Depressive Symptoms Are Associated with the Phenomenal Characteristics of Imagined Positive and Negative Future Events

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Summary: Depressive symptoms are often found to be associated with the number of imagined positive and negative future episodes. Whereas most previous studies investigated the number of imagined events within a limited time period, our study focused on the phenomenal nature of future episodes and their relationships to depressive symptoms, as measured by the Beck Depression Inventory (BDI). Nonclinical participants (n = 183) rated the phenomenal qualities (vividness, contextual/sensory details, felt, importance, accessibility, and certainty) of future episodes generated in response to negative and positive cue words. We found that lower ratings on the phenomenal characteristics of the positive events were associated with higher BDI scores, while an opposite pattern was observed for the negative events. However, there was no relationship between the proportion of imagined episodes that were specific and the BDI scores. Altogether, these results suggest that depressive symptom severity is associated with a wide range of phenomenal characteristics of imagined future episodes. Copyright © 2015 John Wiley & Sons, Ltd.

Episodic memories refer to those memories from someone's own personal past that contain knowledge at a high level of specificity and represent short time periods (from minutes to hours), usually in the form of visual images (Conway, 2005). Interestingly, it seems that in some cases, the presence of clinical symptoms is associated with differences in the retrieval of episodic autobiographical memories. For instance, it is often found that depressive patients showed reduced autobiographical memory specificity when they were asked to recall events from their own personal past (Williams, 1999; Williams et al., 2007). Patients with depressive symptoms, as compared with control subjects, needed more time to recall positive memories and gave fewer responses when instructed to recall specific autobiographical events (e.g., Williams & Broadbent, 1986).

Episodic memory makes possible not only the recollection of past experiences but also the simulation of future episodes (Tulving, 1972, 2002). The constructive episodic simulation hypothesis suggests that when people imagine a possible future episode, they recombine event details of autobiographical memories (e.g., contextual and sensory-perceptual details) stored in episodic memory (Schacter & Addis, 2007). Supporting this idea, there is convincing empirical evidence for the overlap between autobiographical remembering and future thinking (for reviews, see Schacter & Addis, 2007; Schacter, Addis, & Buckner, 2007). In line with this, a wealth of studies provided evidence for impairments both in autobiographical remembering and future thinking in various psychiatric populations, such as in schizophrenia (e.g., D'Argembeau, Raffard, & Van der Linden, 2008) and posttraumatic stress disorder (e.g., Brown et al., 2013).

The relationship between difficulty in future thinking and autobiographical remembering has also been demonstrated in depression. A study (Williams et al., 1996) found a strong positive correlation between the specificity of autobiographical events and imagined episodes in a group of suicidal patients. Further studies (e.g., Bjärehed, Sarkohi, & Andersson, 2010; MacLeod & Salaminiou, 2001; MacLeod, Tata, Kentish, & Jacobsen, 1997) established that similarly to the retrieval of autobiographical memories, depressive patients tend to imagine a reduced number of positive future events within a limited time period when compared with nondepressed control subjects. Most studies on the relationship between depression and future thinking have used an adapted verbal fluency paradigm, the future-thinking task (MacLeod, Rose, & Williams, 1993). In this task, participants are asked to imagine as many possible future episodes as they can over three time periods (next week, next year, and the next 5–10 years). For each period, participants have 1 minute to generate positive future events and 1 minute to imagine negative episodes.

Contrary to the generation of positive future events, there is no consensus on whether depressive patients tend to imagine a larger number of negative episodes than controls. MacLeod et al. (1993) suggested that the reduced number of imagined positive future episodes in depression is not necessarily associated with an increased number of anticipated negative events. In accordance with this suggestion, most studies using the future-thinking task failed to find any relationship between depressive symptoms and the anticipation of negative future episodes (e.g., Bjärehed et al., 2010; MacLeod et al., 1997). MacLeod and Byrne (1996) reported somewhat different results: there was a decrease in the imagination of positive episodes and an increase in the number of generated negative future events in a group of mixed (anxious–depressed) participants. The authors argued that while the reduced number of positive events could be due to the presence of depressive symptoms, the increased number of negative episodes could be due to symptoms of anxiety (for similar results, see, e.g., MacLeod et al., 1997).

In most cases, participants were patients with severe depressive symptoms, but there are examples of studies

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involving nonclinical individuals. It has been demonstrated in nonclinical samples that reduced positive future thinking was associated with depressive symptom severity (Kosnes, Whelan, O'Donovan, & McHugh, 2013), increased hopelessness (O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004), and reduced well-being (MacLeod & Conway, 2005). In contrast, Miles, MacLeod, and Pote (2004) failed to find any relationship between scores on a self-reported inventory and the simulation of positive events, but there was an increase in the number of negative episodes generated by more depressive participants. It is worth noting, however, that the difference in the number of negative events between the two groups was not seen when anxiety was controlled as a covariate.

Although a large number of studies investigated whether depressive symptoms were associated with the number of generated past and future events within a limited time period, studies on the relationship between depressive symptoms and the phenomenal qualities of autobiographical memories and imagined future episodes are largely missing. However, several theorists (e.g., Brewer, 1999; Conway, 2001; Johnson, Foley, Suengas, & Raye, 1988; Suengas & Johnson, 1988; and Tulving, 1983) highlighted the importance of the subjective experience that accompanies the retrieval of autobiographical events and the generation of possible future episodes. For instance, underlining the importance of the subjective experience of autobiographical remembering, William Brewer (1999) introduced the term recollective memory, which refers to the phenomenally experienced form of a single, particular episode from someone's own personal past. Studies on source and reality monitoring (Johnson et al., 1988; Suengas & Johnson, 1988) pointed out that the number and specificity of event details (e.g., contextual and sensory-perceptual details) can be measured by self-ratings of the phenomenal characteristics of both perceived and imagined events. Although it seems that memories for past experiences are more vivid and detailed than memories for imagined episodes (e.g., Johnson et al., 1988), patterns of the phenomenal characteristics of past and future events show strong similarities (e.g., D'Argembeau & Van der Linden, 2004). A recent study (Werner-Seidler & Moulds, 2011) investigated the phenomenal characteristics of negative and positive autobiographical events in a group of recovered depressed patients and a group of never-depressed control subjects. While no difference was found for the recalled negative memories between the groups, positive autobiographical memories were given lower ratings on vividness generated in a sad mood by a group of recovered depressed participants. It has also been demonstrated that more severe depressive symptoms were associated with reduced vividness of positive future scenarios (Holmes, Lang, Moulds, & Steele, 2008; Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011; Stöber, 2000).

In the present study, we also aimed to investigate whether the presence of depressive symptoms was associated with the phenomenal qualities of generated events, but instead of focusing on the general vividness of imagined episodes, our study investigated a wide range of phenomenal characteristics of positive and negative events (vividness, contextual details: time and location, sensory perceptual details:

visual information and sounds, felt, personal importance, accessibility, and certainty). Based on the theoretical frameworks and the empirical evidence described earlier, we assumed that more severe depressive symptoms are associated with lower ratings on the phenomenal qualities of imagined positive future episodes.

METHOD

Participants

Altogether, 184 Hungarian adults completed our Internet-based questionnaire. Participants received no compensation for their participation. One participant was excluded from our sample, because this subject gave the same response to each question. Therefore, we analyzed the results of 183 participants (48 men and 135 women) between the ages of 18 and 69 years ($M = 25.0$ years, $SD = 8.2$). Distribution of educational attainment was as follows: less than a high school diploma — 4.9%; high school diploma — 15.3%; undergraduate university students — 53.6%; and university degree — 26.2%.

Materials

Cue words
Twelve cue words were presented for each participant: two neutral (bird and bread), five positive (joy, kiss, love, mercy, and moral), and five negative (grief, hatred, malice, misery, and menace) words translated from the database by Rubin and Friendly (1986). In the practice phase, two neutral words were given in the same order for each participant. Then, to eliminate the serial order effect of the cue words, the 10 emotional words were presented in one of two random sequences. The number of consecutively presented negative or positive words was limited to two in the first and the second sequence as well. The first sequence was given for 63 participants, and the second sequence was presented for the remaining 120 participants.

Questionnaires
Participants imagined a possible future episode in response to each cue word, and then they rated the phenomenal characteristics of the episodes on a 7-point scale. Seven items were selected and translated from the Memory Characteristics Questionnaire (Johnson et al., 1988), which was developed to measure a wide range of phenomenal qualities of autobiographical memories and imagined episodes: vividness (Overall vividness is: 1 = *vague*, 7 = *very vivid*), time (My memory for the time when the event takes place is: 1 = *vague*, 7 = *clear/distinct*), location (My memory for the location where the event takes place is: 1 = *vague*, 7 = *clear/distinct*), felt (Feelings at the time were: 1 = *negative feelings*, 7 = *positive feelings*), visual details (My memory for this event involves visual detail: 1 = *little or none*, 7 = *a lot*), sounds (My memory for this event involves sound: 1 = *little or none*, 7 = *a lot*), and certainty (Do you have any doubts about the accuracy of your memory for this events? 1 = *a great deal of doubt*, 7 = *no doubt whatsoever*).

Further, two items were included in the final version of our questionnaire: accessibility (When I try to access this event, it is: 1 = *easy to access*, 7 = *difficult to access*) and importance (This event is important to me: 1 = *not at all*, 7 = *very important*). We asked our participants to rate the accessibility of the events, because previous studies have shown that in depression, it is easier to access negative (mood-congruent) events when compared with the retrieval of positive episodes (for a review, see Matt, Vazquez, & Campbell, 1992). The personal importance of the events was included in the final version of the questionnaire, because it is known that the importance of an event is strongly related to its vividness and accessibility (e.g., Cohen & Faulkner, 1988; Rubin & Kozin, 1984; and Sehulster, 1989).

A short version of the Beck Depression Inventory (BDI-13; Beck & Beck, 1972; Hungarian: Halmai et al., 2008) was used to assess depressive symptom severity including 13 items each with four possible responses (0–3) reflecting varying degrees of symptom severity. The BDI-13 was developed by removing eight items from the original 21-item version of the questionnaire.

Procedure

An Internet-based questionnaire was used to collect data; the link of the questionnaire was posted on social networking sites and was sent via e-mail to Hungarian undergraduate students and to private groups of people interested in psychological research. On the first page, we informed the participants that they were participating in an experiment on future thinking and emotions. First, they completed our preliminary questionnaire including questions on demographic data and any known psychiatric and/or neurological disorder. We instructed them that they would see 12 words and that their task would be to imagine one possible future episode in response to each word. We asked them to imagine future events that had specific details on time and location and which would happen at least 1 year later to eliminate the effect of the temporal distance of the events.

Each cue word was presented in the first line of a separate page, and participants were not allowed to return to the previous page. We asked the participants to describe in one paragraph the content of the episode associated with the cue word and to rate the phenomenal qualities of each generated event. Finally, they completed the BDI-13 (Beck & Beck, 1972; Hungarian: Halmai et al., 2008).

RESULTS

Correlations between the BDI score and the phenomenal characteristics of the imagined positive and negative future events

The average of the BDI total score was 4.93 (*SD* = 4.93; range: 0–27) in our sample. The value of Cronbach's alpha was 0.84, which indicates good internal consistency of the items in the scale. In order to analyze the relationship between the BDI scores and the phenomenal qualities of the generated events, a negative and a positive score were determined for each phenomenal characteristic by separately calculating the mean ratings of the five negative and the five positive future episodes. Furthermore, a difference index was calculated for each item by subtracting the negative from the positive score.

A series of Pearson's correlation coefficients was conducted to analyse the relationship between the BDI score and ratings on the phenomenal qualities of the negative and positive future events (Table 1). For the negative events, we found low but significant positive correlations between the BDI score and mean ratings on six characteristics (vividness, time, importance, accessibility, sounds, and certainty). In contrast, significant negative correlations were observed for seven phenomenal qualities of the positive events (vividness, time, location, felt, accessibility, sounds, and certainty). In other words, higher BDI scores were associated with lower ratings on the phenomenal characteristics of the positive future events, but an opposite pattern was observed for the negative episodes. Correlations between the BDI score and the difference indexes also confirmed these findings: significant negative correlations were found for all but one item (felt).

Table 1. Correlations between the BDI scores and the phenomenal qualities of imagined negative and positive future episodes

Phenomenal characteristics	Negative events	Positive events	Difference index
Vividness	.18* [.06, .30]	−.25*** [−.39, −.09]	−.34*** [−.45, −.22]
Time	.18* [.02, .34]	−.16* [−.31, .01]	−.32*** [−.45, .19]
Location	.05 [−.11, .20]	−.18* [−.31, −.03]	−.20** [−.31, −.07]
Felt	−.04 [−.21, .14]	−.24*** [−.40, −.06]	−.12 [−.27, .05]
Importance	.25*** [.12, .38]	−.09 [−.23, .04]	−.28*** [−.41, −.17]
Accessibility	.18* [.05, .30]	−.27*** [−.43, −.10]	−.33*** [−.47, −.16]
Visual details	.08 [−.06, .21]	−.10 [−.25, .03]	−.18* [−.29, −.05]
Sounds	.19* [.03, .34]	−.18* [−.32, −.03]	−.33*** [−.42, −.23]
Certainty	.33*** [.20, .44]	−.26*** [−.39, −.10]	−.46*** [−.58, −.34]

Notes:
Values represent *r*-values (Pearson's correlation coefficients); 95% confidence intervals for the correlation coefficients are shown in brackets [lower limit, upper limit].
Difference indexes were determined by subtracting the mean ratings on each phenomenal characteristic of the negative events from the mean ratings on the phenomenal qualities of the positive episodes.
BDI, Beck Depression Inventory.
*p < .05, **p < .01, ***p < .001.

Correlation between the BDI score and the proportion of imagined specific events

In the second cycle of the analysis, we tested whether the relationship between depressive symptom severity and ratings on the phenomenal characteristics of the imagined episodes is due to a higher proportion of specific events generated by individuals with less severe depressive symptoms. Although participants were instructed to generate episodes that had specific details on time and location, we conducted an analysis on a post hoc basis that addressed this issue.

On the basis of event descriptions, one rater categorized each event into one of two categories: specific events or general episodes. Another independent rater classified 25 per cent of the generated episodes (458 events). The classification criteria we used were adapted from Haque and Conway (2001) who developed this coding procedure for classifying autobiographical memories. Cohen's kappa was used to assess inter-rater reliability. The value of Cohen's kappa was 0.86, which indicates high agreement among raters. Only the first rater's ratings were included in the final analysis.

At first, we calculated for the entire sample what percentage of all reported episodes was specific ($M = 44.2\%$, $SD = 33.9$). Then we calculated the proportions of specific events generated separately for the positive and the negative cue words (positive: $M = 45.6\%$, $SD = 36.8$; negative: $M = 42.8\%$, $SD = 34.7$). We did not find any significant correlation between the proportions of specific episodes and the BDI scores [all generated events: $r [183] = -.13$, not significant (NS); positive events: $r [183] = -.11$, NS; negative events: $r [183] = -.14$, NS].

Finally, we addressed whether significant relationships between the BDI scores and the phenomenological ratings remained significant when the proportion of specific events was controlled for. Therefore, we conducted a series of partial correlations between depressive symptom severity and ratings of the phenomenal qualities of all events, and the proportion of specific events was used as a covariate. All significant correlations remained significant: for positive events — vividness ($r [183] = -.25$, $p < .001$), time ($r [183] = -.17$, $p < .05$), location ($r [183] = -.16$, $p < .05$), felt ($r [183] = -.25$, $p < .001$), accessibility ($r [183] = -.28$, $p < .001$), sounds ($r [183] = -.17$, $p < .05$), and certainty ($r [183] = -.29$, $p < .001$); for negative events — vividness ($r [183] = .21$, $p < .01$), time ($r [183] = .17$, $p < .05$), importance ($r [183] = .27$, $p < .001$), accessibility ($r [183] = .19$, $p < .01$), sounds ($r [183] = .20$, $p < .01$), and certainty ($r [183] = .31$, $p < .001$). Furthermore, the nonsignificant correlation between the BDI scores and the visual details of the negative episodes became significant after controlling the effect of specific events ($r [183] = -.15$, $p < .05$).

DISCUSSION

The present study aimed at investigating the relationship between depressive symptom severity and future thinking in a nonclinical sample. It was found that higher scores on a self-reported depression inventory were associated with lower ratings on certain phenomenal characteristics of the imagined positive events and with higher ratings on the phenomenal qualities of the generated negative future episodes.

Previous studies found that individuals with depressive symptoms have difficulty in generating possible positive future events. They tend to imagine a reduced number of positive episodes (e.g., Bjärehed et al., 2010; MacLeod & Salaminiou, 2001; and MacLeod et al., 1997) and tend to generate less vivid positive events (Holmes et al., 2008; Morina et al., 2011; Stöber, 2000). We showed that depressive symptom severity is related not only to reduced vividness of imagined positive episodes but also to less specific event details (contextual and sensory-perceptual details). Furthermore, positive events imagined by individuals with more severe depressive symptoms were less positive in tone, less accessible, and were given lower ratings on certainty.

A very recent study (Anderson & Evans, 2014) showed that positive future events generated by a group of dysphoric patients with high levels of depressive symptoms were given lower ratings on their characteristics (vividness, coherence, sensory details, emotional intensity, and bodily experience). Investigating a nonclinical sample, we found a very similar pattern of results for vividness and sensory details (sounds). In addition, we pointed out that further characteristics of future scenarios are associated with the presence of depressive symptoms (time, location, accessibility, and certainty). However, in our sample, depressive symptoms were not associated with the importance of the positive events.

Similarly to the generation of future expectancies, a wealth of studies has found reduced autobiographical memory specificity in depression (e.g., Williams et al., 1996). One recent study (Werner-Seidler & Moulds, 2011) has shown that positive autobiographical memories were less vivid in a group of formerly depressed individuals when compared with never-depressed control subjects. Our study resulted in similar findings for imagined future episodes that are consistent with the observation that ratings on the phenomenal characteristics of past and future episodes show strong similarities (for a review, see Schacter & Addis, 2007). Interestingly though, Anderson and Evans (2014) reported that only the characteristics of future, but not past, events were associated with the presence of depressive symptoms in dysphoric individuals.

It was suggested previously that impaired positive future thinking in depression is not necessarily associated with an increase in negative expectancies (MacLeod et al., 1993). Accordingly, former studies (e.g., Bjärehed et al., 2010; MacLeod et al., 1997) usually failed to find an increased number of negative future-related expectancies in depressive individuals. Furthermore, more depressed individuals did not tend to imagine more vivid negative events than controls (Morina et al., 2011; Stöber, 2000). Despite these findings, we presented results showing that higher scores on the self-reported depression inventory were associated with higher ratings on vividness, time, importance, sounds, and certainty. Furthermore, similarly to results of previous studies (Matt et al., 1992), we also found that for more depressed subjects, it was easier to access mood-congruent (negative) episodes.

A possible explanation for higher ratings on the phenomenal qualities of the negative events is the presence of symptoms of anxiety, as suggested by MacLeod and Byrne (1996;

see also MacLeod et al., 1997). Anxious patients tend to report a larger number of negative past and future episodes during a predetermined period of time than control participants as well as depressive patients but have no difficulty in the recollection of positive autobiographical memories and in positive future thinking (MacLeod et al., 1997). Anxiety is also related to enhanced vividness of negative future scenarios. A possible aim of future studies would be to investigate whether the presence of symptoms of anxiety is associated with the specificity of event details and further phenomenal qualities of past and future events.

Furthermore, we did not find any relationship between depressive symptoms and the proportion of generated events that were specific. A previous study (Miles et al., 2004) also investigated nonclinical individuals and resulted in similar findings for positive episodes. It can be concluded that our results on the qualitative nature of future expectancies cannot be explained by a difference in the proportion of specific events. Finally, it should be highlighted that the small magnitude of our findings indicates that there is a low association between the phenomenal characteristics of future scenarios and the level of depressive symptoms.

In sum, we found similar results investigating the phenomenal characteristics of imagined future events than previous research on depression using the future-thinking task. These findings underlie the assumption that the presence of depressive symptoms affects the number and the phenomenal nature of imagined future episodes.

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