leibetseder, M. M. (2000). Prediction of postnatal affective changes by autobiographical memories. *European Psychologist*, *5*(1), 52–61.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate behavioral research*, *39*(1), 99–128.
- Nolen-Hoeksema, S. (1991). *Response styles questionnaire*. Unpublished manuscript.
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, *61*(1), 115–121.
- Papageorgiou, C., & Wells, A. (2003). An empirical test of a clinical metacognitive model of rumination and depression. *Cognitive Therapy and Research*, *27*(3), 261–273.
- Park, R. J., Goodyer, I. M., & Teasdale, J. D. (2004). Effects of induced rumination and distraction on mood and overgeneral autobiographical memory in adolescent major depressive disorder and controls. *Journal of Child Psychology and Psychiatry*, *45*(5), 996–1006.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731.
- Quintana, S. M., & Maxwell, S. E. (1999). Implications of recent developments in structural equation modeling for counseling psychology. *The Counseling Psychologist*, *27*(4), 485–527.
- Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385–401.
- Raes, F., Hermans, D., de Decker, A., Eelen, P., & Williams, J. M. G. (2003). Autobiographical memory specificity and affect regulation: An experimental approach. *Emotion*, *3*(2), 201.
- Raes, F., Hermans, D., Williams, J. M. G., Beyers, W., Eelen, P., & Brunfaut, E. (2006). Reduced autobiographical memory specificity and rumination in predicting the course of depression. *Journal of Abnormal Psychology*, *115*(4), 699–704.
- Raes, F., Hermans, D., Williams, J. M. G., Demyttenaere, K., Sabbe, B., Pieters, G., et al. (2005). Reduced specificity of autobiographical memory: A mediator between rumination and ineffective social problem-solving in major depression? *Journal of Affective Disorders*, *87*(2–3), 331–335.
- Raes, F., Watkins, E. R., Williams, J. M. G., & Hermans, D. (2008). Non-ruminative processing reduces overgeneral autobiographical memory retrieval in students. *Behaviour Research and Therapy*, *46*(6), 748–756.
- Rood, L., Roelofs, J., Bögels, S. M., Nolen-Hoeksema, S., & Schouten, E. (2009). The influence of emotion-focused rumination and distraction on depressive symptoms in non-clinical youth: A meta-analytic review. *Clinical Psychology Review*, *29*(7), 607–616.
- Spasojević, J., & Alloy, L. B. (2001). Rumination as a common mechanism relating depressive risk factors to depression. *Emotion*, *1*(1), 25–37.
- Stange, J. P., Hamlat, E. J., Hamilton, J. L., Abramson, L. Y., & Alloy, L. B. (2013). Overgeneral autobiographical memory, emotional maltreatment, and depressive symptoms in adolescence: Evidence of a cognitive vulnerability–stress interaction. *Journal of Adolescence*, *36*(1), 201–208.
- Sumner, J. A. (2012). The mechanisms underlying overgeneral autobiographical memory: An evaluative review of evidence for the CaR-FA-X model. *Clinical Psychology Review*, *32*(1), 34–48.
- Takano, K., & Tanno, Y. (2009). Self-rumination, self-reflection, and depression: Self-rumination counteracts the adaptive effect of self-reflection. *Behaviour Research and Therapy*, *47*(3), 260–264.
- Watkins, E., & Brown, R. (2002). Rumination and executive function in depression: An experimental study. *Journal of Neurology, Neurosurgery & Psychiatry*, *72*(3), 400–402.
- Watkins, E., Teasdale, J., & Williams, R. (2000). Decentering and distraction reduce overgeneral autobiographical memory in depression. *Psychological Medicine*, *30*(04), 911–920.
- Watkins, E., & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: Effects of self-focus and analytic thinking. *Journal of Abnormal Psychology*, *110*(2), 353–357.
- Williams, J. M. G., Barnhofer, T., Crane, C., Herman, D., Raes, F., Watkins, E., et al. (2007). Autobiographical memory specificity and emotional disorder. *Psychological bulletin*, *133*(1), 122–148.
- Williams, J. M., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, *95*(2), 144–149.