Published in final edited form as:

J Adolesc. 2013 February ; 36(1): 201–208. doi:10.1016/j.adolescence.2012.11.001.

Overgeneral Autobiographical Memory, Emotional Maltreatment, and Depressive Symptoms in Adolescence: Evidence of a Cognitive Vulnerability-Stress Interaction

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Abstract

Overgeneral autobiographical memory (OGM) is associated with depression and may confer risk for the development of depressed mood, but few longitudinal studies have evaluated OGM as a predictor of depressive symptoms in early adolescence, particularly in the context of environmental stressors. We investigated whether OGM and emotional maltreatment would interact to predict prospective increases in depressive symptoms in early adolescents and whether these effects differed by race. Among 174 seventh-graders, OGM and familial emotional abuse interacted to predict depressive symptoms eight months later, controlling for initial depressive symptoms. Specifically, emotional abuse predicted increases in depressive symptoms among Caucasian adolescents with more OGM, but not among those with less OGM. This association was not significant for African American adolescents. These results provide support for a cognitive vulnerability-stress relationship between OGM and emotional abuse in early adolescence and suggest that these mechanisms of risk for depression may be specific to Caucasian adolescents.

Keywords

Overgeneral autobiographical memory; autobiographical memory; cognitive vulnerability; depression; emotional maltreatment; life stress

During adolescence, the prevalence of depression increases dramatically, with debilitating consequences (Avenevoli, Knight, Kessler, & Merikangas, 2008). Despite alarming statistics, research only has relatively recently begun to examine the etiology, course, and treatment of depression in adolescents (Abela & Hankin, 2008). Prior work also has indicated that subthreshold depression is associated with substantial functional impairment among adolescents (Avenevoli et al., 2008), and subclinical depressive symptoms in

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adolescence predict the onset of major depressive disorder (MDD) in adulthood (e.g., van Lang, Ferdinand, & Verhulst, 2007). Thus, given the high prevalence and burden of MDD, more research is needed to evaluate risk factors for the development of depressive symptoms in adolescence.

One feature that has been shown to characterize individuals with depression is overgeneral autobiographical memories (Williams et al., 2007). Autobiographical memory refers to a base of personal information that includes specific episodic memories of past events and more conceptual, self-relevant information (Williams et al., 2007; Williams & Broadbent, 1986). Overgeneral autobiographical memory (OGM) refers to the finding that some individuals, when asked to retrieve a specific memory in response to a cue word, retrieve memories that are categorical events (e.g., “I used to ride in my uncle’s truck twice a week”) or events that lasted longer than a day (e.g., “My week-long vacation to Maine”), rather than an event that occurred on one day at a particular time and place (e.g., “I scraped my knee at school on Tuesday”).

Research has suggested that recalled memories may remain more general if the conceptual information that is activated during early stages of memory retrieval is related to one’s self-representation (Williams, 2006; Williams et al., 2007). Additionally, nonspecific retrieval of memories may serve as a functional avoidance strategy that reduces distress associated with recall of aversive experiences. Although this strategy is adaptive in the short term, it may impact negatively upon problem-solving ability leading to distress as a result of failed problem-solving attempts (Williams, 2006). Over time, an overgeneral retrieval style may occur more broadly as avoidance of details about negative experiences and is reinforced for purposes of affect regulation (Williams, 2006). Along with functional avoidance, the CaR-FA-X model proposes two other possible mechanisms responsible for increased overgeneral memory: first, rumination on abstract self-related information may increase difficulties with the retrieval of specific memories; second, executive dysfunction may lead to deficiencies in the inhibition of interfering material (Williams et al., 2007).

Individuals with a history of depression, as well as adolescents at risk for developing depression (e.g., Kuyken & Dalgleish, 2011), have more overgeneral retrieval styles compared to never-depressed individuals, a distinction demonstrated in adults, adolescents, and children (e.g., Kuyken & Dalgleish, 2011; for a review, see Sumner, Griffith, & Mineka, 2010). More recently, longitudinal studies have evaluated OGM as a risk factor for depressed mood, although few of these studies have used adolescent samples. OGM has been demonstrated to predict the onset of depressive symptoms and episodes in adolescents (Rawal & Rice, 2012) and the onset and duration of depressive episodes among adults (Sumner et al., 2010).

Although OGM appears to serve as a general risk factor for depression, cognitive vulnerability-stress theories of depression in adolescence suggest that cognitive vulnerabilities such as OGM may be particularly harmful when individuals encounter stressful life events (Hankin & Abramson, 2001). However, few longitudinal studies have evaluated OGM as a vulnerability to depression in interaction with life events. Two studies have reported that OGM predicted increases in depressive symptoms among college students who experienced stressful life events or hassles (Anderson, Goddard, & Powell, 2010; Gibbs & Rude, 2004), and another found that OGM in interaction with chronic interpersonal stress predicted recurrence of depressive episodes in late adolescents with a history of major depression (Sumner et al., 2011). However, it is not clear to what extent these findings generalize to early adolescents, who may be at risk for the first onset, rather than the recurrence, of depression.

A cross-cultural study found that overgeneral memory was associated with clinical depression in both British and Taiwanese participants; retrieval of specific vs. overgeneral memories in nondepressed adults was found to be affected by culture, in that Taiwanese participants retrieved fewer specific memories and more categoric memories than British participants (Dritschel, Kao, Astell, Neufeind, & Lai, 2011). However, previous studies of OGM have not directly evaluated whether such vulnerability-stress models of OGM apply to African Americans or to adolescents of different races. One existing study found that OGM predicted increases in depressive symptoms among Caucasian females but not among African American females, but did not evaluate intervening life stressors or the effect of OGM in males (Hipwell, Sapotichne, Klostermann, Battista, & Keenan, 2011). Although the reason for the racial difference in the effects of OGM on depression in this study was not clear, the authors speculated that the differential effects of OGM may reflect different cultural experiences that result in greater rehearsal of specific memories for events among Caucasian adolescents. For example, children are better able to recall specific memories when their mothers frequently give them precise information about their past experiences (Reese & Fivush, 1993). Thus, if parents of Caucasian adolescents are more likely to rehearse specific memories with them, then deficits in specificity of autobiographical memories may be more indicative of vulnerability to depression among Caucasian adolescents (who would be expected to have high memory specificity) than among African American adolescents. However, no work to date has replicated the racial differences in the effects of OGM reported by Hipwell et al. (2011), nor has research evaluated racial differences in OGM as a vulnerability to depression in the context of stress.

This limitation is noteworthy because some epidemiological studies have indicated higher rates of depression as well as more chronic and impairing depressive disorders among African American individuals (Sen, 2004; Van Voorhees, Paunesku, Kuwabara, Reinecke, & Basu, 2008; Williams et al., 2007). Additionally, preventive interventions that target modifying negative cognitions have been shown to be less beneficial to African American children (Cardemil, Reivich, Beevers, Seligman, & James, 2007), which highlights the need for the identification of mechanisms of depression among individuals of different races. In contrast, recent epidemiological surveys have suggested that risk for depression may actually be lower among African Americans (e.g., Breslau et al., 2005). If OGM can explain increases in depression in Caucasian adolescents, but not in African American adolescents, this might help to account for differential risk for depression in the two racial groups.

One stressor that may be particularly potent during early adolescence is emotional maltreatment (Alloy et al., 2006), which is typically conceptualized in terms of emotional abuse (EA) and emotional neglect (EN). EA is a more active form of maltreatment and consists of “verbal assaults on a child’s sense of worth or well-being or any humiliating or demeaning behavior directed toward a child by an adult or older person,” whereas EN is more passive and is defined as “the failure of caretakers to meet children’s basic emotional and psychological needs, including love, belonging, nurturance, and support” (Bernstein et al., 2003, p. 175). Although a lifetime history of EA may be associated with a tendency to have more OGM, perhaps as a functional avoidance strategy to avoid thinking about these negative experiences (Raes, Williams, Hermans, & Eelen, 2005), when evaluated prospectively, emotional maltreatment may also increase risk for depressive symptoms (Hankin, 2005) and diagnosable depressive episodes (Liu, Alloy, Abramson, Iacoviello, & Whitehouse, 2009) in adulthood, as well as during childhood and adolescence (Alloy et al., 2006; Gibb & Abela, 2008).

In the present study, we hypothesized that OGM would interact with EA and EN to predict prospective increases in depressive symptoms among a diverse sample of early adolescents. We expected that adolescents who experienced emotional maltreatment would be more

likely to exhibit increases in depressive symptoms at follow-up if they had more OGMs at baseline, relative to adolescents who had fewer OGMs at baseline. We also evaluated whether these relationships differed for Caucasian and African American adolescents.

Method

Participants

Participants were part of a larger prospective longitudinal study of sex and racial differences in the emergence of depressive disorders during adolescence. Caucasian and African American adolescents, ages 12–13 (mean age = 12.32, $SD = 0.58$) were recruited through newspaper advertisements (approximately 32% of the sample) and school mailings from Philadelphia area schools (68% of the sample), and were demographically representative of the Philadelphia area. To be eligible, participants had to be 12 or 13 years old, self-identify as Caucasian/White or African American/Black (Hispanic adolescents were also eligible if they also identified as White or Black), and have a mother/primary female caregiver willing to participate. Exclusion criteria in the study included: 1) the absence of a mother/primary female caregiver; 2) the mother or adolescent was psychotic, mentally retarded, had a severe developmental disorder, or a severe learning disability; 3) the inability to complete study measures by the mother or adolescent due to the inability to read or speak English or for any other reason. The sample for the present analyses consisted of 174 adolescents (57.9% female, 60.2% African American, 39.8% Caucasian, and 3.8% who identified as Hispanic but also as African American or Caucasian) who had completed both a baseline and a follow-up visit approximately eight months later. The families exhibited a range of socioeconomic status levels, with 12.5% of participants falling below \$30,000 annual family income, 34.7% falling between \$30,000 – \$59,999, 17.6% falling between \$60,000 – \$89,999, and 26.1% falling above \$90,000.

Procedures

At the initial assessment (Time 1), participants completed measures of autobiographical memory and depressive symptoms. At a follow-up visit eight months later, participants completed a measure of EA and EN during the time since Time 1, as well as the measure of depressive symptoms.

Measures

Emotional Abuse (EA) and Emotional Neglect (EN)—The EA and EN subscales of the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003) were used to measure adolescents' self-reports of familial EA and EN between the initial assessment and the follow-up visit. Each subscale consists of five items and each item is rated on a 5-point Likert scale ranging from 1 (“*Never true*”) to 5 (“*Very often true*”). The total score of each subscale is obtained by summing all five items after reverse-scoring some of the items, with higher scores indicating more EA or EN. Numerous studies have demonstrated that the CTQ-EA and CTQ-EN have excellent reliability and validity (Bernstein et al., 2003). In the current study, $\alpha = .72$ for EA and $\alpha = .75$ for EN.

Autobiographical Memory—A modified version of the Autobiographical Memory Task (AMT; Williams & Broadbent, 1986) was used to assess autobiographical memory specificity. In the original AMT, the experimenter verbally presented five negative and five positive cue words to the participant. After each word, the participant was given 60 seconds to retrieve the first specific memory that came to mind. Specific memories were defined as the recollection of an event from one's life that occurred on a single day in a particular location (Williams & Broadbent, 1986). An example of a specific memory would be “I got a brown shirt as a gift from my parents last Monday in our house.” Overgeneral memories

were considered the recollection of an event that was extended (occurred over more than one day), categorical (a general class of repeated events), or too general to be considered extended or categorical.

In the modified AMT, the experimenter presented a total of nine cue words (3 positive, 3 negative, and 3 neutral). Neutral words were added to our paradigm to allow us to evaluate whether the effects of OGM on depression were specific to recall of valenced cue words. Words were selected based on previous versions of the AMT used with adolescents, with positive and negative words selected based on high ratings of emotionality and neutral words based on low ratings of emotionality (Park, Goodyer, & Teasdale, 2002; Williams, Teasdale, Segal, & Soulsby, 2000). The cue words used were the following: positive (*relieved, happy, proud*), negative (*failure, guilty, hopeless*), and neutral (*huge, nature, search*).

Three practice trials were conducted prior to beginning the AMT, with appropriate feedback regarding specificity. Previous research has been inconsistent with respect to whether overgeneral memory recall for positive versus negative cue words is most associated with depression, and a recent study provided evidence that the AMT is a one-factor instrument (Griffith et al., 2009). Consistent with previous studies (Sumner et al., 2010), in the current study we report analyses using the total number of overgeneral memories to all cue words. The number of overgeneral memories recalled in our study correlated highly with the number of specific memories recalled ($r = -.94, p < .001$), so we used the number of overgeneral memories as our focal predictor variable (results were comparable when using the number of specific memories as the focal predictor). Inter-rater reliability in a randomly selected 5% of the sample (81 pairs of ratings) was $\kappa = .79$.

Depressive symptoms—The Children's Depression Inventory (CDI; Kovacs, 1985) is a self-report measure designed to assess symptoms of depression in youth. Each of the 27 items is rated on a 0 to 2 scale and total scores range from 0 to 54, with higher scores indicating more depressive symptoms. The CDI has good reliability and validity (Klein, Dougherty, & Olino, 2005). Internal consistency in this sample was $\alpha = .84$ at Time 1 and at follow-up.

Depressive diagnoses—The Kiddie – Schedule for Affective Disorders and Schizophrenia – Epidemiological Version (K-SADS-E; Orvaschel, 1995a) is a semistructured diagnostic interview that assesses current and past *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV-TR*; American Psychiatric Association, 2000) Axis I psychopathology in youth. The K-SADS-E was administered to adolescents and their mothers to assess the youth's current and lifetime history of MDD, as well as current diagnoses. The K-SADS-E was administered first to the mother and then to the youth by the same interviewer, who then created summary ratings. To maintain fidelity to the K-SADS-E, we used the interviewer's summary ratings based on his/her 'best-estimate' clinical judgment from interviewing both participants. The K-SADS-E diagnostic interviews have good inter-rater and retest reliability (Orvaschel, 1995b), with κ 's of .73 and .72 for Major Depression and Dysthymia, respectively, .63–.75 for anxiety disorders, and .51–.77 for other disorders (Orvaschel, 1995b). K-SADS-E interviews were administered by Clinical Psychology postdoctoral fellows, Clinical Ph.D. students, individuals with Clinical or Counseling Masters degrees, and post-BA research staff. In the present study, inter-rater reliability based on 120 pairs of ratings (5 raters for each of 24 diagnoses from 10 K-SADS interviews) was $\kappa = .85$. Interviewers were blind to other project data, including the adolescents' AMT scores. Ten adolescents (5.7%) had a past or current major depressive episode.

Results

Preliminary Analyses

All analyses used alpha level of .05 to indicate statistical significance—

Compared to males, females retrieved more overgeneral memories at a trend level ($t = 1.86$, $p = .06$), and exhibited significantly higher levels of EA ($t = 2.24$, $p = .02$) and higher levels of depressive symptoms at follow-up ($t = 2.05$, $p = .04$), but did not differ on EN ($t = 1.59$, $p = .12$) or Time 1 depressive symptoms ($t = 1.37$, $p = .17$). Compared to African American adolescents, Caucasian adolescents experienced higher levels of EN at a trend level ($t = 1.93$, $p = .06$), but the racial groups did not differ on number of overgeneral memories recalled ($t = 0.79$, $p = .43$), levels of EA ($t = 1.64$, $p = .10$), or depressive symptoms at Time 1 ($t = 0.81$, $p = .42$) or at follow-up ($t = 1.31$, $p = .19$). Caucasian adolescents also had higher levels of familial income ($t = 5.26$, $p < .001$), but differed from African American adolescents in age only at a trend level ($M_C = 12.2$, $M_{AA} = 12.4$, $t = 1.86$, $p = .06$) and did not differ on gender ($\chi^2 = 0.32$, $p = .57$). Initial CDI scores were in the clinically-significant range (>13 ; Kovacs, 1985) for 16.2% of the sample. Correlations between primary variables and descriptive statistics are displayed in Table 1.

Prospective Analyses

To evaluate whether levels of overgeneral memories recalled would moderate the relationships between EA and EN and depressive symptoms at follow-up, and whether these relationships were further moderated by race, we conducted hierarchical linear regressions (Table 2). Continuous predictor variables were centered at their means prior to analysis, and dichotomous variables (race and sex) were dummy-coded as 0 and 1 (Aiken & West, 1991). To rule out the possibility that any racial differences in the OGM-stress interactions would be attributable to racial differences in socioeconomic status, we controlled for family income.

A significant three-way interaction emerged between overgeneral memory recall, EA, and race predicting CDI at follow-up (controlling for Time 1 CDI), such that there was a significant two-way interaction between overgeneral memory recall and EA for Caucasian adolescents ($t = 3.04$, $p < .01$), but not for African American adolescents ($t = 0.01$, $p = .99$). To examine the direction of the significant interaction (Figure 1), we plotted the interaction at one standard deviation above and below the mean levels of overgeneral memory recall and EA (Aiken & West, 1991). For Caucasian adolescents, consistent with hypotheses, EA predicted increases in depressive symptoms among individuals with more overgeneral memories ($t = 3.95$, $p < .001$), but not among individuals with fewer overgeneral memories ($t = -0.64$, $p = .53$). Additionally, overgeneral memory predicted increases in depressive symptoms among Caucasian adolescents with higher levels of EA ($t = 3.68$, $p < .001$), but not among those with lower levels of EA ($t = -1.42$, $p = .16$). There was a significant main effect of EA in predicting increases in depressive symptoms, and a trend-level main effect of OGM on depressive symptoms (Table 2), suggesting that EA may have a larger impact than OGM on symptoms of depression, a result consistent with prior work evaluating cognitive vulnerabilities to depression in adolescence, which typically has found that stress is one of the strongest predictors of depression (Abela & Hankin, 2008).

There was not a significant three-way interaction between the total number of overgeneral memories recalled, EN, and race predicting CDI at follow-up¹, and the main effects of EN

¹However, analysis of specific cue words provided partial support for this model, in that the interaction between EN and OGM for positive cue words was significant in the full sample ($t = 2.71$, $p < .01$); EN predicted increases in depressive symptoms among adolescents with more OGMs ($t = 2.40$, $p = .02$), but not among adolescents with fewer OGMs ($t = -1.31$, $p = .19$).

and OGM were not significant (Table 2). Multicollinearity statistics for both models were good (VIFs < 3.78, Tolerances > 2.65).

Discussion

The results of the present study suggest that overgeneral autobiographical memory serves as a vulnerability to depressive symptoms among early adolescents, specifically among Caucasian adolescents who experience emotional maltreatment. Caucasian adolescents who recalled more overgeneral memories at the initial assessment experienced increases in depressive symptoms across an eight-month follow-up period if they also encountered high levels of emotional abuse. Similarly, Caucasian adolescents who encountered higher levels of emotional abuse were at particular risk of developing increases in depressive symptoms if they had more overgeneral memories at baseline. In addition, results indicated partial support for a two-way interaction between overgeneral retrieval style for positively-valenced cues and emotional neglect in predicting depression symptoms at follow-up. Together, these results provide evidence for a cognitive vulnerability-stress relationship between OGM and emotional maltreatment in predicting depressive symptoms among Caucasian adolescents.

The vulnerability-stress relationships evaluated suggest that an overgeneral retrieval style for autobiographical memories may serve as a vulnerability factor to depression during adolescence, but that OGM may not confer risk until triggered by stressors such as emotional abuse or neglect. Emotional maltreatment is a particularly potent predictor of depression (Alloy et al., 2006) and may explain why some, but not all, adolescents who have an overgeneral retrieval style experience increases in symptoms of depression. This study extends evidence for an OGM by stress interaction downward to a younger sample than was used in the three existing studies that found similar interactions in adults (Anderson et al., 2010; Gibbs & Rude, 2004) and late adolescents (Sumner et al., 2011), and implicates emotional maltreatment as a stressor that may bring about depression among adolescents who are vulnerable as a result of OGMs. Although little research has evaluated how OGM changes and stabilizes over time, it is likely that OGM continues to develop in adolescence (e.g., as a result of negative experiences [Raes et al., 2005]) and there is evidence that OGM may vary along with current mood state (Au Yeung et al., 2006; Debeer et al., 2011; Raes et al., 2012). However, given that OGM has been demonstrated to prospectively confer risk for depression even after controlling for current symptoms of depression (e.g., Rawal & Rice, 2012; for a review, see Sumner et al., 2010), and that OGM confers vulnerability to depression in the context of stress (Anderson et al., 2010; Gibbs & Rude, 2004; Sumner et al., 2011), evaluating OGM as a vulnerability factor for depression may be warranted.

The exact mechanism by which an overgeneral retrieval style functions as a vulnerability factor in an adolescent population is not clear. Research supports an association between overgeneral memory and rumination in which environmental cues activate networks of self-related conceptual information and ruminative processes that ultimately result in memory retrieval at a more general level (Sumner, 2012). Negative self-schemas, which play a significant role in depression, may be activated in this process and a ruminative self-focus would likely exacerbate the impact of these self-schemas on symptoms of depression (Sumner, 2012). Although speculative, it is possible that the ability to retrieve specific memories of EA may also allow one to see patterns in the abuse and be able to attribute it to something external to the self, thus buffering against depression. In contrast, only OGM for positive cue words interacted with EN to predict increases in depressive symptoms. This may suggest that the inability to recall specific positive memories may make adolescents particularly vulnerable to depression when they experience EN, which is characterized by low levels of familial care, attention, and positive affect toward the adolescent. Having the ability to recall specific positive memories (e.g., of social support or validation of one's

value) in one's life may buffer adolescents against the effects of familial neglect on depressive symptoms.

OGM may also serve as a cognitive avoidance strategy that negatively impacts on social problem-solving ability and results in poor coping responses to life stress (Raes, Hermans, de Decker, Eelen, & Williams, 2003). Thus, adolescents with an overgeneral retrieval style may cope poorly with emotional maltreatment and as a result become depressed. Overgeneral retrieval style may still be developing and generalizing across domains during adolescence (Sumner, 2012), which may explain why we found only partial support for interactions between OGMs and EN in predicting depression. Another possibility is that we found only partial support for valenced cue words because we lacked sufficient power to evaluate racial differences in these interactions.

In our adolescent sample, there were no significant racial differences in levels of maltreatment, OGM or depressive symptoms. However, we found the OGM x EA relationship predicted depressive symptoms only in Caucasian adolescents, consistent with a recent study that found a main effect of OGM on depressive symptoms that was specific to Caucasian adolescents (Hipwell et al., 2011). There is not a clear explanation of why OGM in interaction with stress did not predict depression among African American adolescents in our sample. One possibility is that African American adolescents with OGM are less likely to experience increased depression as a result of emotional maltreatment, but would show increased depression from another form of stress (e.g., chronic daily stress) not assessed in this study. Another possibility is that the African American adolescents were buffered from depression by a protective factor (e.g., peer prosocial behavior) not assessed in our study. Nevertheless, it is possible that the interaction between OGM and emotional abuse might help to account for differential risk for depression between Caucasian and African American adolescents, although future studies should replicate these results before firm conclusions can be drawn. Consistent with the sex gap in depression that begins during adolescence (Hankin & Abramson, 2001), females reported a trend toward more overgeneral memories and had higher levels of EA, which could partially account for their higher levels of depression at follow-up relative to males.

Several strengths and limitations of the present study should be noted. We conducted a prospective study that evaluated OGM in the context of emotional maltreatment using a diverse sample of early adolescents at an age just prior to the period of highest risk of first onset of depression. One limitation of this study was the use of a new version of the AMT that had not been used in previous research. The only modification in our version of the AMT was the addition of three neutral words and the use of three (instead of five) words of each valence, and these cue words had been used in previous studies of autobiographical memory. However, with our version of the AMT, we demonstrated that the OGM by emotional maltreatment interactions predicted depressive symptoms only for the valenced words and not the neutral words. In addition, in contrast with several previous studies of OGM that have found small but often significant associations with depression (Sumner et al., 2010), in our sample OGM was not significantly correlated with depressive symptoms. However, our results highlight the potential utility of examining moderators of the relationship between OGM and depression, as OGM may be most linked to depressive symptoms among adolescents who experience stressors such as emotional maltreatment. Future research may wish to evaluate OGM as a vulnerability to depression when adolescents experience other types of stressors such as physical or sexual abuse. Future studies should also consider using more sophisticated statistical approaches (such as structural equation modeling, or hierarchical linear modeling with idiographic [within-subject] measurement of stress [Abela & Hankin, 2008]) to evaluating vulnerability-stress relationships between OGM, emotional maltreatment, and depression during adolescence.

In addition, because we measured EA and EN that took place during the follow-up period but after OGM was assessed, we were unable to assess alternative temporal models of these variables, such as a mediational model in which OGM would mediate the association between lifetime EA/EN and depression (e.g., models that predict that OGM may develop as a consequence of traumatic experiences; Williams, 2006; Raes et al., 2005), which could be further moderated by more recent stressors such as emotional maltreatment and also potentially by race. Future research should employ multi-wave designs to allow for testing the directionality of the potentially transactional relationships between these variables. Although OGM is most theoretically linked to depression, another limitation of this study is that we did not assess symptoms of other internalizing or externalizing disorders and so cannot conclude that our results are specific to symptoms of depression. Additionally, the majority of our sample had relatively low levels of depressive symptoms at both time points, which may have limited our ability to detect relationships between OGM and depressive symptoms (such as with the EN x total OGM interaction and specificity to Caucasian adolescents) because of a floor effect. Future studies should replicate these findings using high-risk samples or adolescents with higher levels of depressive symptoms, in whom stronger evidence for an EN x OGM interaction might be evident. Finally, although we employed a commonly-used measure of emotional maltreatment, it was a self-report checklist. Although interview methods require more resources to administer, it is possible that measuring EA and EN via interview would have been more accurate because of possible inaccuracies in reporting incidents of maltreatment.

Results of the present study have implications for current knowledge about overgeneral retrieval style for autobiographical memories in depression and causal mechanisms involved in the development of depression. Evidence that overgeneral memory in interaction with high levels of stress significantly influences depressive symptoms in adolescents would support further study of OGM as a tool in the identification of adolescents at risk for depression. Further research is needed to determine if OGM is a risk factor for depression in adolescents of all races and to ensure that testable hypotheses are appropriate for individuals of different races, ethnicities, and cultures. Recent evidence suggests overgeneral memory can be modified through memory specificity training (Raes, Williams, & Hermans, 2009) and adolescence may be an ideal period for such training to aid in prevention prior to the surge in rates of depression that occurs during adolescence (Hankin et al., 1998).

In conclusion, these results provide support for OGM as a vulnerability factor for prospective increases in depressive symptoms when experienced in interaction with emotional maltreatment among Caucasian adolescents. Future research should continue to investigate OGM in the context of life stressors and should evaluate the utility of OGM in predicting the first onset of depressive disorder during adolescence.

Acknowledgments

This work was supported by NIMH grant MH79369 to Lauren B. Alloy.

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Highlights

- We tested overgeneral autobiographical memory (OGM) as a vulnerability to depression
- OGM interacted with emotional abuse (EA) to predict increases in depressive symptoms
- EA predicted increases in depression among Caucasian adolescents with more OGMs
- OGM may serve as a vulnerability to depression in the face of stressors such as EA
- OGM may confer vulnerability to depression among Caucasian adolescents

Figure 1.

Three-way interaction between overgeneral memory recall, emotional abuse, and race predicting depressive symptoms at follow-up, controlling for initial depressive symptoms.

Table 1

Correlations Between Study Variables

Measure	1	2	3	4	5
1. CTQ Emotional Abuse	---	.43***	-.07	.38***	.41***
2. CTQ Emotional Neglect		---	.04	.29***	.32***
3. AMT # Overgeneral			---	.04	.06
4. CDI Time 1				---	.55***
5. CDI Time 2					---
Mean	0.77	7.63	7.99	6.51	5.08
SD	1.24	3.25	2.95	5.97	4.70

* $p < .05$,** $p < .01$,*** $p < .001$.

Note: AMT # Overgeneral = number of overgeneral memories recalled; CTQ = Childhood Trauma Questionnaire; CDI = Children's Depression Inventory.

Table 2

Interactions Between Overgeneral Memories and Emotional Abuse or Neglect Predicting Depressive Symptoms at Follow-Up, Controlling for Initial Depressive Symptoms

Regression Step	Variable	β	t	ΔR^2
<u>Emotional Abuse (EA)</u>				
Step 1	T1 CDI	.49	7.20 ***	.38 ***
	Income	.13	1.92	
	Gender	.06	0.87	
	Age	-.08	-1.33	
	MDD	.03	0.52	
Step 2	OG	.18	1.78 †	.02
	EA	.27	3.12 **	
	Race	.01	0.16	
Step 3	OG x Race	-.19	1.66 †	.03 *
	EA x Race	-.13	-1.59	
	OG x EA	.30	2.67 **	
Step 4	OG x EA x Race	-.25	-2.06 *	.02 *
<u>Emotional Neglect (EN)</u>				
Step 1	T1 CDI	.54	7.84 ***	.38 ***
	Income	.14	1.95	
	Gender	.06	0.88	
	Age	.08	-1.19	
	MDD	.06	0.91	
Step 2	OG	.20	1.56	.02
	EN	.07	0.70	
	Race	.02	0.28	
Step 3	OG x Race	-.20	-1.62	.02
	EN x Race	.09	1.01	
	OG x EN	.01	0.09	
Step 4	OG x EN x Race	.04	0.35	<.01

† $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Note. T1 = Time 1; CDI = Children's Depression Inventory; MDD = **diagnosis of major depressive disorder on Kiddie – Schedule for Affective Disorders and Schizophrenia**; OG = number of overgeneral memories recalled; EA = Emotional Abuse; EN = Emotional Neglect. Race is coded as 0 = Caucasian, 1 = African American.