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Overgeneral autobiographical memory predicts changes in depression in a community sample

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Abstract

This study investigated whether overgeneral autobiographical memory (OGM) predicts the course of symptoms of depression and anxiety in a community sample, after 5, 6, 12 and 18 months. Participants (*N* = 156) completed the Autobiographical Memory Test and the Depression Anxiety Stress Scales-21 (DASS-21) at baseline and were subsequently reassessed using the DASS-21 at four time points over a period of 18 months. Using latent growth curve modelling, we found that OGM was associated with a linear increase in depression. We were unable to detect changes over time in anxiety. OGM may be an important marker to identify people at risk for depression in the future, but more research is needed with anxiety.

Key words: *autobiographical memory, overgeneral autobiographical memory, OGM, depression, anxiety, prediction, community sample, latent growth curve modelling*

Overgeneral autobiographical memory predicts changes in depression and anxiety in a community sample

Overgeneral autobiographical memory (OGM) is defined as a difficulty in recalling specific autobiographical events from one's life. It was first investigated by Williams and Broadbent (1986) in a sample of suicidal patients. The most common assessment tool for OGM is the Autobiographical Memory Task (AMT; Williams & Broadbent, 1986), which exists in several different versions. Generally, participants are asked to provide specific memories in response to a set of cue words, which are presented one at a time. The instructions of the AMT define a specific memory as a personal memory of one particular event that is localized in time lasting less than one day (e.g., "The moment I found out that I got the job"; Williams et al., 2007). The valence of the cue words is usually alternated between positive (e.g. "happy") and negative (e.g. "sad"). Although the goal is to retrieve specific memories, participants often generate various types of non-specific responses. These include non-specific, 'categoric' memories, which are events that have occurred more than once (e.g. "Every time I go to my favourite pub."). Other non-specific responses include 'extended' memories (lasting longer than one day, e.g. "During my vacation in Spain last year.") and 'non-memories' (a.k.a. semantic associates, e.g., "I like being happy."). People suffering from clinical depression generally report fewer specific and more categoric memories (Williams et al., 2007).

OGM and depression

OGM predicts depressive symptoms following stressful life events (e.g., Gibbs & Rude, 2004). In terms of OGM and depression diagnoses, Rawal and Rice (2012) studied 277 adolescents who were at familial risk for depression. These participants were initially non-depressed, but OGM predicted the onset of major depressive disorder (MDD). Brittlebank, Scott, Williams, and Ferrier (1993) showed, in a sample of 22 patients with MDD, that higher levels of OGM predicted a worse course of depression. Peeters, Wessel, Merckelbach, and Boon-Vermeeren (2002) and Raes et al. (2006) both showed associations with OGM and a worse course of major depression at a seven-month follow-up point. Thus,

across several studies, OGM predicts the course of depression across different populations (for meta-analytic review, see Sumner et al., 2011).

OGM and anxiety

Because mood and anxiety disorders are often comorbid, OGM may be related to anxiety as well as depression. In support of this hypothesis, many studies have shown an association between OGM and posttraumatic stress disorder (PTSD). Studies by McNally, Lasko, Macklin, and Pitman (1995) and McNally, Litz, Prassas, Shin, and Weathers (1994) showed that Vietnam combat veterans with PTSD exhibited more difficulty in recalling specific memories compared to those without PTSD. Schönefeld, Ehlers, Böllinghaus, and Rief (2007) expanded upon these findings in a study with 42 assault survivors; participants with PTSD retrieved fewer specific memories and more overgeneral memories compared to assault survivors without PTSD, but only when they were explicitly instructed to suppress assault-related memories. For other anxiety disorders, the relationship between OGM and anxiety is less clear. For example, Wilhelm, McNally, Baer, and Florin (1997) found that patients with obsessive-compulsive disorder do not exhibit OGM, unless they suffer from concurrent MDD. Furthermore, studies of general anxiety disorder, social anxiety disorder or blood and spider fearful individuals failed to find associations with OGM (Williams et al., 2007).

There are some indications, however, that OGM might be related to the course of anxiety. The majority of studies have focused on OGM predicting anxiety in the context of trauma or stressful life events (Williams et al., 2007). Harvey, Bryant, and Dang (1998) found that participants who developed acute stress disorder (ASD) following motor vehicle accidents reported fewer specific memories in response to positive cue words, compared to those who did not develop ASD. Furthermore, in a four-year study of fire fighters, Bryant, Sutherland, and Guthrie (2007) showed that impaired retrieval of specific memories in response to positive cues prior to trauma exposure predicted levels of posttraumatic stress after exposure to trauma. Finally, Kleim and Ehlers (2008) showed that among participants who were assessed two weeks after an assault, OGM predicted PTSD six months later over and above initial symptom severity and diagnoses of major depressive disorder, acute stress disorder, and assault-related

specific phobia. As of yet, no studies have focused on the relationship between OGM and the occurrence of anxiety outside of trauma research, so there is little evidence that OGM is related to levels or course of anxiety. We sought to expand this area by examining the relationship between OGM and the course of anxiety as well as depression.

OGM and the course of depression and anxiety

Baddeley (1988) proposed a mechanism that connects OGM to psychopathology – specific memories of past situations are often used as a frame of reference to guide problem solving in the present. Thus, when one faces a problem, ones can think back to comparable situations for possible solutions. Failure to access these specific memories, therefore, can lead to a lack of solutions and poor problem solving. Being overgeneral about the past may also be linked to difficulties imagining the future. This relationship between OGM and poor problem solving has been found in a number of clinical and non-clinical samples (Evans, Williams, O'Loughlin, & Howells, 1992; Goddart, Dritschel, & Burton, 1996; Pollock & Williams, 2001; Raes et al., 2005). Healy, Rose, and Macleod (1996) found that individuals who are overgeneral about their past also tend to be overgeneral about their future. Having such a blurred, vague perspective on the future might induce feelings of indifference and hopelessness, and might impair planning for the future.

Studies of OGM have linked it to the course of psychopathology, but existing longitudinal studies have usually included a single follow-up assessment. Such studies are important to identify whether change can occur, but are limited because they can conflate change with measurement error (Willett, Singer, & Martin, 1998), and they provide no opportunity to examine the form of the relationship (e.g., Anderson, Goddard, & Powell, 2010; Raes et al., 2006). At present, few studies have included multiple follow-up assessments.

A study of depressed patients by Brittlebank et al. (1993) showed large correlations between OGM in response to positive words and depression measured at three- and seven-month follow-up points. For the negative cue words, the association was weaker relative to the positive cue words. Peeters et al. (2002) studied of 25 patients with MDD over time. Using hierarchical linear modelling, they showed that OGM

in response to negative cue words predicted depression at a three-month follow-up. Nearly significant results were reported the seven-month follow-up. Furthermore, Hipwell, Reynolds, and Pitts Crick (2004) studied healthy pregnant women and found that OGM did not significantly predict postpartum depressive symptoms after two weeks. After eight weeks, however, OGM did significantly predict depression. Hermans et al. (2008) focused on students who failed their first university exams, but no significant correlation was found between OGM and change scores for depression between baseline and a two-week follow-up. After nine weeks, however, higher levels of OGM were associated with depression change scores.

In summary, there is some evidence for a relationship between OGM and changes in symptoms of depression and anxiety, but more studies are needed with longer follow-up assessments and multiple time points. Our study seeks to expand the literature in this area with a longitudinal study with 4 follow-up points over 18 months.

Current study

More research is needed on whether OGM can predict symptoms of anxiety and depression outside the specific contexts of stress and trauma research. To extend this area of inquiry, we recruited a community sample to examine the potential of OGM to predict symptoms of depression and anxiety alike. Participants received questionnaires at five different time up points (baseline, 5 months, 6 months, 12 months and 18 months). This follow-up period is the longest known in literature for a community sample. It is also one of the longest follow-up studies on OGM in general, together with those by Spinhoven et al. (2006) and Bryant, Sutherland, and Guthrie (2007), which included follow-up periods for 49 and 24 months respectively. We hypothesised that OGM at baseline would predict the trajectory of anxiety and depression. Moreover, we examined the influence of additional covariates on the course of depression and anxiety, in particular the educational level, gender, and age of participants.

Method

Participants

Our sample included 156 participants (53 men and 103 women; mean age 38.8 years, *SD* = 14.1, range = 18.9-68.8) from Flanders, the northern, Dutch-speaking region of Belgium. In terms of education level, 11% had completed lower secondary education, 43% had completed higher secondary education, and 46% had completed higher education; data on education were missing for one participant. Potential participants responded to advertisements in local newspapers about a questionnaire study of general well-being. Participants received €10 per assessment. They were recruited as a convenience sample for a matched-control study evaluating the effectiveness of a psychoeducational intervention. Participants were screened using question 15 of the Web Screening Questionnaire (WSQ; Donker, van Straten, Marks, Cuijpers, 2009) about suicidal tendencies (Answering 'I would do it given the opportunity' on the question whether the idea of harming yourself or taking your life, recently came into their mind; *N* = 1), as well as the General Anxiety Disorder Questionnaire-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2003) showing whether they suffered from a severe generalized anxiety disorder (15+ on a 21 point scale; *N* = 21). Participants meeting these criteria were excluded. One participant with a suicide risk was contacted and informed about the possibilities for professional help in the vicinity.

For the current study, we only considered this control group, because the goal of the study was to use OGM to predict the natural course of depression and anxiety in undiagnosed, non-disordered participants.

Materials

Autobiographical Memory Task (AMT; Williams & Broadbent, 1986). Memory specificity was measured using a written version of the AMT. Participants were presented with ten cue words and asked to provide a different, specific memory in response to each of them. The words were of positive and negative valence and presented in alternating order. Because the participants received the AMT via postal mail, it was completed without a time limit. Translated from Dutch, the positive cues were: pleasurable, attentive, proud, social and enthusiastic; negative cues were: angry, emotionally hurt, angry, clumsy, and

disappointed. Responses were classified into one of six categories: specific memories, categoric memories, extended memories, no memory (a.k.a. semantic associates), repeated events, and omissions. Extended memories refer to an event that may have happened only once, but that lasted longer than one day. A memory is labelled as 'same event', when participants violate instructions and an event is repeated at least once in response to different cue words. The 'no memories' category mostly concerns semantic associations and irrelevant answers. Omissions are non-responses. Inter-rater reliability was determined for the responses of 30 participants. The level of agreement between raters was high (K = .84). In addition, the AMT is unidimensional and its psychometric properties are known to be good (e.g., Griffith et al., 2009; Griffith, Kleim, Sumner, & Ehlers, 2012; Griffith, et al., 2012; Heron, Crane, Gunnell, Lewis, Evans, & Williams, 2012). We calculated AMT proportions by dividing the number of responses for each category by the total number of actual responses minus the number omissions (i.e., the denominator of each proportion was the total number of responses possible with the number of non-responses subtracted).

Depression Anxiety Stress Scales (DASS-21; de Beurs, Van Dyck, Marquenie, Lange, & Blonk, 2001). Participants completed the DASS-21, including the depression (DASS-21-D) and anxiety (DASS-21-A) subscales. Each subscale contains 7 items and sum scores range from 0 to 42. Although symptoms of depression and anxiety are often highly correlated, the DASS has adequate discriminant validity and the internal consistency for both the depression and anxiety subscale is excellent with αs of .95 and .90, respectively.

Procedure

Participants completed the AMT and DASS-21 at Time 1, which were sent by mail to the investigators. During the follow-ups, the DASS-21 was the only outcome measure. Time 2 was five months after Time 1; Time 3 was six months after Time 1; Time 4 was one year after Time 1; Time 5 was 18 months after Time 1. Dropout was low at each time point: 156 participants completed the questionnaire at Time 1, 153 at Time 2, 144 at Time 3, 145 at Time 4, and 145 at Time 5. As a part of the larger treatment effectiveness study, participants also completed additional measures, which were

unrelated to the current study.

Analyses

For both DASS subscales, if fewer than 20% of the items were missing (i.e. not more than one item), we prorated the scores by assigning the missing item the average value of the other items of the subscale. We used latent growth curve modelling (e.g., Bollen & Curran, 2006; Duncan, Duncan, & Strycker, 2006) to examine the trajectory of depression and anxiety. We also examined whether OGM predicted the trajectory of depression and anxiety over the 18 months of follow up. In latent growth curve modelling, a latent variable for an intercept is defined using loadings of 1.0 for each time point. For the slope parameter, we coded time such that growth was represented by change in depression or anxiety as a function of months since baseline. Thus, loadings on the slope parameter were set to 0, 5, 6, 12, and 18, respectively. These two latent variables represent the linear trend across time for depression and anxiety. We then regressed these latent variables on the proportion of categoric memories from the AMT (omissions excluded from the denominator), gender (1 = female, 0 = male), age in years, and level of education (1 = higher education, 0 = less than higher education). In addition to modelling the linear trend over time, latent growth curve modelling is a form of structural equation modelling, so fit indices for each model are produced. These fit indices help to determine whether a specified model is appropriate for the data.

OGM, anxiety, and depression were not normally distributed in this sample, so we used the robust maximum likelihood estimator for model parameters, standard errors, and chi-square tests (MLR; Muthén & Muthén, 1998-2012). To be included in the analyses, participants had to complete the baseline assessment and one or more follow-up time points. This method of estimation provides full information maximum likelihood estimation in the presence of missing data, and missing data were minimal in this sample.

Results

Descriptive statistics

Table 1 presents descriptive statistics for the DASS-21 depression and anxiety subscales. Table 2 furthermore provides an overview of the correlations between both subscales at all five time points. As for the AMT, we report the proportion of different memory types excluding omissions (33 on a total of 1560 cue words) from the calculations. Participants reported on average 64% (*SD* = 27) specific memories, 4% (*SD* = 10) categoric memories, 17% (*SD* = 16) extended memories, 14 (*SD* = 19) no memories, and less than 1% (*SD* = 3) repeated events.

OGM and symptom changes

Our latent growth curve model for depression is presented in Figure 1. This model fit well according to several fit indices: root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) = .00, 90% confidence interval = .00-.07, comparative fit index (CFI; Bentler, 1990; Hu & Bentler, 1999) = 1.00, Tucker-Lewis Index (TLI; McDonald & Marsh, 1990; Tucker & Lewis, 1973) = 1.00, standardised root mean square residual (SRMR; Hu & Bentler, 1999) = .04; the χ^2 for the model was not significant, which is also consistent with a good-fitting model, χ^2 (22) = 21.60, p = .48. The average change in depression per month was -.03, but as shown in Figure 1, higher levels of OGM resulted in higher slope values (i.e., less negative or more positive), slope = .78 (standard error = .26), p = .003. In terms of effect size, each additional memory retrieved (assuming zero omissions), would result in an increased slope of .08. Again, the slope is change in depression per month on the DASS depression scale (0-42 scale). The standardised value of this coefficient was .3. None of the other covariates in the model were significantly related to the slope and intercept parameters.

The χ^2 for model fit for the latent growth curve model for anxiety was significant, χ^2 (22) = 37.17, p = .02, which is inconsistent with a good fitting model. Other fit indices were as follows: *RMSEA* = .07, 90% confidence interval = .03-.10, *CFI* = .91, *TLI* = .88; *SRMR* = .05. We were unsuccessful in modifying the model to obtain a better fit (e.g., adding a quadratic trend over time to the model). Within the model, the relationship between OGM and changes in anxiety over time approached, but failed to reach significance, .76 (standard error = .45), p = .09.

Discussion

We studied a large community sample at five time points, with the last time point 18 months after baseline. For depression, we successfully fitted a linear trend over time, and this linear trend was associated with the proportion of overgeneral memories, excluding omissions. Higher levels of OGM were associated with a large linear slope over time, with gender, education, and age as additional covariates in the model. For anxiety, we were unable to successfully fit a model. This may be because anxiety was less stable over time. The DASS only measures symptoms during the past week, so we likely missed periods of depression and anxiety. These unmeasured periods of time may have prevented us from finding a well-fitting model for anxiety.

Most existing studies have focused on the relationship between OGM and changes in depression, so it is important to extend this research into anxiety. Furthermore, previous studies on OGM and anxiety have always considered the effects of OGM for a select number of people who faced highly stressful or traumatic situations, whereas the current study broadens its applicability to a more general community sample. A final merit is that we were able to map changes across several time points.

The increasing influence of confounding factors (e.g. environmental or personal changes) in turn might be the reason why the strength of the effects diminishes after peaking at one year follow-up and are no longer significant at 18 months.

Limitations and caveats

This is a predictive study; we did not experimentally manipulate OGM, so it is possible that some unmeasured "third variable" caused both OGM at baseline and changes in depression over time. Thus, one cannot be sure that modifying OGM would lead to a different trajectory of depression. Some investigators are exploring this possibility, however. Memory specificity training for people with OGM has already been developed as a means to treat depression. A study by Raes et al. (2009) showed that the retrieval style of participants became more specific following this training. Neshat-Doost et al. (2012) found similar results – patients treated with MEST had lower levels of depressive symptoms at two-month follow-up for participants as compared with controls. Although we cannot rule out third-variable

explanations, our results as well as the results of Raes et al. and Neshat-Doost et al. would be highly unlikely if OGM had zero causal effect on changes in depression.

Our measurement strategy had some limitations. We did not assess life stress or trauma, so it is unknown whether OGM would predict changes in depression above and beyond trauma, nor whether OGM interacts with stress and trauma. We used a written, self-report version of the AMT that had no time limit. Thus, we cannot know what the testing conditions were like. It is possible, for example, that some participants spent more time on the AMT than others, or that some participants completed their AMT in multiple sessions. Finally, the subscales of depression and anxiety are highly correlated, which is an issue that can also be found in similar questionnaires like the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983), according to Cosco, Doyle, Ward and McGee (2012). Although separate analyses for highly correlated subscales could be considered as redundant, we nevertheless wanted to include both analyses and make the explicit distinction, given the underlying conceptual distinction.

Summary and conclusions

OGM may be an underlying process involved in the exaggeration of symptoms, which is consistent with the hypothesis of Williams et al. (2007) – that OGM may be a trait characteristic that serves as a vulnerability factor for depression. Our study, across 18 months, is consistent with other findings on OGM and depression over time (for review see Sumner et al., 2010).

Future studies should seek to better understand the relationship between OGM and anxiety. A more frequent follow-up schedule may be needed to track anxiety over time. It is possible that our findings result from OGM being associated with depression specifically, but it is well known that anxiety and depression are strongly associated and have a common core (Griffith et al., 2010; Krueger, 1999; Krueger & Markon, 2006; Watson, 2009). Thus, future studies should examine common versus specific elements of depression and anxiety separately.

More research is needed on OGM across several time points. This could provide a better view on changes in the strength of the relationship between OGM and depression and anxiety. If our hypotheses

are correct, a gradual incline in the relationship between OGM and symptoms of anxiety and depression, followed by a slight decline could be found in clinical samples in the short-term (e.g. six months to one year) and in non-clinical samples in the long(er) term (e.g. one year to one year and a half, or even longer). Finally, further replication of these results in non-clinical samples could confirm the potential of the AMT as a screening measure for internalizing psychopathology in the general population. If similar results can also be found in clinical samples (for example in patients with MDD), this would provide additional evidence for OGM as a trait-like characteristics that can act as a significant vulnerability factor for depression.

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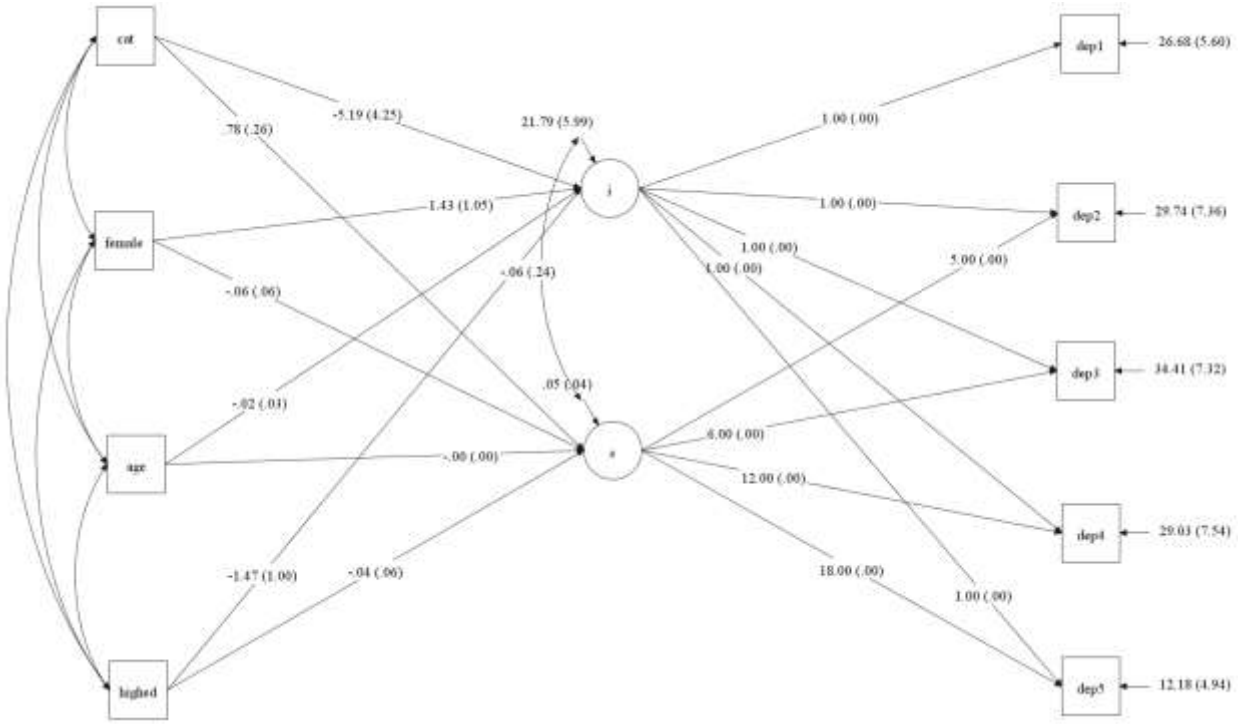

Figure 1. *The latent growth curve model of overgeneral memory, gender, age and education. Variable abbreviations are as follows: cat =proportion of categorical memories with omissions excluded from the denominator, female is coded 1 = Female, 0 = Male, High Ed. = Higher education (1 = higher education, 0 = otherwise), Dep1–Dep5 = DASS-21 depression at Times 1–5, i = the intercept for the linear relationship of depression over time, s = the linear slope of depression over time. All values are unstandardised.*

Table 1

Descriptive statistics for the DASS-21 subscales

	T1			T2			T3			T4			T5		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Depression	6.1	7.2	156	6.4	7.4	153	5.5	7.2	144	6.0	7.6	145	5.3	7.0	145
Anxiety	4.8	4.8	154	4.9	5.2	153	4.6	5.4	144	4.2	5.7	145	3.8	5.0	145
Depression α	.87			.90			.90			.90			.91		
Anxiety α	.66			.75			.77			.82			.78		

Table 2

Correlations between DASS-21 depression and anxiety subscales for five time points

	T1	T2	T3	T4	T5
Correlation	.53 ***	.66 ***	.65 ***	.74 ***	.62 ***

*** $p < .001$