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Relapse prevention strategies for recurrent depression

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Chapter 3

Beliefs about the causes of depression and recovery and their impact on adherence, dosage, and successful tapering of antidepressants



Based on:

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Abstract

Background Continuation of antidepressants after remission is widely used to prevent depressive relapse/recurrence. Little is known about predictors of antidepressant use in terms of adherence, dosage, and successful tapering. The current study aimed to explore beliefs about the causes of depression and recovery (i.e., causal beliefs) and to examine whether they predict antidepressant use.

Methods The data were drawn from a controlled trial and an extension of this trial with additional experience sampling. In total, 289 remitted individuals with recurrent depression (antidepressants ≥ 6 months) were randomly assigned to Preventive Cognitive Therapy (PCT) with antidepressant tapering, PCT with maintenance antidepressants, or maintenance antidepressants alone. Adherence, antidepressant dosage, and causal beliefs regarding the first and last depressive episode were explored via questionnaires.

Results Most participants mentioned stressful life events as cause of depression, although more participants tended to endorse external causes for the first episode and internal causes for the last episode. Antidepressants were most often mentioned as helpful during recovery from both episodes. Over half of all participants were adherent and under half of the participants in the tapering condition were able to complete the taper. Causal beliefs did not predict antidepressant use.

Conclusions The results suggest that causal beliefs play little role in the use of maintenance antidepressants. More information is needed on factors contributing to successful tapering. The results must be interpreted with caution as this is not a naturalistic study and the results might be biased towards a more favorable view regarding antidepressants.

Introduction

Major Depressive Disorder (MDD) is a highly prevalent and recurrent disorder with a large burden of disease (Ferrari et al., 2013; Richards, 2011). After the acute phase of depression, continuation of antidepressants is advised as one of the relapse prevention strategies (American Psychiatric Association, 2010). In the last decade of the 20th century, the use of antidepressants increased four to tenfold in various countries (Jureidini & Tonkin, 2006), and currently in the Netherlands 1.1 million people are using antidepressants (Foundation of Pharmaceutical Statistics, 2014). Rates of non-adherence in antidepressant users are high (Pampallona, Bollini, Tibaldi, Kupelnick, & Munizza, 2002) and side effects are prevalent (Kennedy, 2006). Moreover, individuals have concerns about the long-term side effects and prefer psychotherapy over antidepressants (Gibson, Cartwright, & Read, 2014). In the last few decades, psychotherapeutic treatment strategies have evolved to specifically protect against depressive relapse and recurrence (further referred to as recurrence) after the acute phase of depression (Guidi, Fava, Fava, & Papakostas, 2011). Therefore, alternatives seem available for individuals not wanting to maintain antidepressants after the acute phase of depression. However, studies show contrasting results regarding recurrence rates during guided tapering. A recent study found comparable results on recurrence rates for tapering antidepressants with Mindfulness-Based Cognitive Therapy (MBCT) versus maintaining antidepressants alone (Kuyken et al., 2015). Another study showed increased recurrence rates for individuals tapering versus maintaining antidepressants after treatment with MBCT (Huijbers et al., 2016). Moreover, studies suggest tapering antidepressants might be difficult due to, for example, withdrawal symptoms and difficulties in distinguishing withdrawal symptoms from depressive symptoms (Fava, Gatti, Belaise, Guidi, & Offidani, 2015). Little is known about how many individuals are able to complete the taper (i.e., successful tapering) and what are specific mechanisms that predict antidepressant usage in terms of adherence, dosage, and successful tapering.

Among the factors that could predict antidepressant use are beliefs about the causes and treatments of depression, as these are related to adherence, time to discontinuation, and number of antidepressant prescriptions (Aikens, Kroenke, Swindle, & Eckert, 2005; Horne et al., 2013; Hung, 2014; Lynch, Moore, Moss-Morris, & Kendrick, 2015; Sansone & Sansone, 2012). For example, two systematic reviews showed that several beliefs (e.g., concerning the necessity of antidepressants) are associated with adherence (Hung, 2014; Sansone & Sansone, 2012). A study where individuals with MDD were randomized to one of three Selective Serotonin Reuptake Inhibitors (SSRIs) demonstrates that baseline skepticism about antidepressants predicted time to discontinuation (Aikens et al., 2005). A study in individuals diagnosed with MDD showed that beliefs about depression as a chronic illness and medication as an effective treatment strategy are associated with higher numbers of antidepressant prescriptions (Lynch et al., 2015). Furthermore, studies found that beliefs about the causes and treatment of depression affect treatment outcome (Aikens & Klinkman, 2012; Sullivan et al., 2003). For example, a study in individuals with MDD showed that the perceived need for antidepressants measured prior to treatment with antidepressants is positively associated with subsequent symptom reduction (Aikens & Klinkman, 2012). To our knowledge, no study examined the association between beliefs about the causes and treatment of depression and successful tapering of antidepressants. In addition, no study examined whether beliefs in a biological cause of depression might affect use of maintenance antidepressants in remitted individuals. One study found an association between

the belief in a biological cause of depression and beliefs about the necessity of antidepressants (Aikens, Nease, & Klinkman, 2008). Possibly, biological causal beliefs form a more general framework that guides behavior regarding antidepressant use.

The current study aimed to explore beliefs about the causes of depression and recovery (i.e., causal beliefs) in remitted recurrently depressed individuals and to examine whether they would predict baseline adherence, subsequent dosage and successful tapering of maintenance antidepressants. Studies show that experience with depression and treatment is associated with an increased endorsement of biological or characterological causal beliefs and a more positive attitude towards medication (Gibson et al., 2014; Jorm et al., 2000; Khalsa, McCarthy, Sharpless, Barrett, & Barber, 2011). Since at baseline the individuals in our sample had experienced at least two depressive episodes and were using maintenance antidepressants, we expected to predominantly find biological causal beliefs and beliefs about antidepressants as most helpful during recovery. We hypothesized that beliefs about the causes of depression would change from external (life events) towards internal (biology or coping) beliefs with additional depressive episodes. In addition, we expected an increased endorsement of antidepressants as most helpful during recovery with additional episodes. Regarding antidepressant use, we expected that beliefs in a biological cause of depression and in antidepressants as most helpful during recovery would predict higher baseline adherence. In addition, we expected that these beliefs would prospectively predict unsuccessful antidepressant tapering in participants advised to taper antidepressants and would predict a stable or increased dosage in all participants after 6 months. If causal beliefs predict antidepressant use, clinicians can use this information to predict who will be able to taper antidepressants and for whom it might be best to maintain antidepressants.

Methods

The data were drawn from a multicenter trial ($n = 238$) and an extension of this trial with additional experience sampling ($n = 51$). Remitted individuals with a history of recurrent depression were randomized to maintenance antidepressants with additional Preventive Cognitive Therapy (PCT), PCT while tapering off of antidepressants, or maintenance antidepressants alone. Recruitment ran from June 2009 (assessment from July 14, 2009) to January 2015, and a 24-month follow-up is ongoing until June 2017. The study was approved by the Medical Ethical Committee for Mental Health Institutions (METiGG) and was registered at trialregister.nl (identifier: NTR1907). The study is described in detail elsewhere (Bockting, Elgersma, et al., 2011).

Participants

Participants were aged between 18 and 65 and had to meet the following criteria: 1) at least two prior depressive episodes with the last episode occurring in the last two years; 2) in remission for at least 2 months according to the Structured Clinical Interview for DSM-IV Disorders (SCID-I) (Spitzer, Williams, Gibbon, & First, 1992); 3) a score on the Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1960) less than or equal to 10; and 4) use of antidepressants for at least 6 months. Exclusion criteria were 1) current or past mania/hypomania or a psychotic episode; 2) current alcohol/drug dependence/abuse; 3) predominant anxiety disorder; 4) psychotherapy more than twice a month; and 5) brain damage.

Procedure

Individuals were recruited through mental health care institutions, general practitioners (GPs), pharmacists, and media. After explanation of the procedure, informed consent was obtained. Subsequently, individuals were screened on inclusion and exclusion criteria and interviewed by trained interviewers using the SCID-I. Individuals who met the inclusion criteria were randomized to one of the three conditions.

Measures

Causal beliefs

To assess causal beliefs, a four-item questionnaire based on earlier research (Prins, Verhaak, Bensing, & van der Meer, 2008) was administered before randomization (see Appendix). Individuals were asked what they thought was the most important cause for onset of their *first* and *last* (most recent) depressive episode. The categories listed were *negative or stressful life event(s)*, *biological causes*, *thoughts and ways of dealing with stressful life events* (further referred to as coping), and *otherwise*. Furthermore, individuals were asked what helped most during recovery from both episodes. The categories listed were *psychotherapy/another form of therapy*, *antidepressants*, *perseverance*, *spontaneous recovery*, and *otherwise*. Participants were encouraged to choose one answer. If they could not choose, they were allowed to endorse multiple answers. For those participants we added a new category called ‘multiple answers’. Because we were mainly interested in psychosocial and biological beliefs, we used the first three categories of each answer and combined all other answers in a category named ‘Other’. Secondary analyses were performed in which participants with multiple answers containing biology as most important cause of depression were added to the category ‘biology’, and answers containing antidepressants as most helpful during recovery were added to the category ‘antidepressants’.

Use of antidepressants

The four-item Medication Adherence Questionnaire (MAQ) (Morisky, Green, & Levine, 1986) was used to evaluate whether participants used their antidepressant as intended and as prescribed. This questionnaire was administered at baseline and assessed adherence 3 months prior to study entry. Participants were asked whether they had forgotten to take their medication, had been careless with medication intake, had stopped their medication intake when feeling better, and had stopped the intake when feeling worse. Answering ‘yes’ was coded as one, answering ‘no’ was coded as zero. A total score of 0 was coded as high adherent, 1 or 2 as medium adherent, and 3 or 4 as low adherent. To examine both successful tapering and antidepressant dosage after 6 months, the same questionnaires on antidepressant dosage was used. At baseline, antidepressant use was measured using information from the screening, whereas dosage for the 6 months immediately following baseline was measured using the Trimbos and iMTA questionnaire on Costs associated with Psychiatric illness (TiC-P) (Hakkaart-van Roijen, 2002). To determine successful tapering, we only selected participants randomized to the condition with guided tapering ($n = 85$). In line with the literature (Fawcett, Epstein, Fiester, Elkin, & Autry, 1987; Moleman, 2009), clinicians were advised to completely taper the participants’ antidepressant over a period of 4 weeks, although this period could be extended if participants strongly preferred so. Therefore, we monitored the use of antidepressants over a period of 6 months. Due to ethical constraints, participants were advised to taper antidepressants, but this was not mandatory. Successful taper was defined as either completely

tapering or tapering antidepressants with a minimal reduction of 50%. To examine antidepressant dosage in all participants, a variable was constructed in which antidepressant dosage was defined as a decrease, no change, or an increase in antidepressants after 6 months.

Statistical analyses

In total, 55% of the cases had missing data. Antidepressant dosage after 6 months, baseline adherence to antidepressants, and residual depressive symptomatology missed more than 10% (49%, 33%, and 21%, respectively). Multiple imputations by chained equations were used to estimate the missing values under the assumption that the data were missing at random (MAR). Calculations according to Bodner (2008) were used to calculate the number of imputations necessary. In line with the literature (Graham, 2009), all variables used in the analyses were imputed. Baseline characteristics predicted whether the data were missing, and Little's MCAR test suggested the data might be missing completely at random ($X^2 = 23.2, p = .109$). Altogether we assumed the data were at least partly missing at random and consequently multiple imputations may have reduced bias.

Causal beliefs

McNemar's test was used to compare the proportion of external and internal beliefs and beliefs about antidepressants for the first versus the last depressive episode. The results of the Chi-square tests were pooled using the formulas of Li, Meng, Raghunathan, and Rubin (1991). First, the relative increase in variance caused by the multiple imputations was calculated. Next, the degrees of freedom were calculated including the relative increase in variance, the original degrees of freedom, and the number of imputations. Finally, the test statistic was transformed into an F-statistic. The corresponding p -value was found using the original and the transformed degrees of freedom. Since the calculation of the degrees of freedom of the denominator does not depend on sample size but on the number of imputations and the impact of imputations on increased standard errors, the values might exceed the maximum number if the data were complete. When these degrees of freedom were substantial, the Chi-square distribution was used, as the F-distribution is approximately equal to the Chi-square distribution in this case.

Causal beliefs and use of antidepressants

To examine whether causal beliefs predicted baseline adherence, a multivariable binary logistic regression analysis was performed. In this analysis, the independent variables were the four causal beliefs clustered into biology/medication versus other beliefs, and the dependent variable was baseline adherence coded as 'adherent' (high adherent) or 'non-adherent' (medium or low adherent).

To test whether causal beliefs predicted successful tapering over the 6 months after study entry, a multivariable binary logistic regression analysis was performed in participants advised to taper antidepressants. In this analysis, the independent variables were the four causal beliefs clustered into biology/medication versus other beliefs. The dependent variable was successful tapering antidepressants (0 = not successful, 1 = successful).

To examine whether beliefs in biology/medication versus other causal beliefs measured at baseline prospectively predicted a stable or increased dosage of antidepressants over the 6 months after study entry in all participants, a multivariable multinomial logistic regression analysis was performed. In this analysis, the independent variables were the four causal beliefs,

and the dependent variable was a change in antidepressants ('decrease' = 0, 'equal dosage' = 1, and 'increase' = 2). Because treatment condition is potentially associated with subsequent antidepressant dosage, we controlled for this in the main analysis. In addition, a secondary analysis was performed to assess whether the associations between beliefs and antidepressant dosage differed between the treatment arms.

All three logistic regression analyses were repeated whilst controlling for gender, age, educational level, number of previous depressive episodes, and residual depressive symptomatology.

Results

Participant characteristics are summarized in Table 1. Participants were predominantly female (65%) with a mean age of 47.3 ($SD = 10.3$). The median number of previous depressive episodes was 4 and the mean number of months since remission 8.1 ($SD = 6.4$).

Table 1. Baseline characteristics

Characteristics	Total (N = 289)
Age, mean (SD)	47.3 (10.3)
Female, %	65.4 (189/289)
Country of birth (% the Netherlands)	96.9 (278/287)
Marital status, %	
Single	30.4 (87/286)
Married/cohabiting	60.8 (174/286)
Divorced/widowed	8.7 (25/286)
Education \geq college, %	51.2 (148/289)
Employed, %	67.0 (191/285)
Current or previous psychotherapy, %	86.9 (251/289)
Number of depressive episodes, median (IQR)	4 \pm 3, 6
Months in remission, mean (SD)	8.1 (6.4)
Type of antidepressant (% SSRI)	87.8 (251/286)

Note. The original data is used without multiple imputations. Current or previous psychotherapy yielded current or previous cognitive therapy and/or another form of psychotherapy. SSRI = Selective Serotonin Reuptake Inhibitor.

Causal beliefs

Causal beliefs are summarized in Table 2. The most commonly mentioned belief about the cause of both the first and the last depressive episode was negative or stressful life events. Antidepressants were perceived as most helpful during recovery from both depressive episodes. When the participants with multiple answers including antidepressants were aggregated with the category antidepressants, a total of 35% endorsed antidepressants as most helpful during recovery from the first and 44% from the last depressive episode. The diagonals in Table 2 show that 43% mentioned the same cause for both the first and last depressive episode and that 40% mentioned the same cause of recovery for both episodes.

The results from McNemar's test suggested a change from an external cause for the first depression towards an internal cause for the last depression ($X^2(1) = 7.14, p = .008$, comparable with the secondary analysis). Participants more often endorsed antidepressants as most helpful during recovery from their last compared to their first episode (only supported by the secondary analysis ($X^2(1) = 4.72, p = .030$)). A post-hoc analysis using a Chi-square test showed no association between the change from external to internal causes and the increased endorsement of antidepressants ($X^2(1) = .01, p = .920$).

Causal beliefs and use of antidepressants

Of all participants, 52% ($n = 150$) scored high adherent to antidepressants. Table 3 shows causal beliefs did not predict baseline adherence to antidepressants. Of the 85 participants randomly assigned to the tapering condition, 40% ($n = 34$) were able to completely taper antidepressants. When we additionally took into account the participants that tapered antidepressants with a minimum reduction of 50%, this percentage increased to 59% ($n = 50$). Table 4 displays the results of the logistic regression and shows that causal beliefs did not predict successful tapering of antidepressants. Table 5 presents the results of the multinomial logistic regression performed in all participants and shows that after correcting for treatment condition, biological versus other causal beliefs did not predict a stable or increased dosage of antidepressants 6 months after study entry.

Table 2. Beliefs about the causes of depression and recovery

		Cause of last depressive episode, <i>n</i> (%)			
Cause of first depressive episode, <i>n</i> (%)	Life events	Biological	Coping	Other	Total
Life events	53 (18.3)	23 (8.0)	41 (14.2)	11 (3.8)	128 (44.4)
Biological	15 (5.2)	12 (4.2)	5 (1.7)	5 (1.7)	38 (13.1)
Coping	20 (6.9)	13 (4.5)	41 (14.2)	5 (1.7)	79 (27.3)
Other	13 (4.5)	5 (1.7)	8 (2.8)	19 (6.6)	44 (15.2)
Total	101 (35.0)	52 (18.0)	96 (33.2)	40 (13.8)	289 (100)

		Most helpful last depressive episode, <i>n</i> (%)			
Most helpful first depressive episode, <i>n</i> (%)	Psychotherapy	Antidepressants	Perseverance	Other	Total
Psychotherapy	15 (5.2)	13 (4.5)	14 (4.8)	18 (6.2)	58 (20.1)
Antidepressants	11 (3.8)	41 (14.2)	13 (4.5)	12 (4.1)	78 (27.0)
Perseverance	14 (4.8)	14 (4.8)	24 (8.3)	19 (6.6)	70 (24.2)
Other	12 (4.1)	26 (9.0)	10 (3.5)	34 (11.8)	83 (28.7)
Total	52 (18.0)	94 (32.5)	60 (20.8)	83 (28.7)	289 (100)

Note. Using multiple imputations by chained equations, data of the imputations were averaged and rounded to the nearest number. Therefore, the frequencies and percentages do not add up exactly.

Note. Instructions: The total number of participants endorsing a specific belief for the first or last depressive episode is displayed in the diagonals of the table. Within the table you can find how many participants endorsed a specific belief about both the first and last depressive episode.

Note. The category ‘other’ regarding the causes of depression was composed of two answering options, namely: 1. A combination of answers (first depressive episode: *n* = 23, last depressive episode: *n* = 17). The most frequent combinations of responses regarding causes of both the first and last depressive episode were life events and biology (first depressive episode: 29%, last depressive episode: 27%), life events and coping (first depressive episode: 19%, last depressive episode: 20%), and biology and coping (first depressive episode: 24%, last depressive episode: 27%). 2. An open-ended question in which the participants could fill out an alternative answer if other categories were not applicable (first depressive episode: *n* = 21, last depressive episode: *n* = 23). Examples of these answers were mainly about long-term environmental factors (e.g., working conditions, loneliness) and health factors (e.g., fatigue or other preexisting health conditions).

Note. The category ‘other’ regarding what was most helpful during recovery from depression was composed of three answering options, namely: 1. Spontaneous recovery (first depressive episode: *n* = 33, last depressive episode: *n* = 26). 2. A combination of answers (first depressive episode: *n* = 34, last depressive episode: *n* = 43). The most frequent combinations of responses for both the first and the last depressive episode were psychotherapy and antidepressants (first depressive episode: 48%, last depressive episode: 53%), psychotherapy and perseverance (first depressive episode: 16%, last depressive episode: 13%), and antidepressants and perseverance (first depressive episode: 10%, last depressive episode: 8%). 3. An open-ended question in which the participants could fill out an alternative answer if other categories were not applicable (first depressive episode: *n* = 16, last depressive episode: *n* = 14). Examples of these answers were support from friends and/or family (first depressive episode: 25%, last depressive episode: 9%), changes in the environment (first depressive episode: 41%, last depressive episode: 18%), and changes in lifestyle (first depressive episode: 25%, last depressive episode: 36%). The most frequently mentioned change in lifestyle concerned having more rest or a better daily rhythm.

Table 3. Multivariable binary logistic regression of causal beliefs on baseline adherence to antidepressants

Predictor variable	B	OR	95% CI	p
Biological cause of first depressive episode	-0.45	0.64	[0.27, 1.53]	.316
Biological cause of last depressive episode	0.04	1.04	[0.47, 2.26]	.931
Antidepressants as most helpful first depressive episode	0.09	1.10	[0.53, 2.29]	.803
Antidepressants as most helpful last depressive episode	0.22	1.25	[0.64, 2.45]	.519

Note. The dependent variable was baseline adherence to antidepressants. In this multivariable model, the independent variables were perceived cause of the first and last depressive episode and beliefs about what helped most during recovery from the first and last depressive episode measured at baseline.

Note. The secondary analysis, where participants with multiple answers including biology and medication were collapsed with the corresponding category, showed similar results. In addition, correcting the analyses for baseline clinical characteristics resulted in similar results.

Table 4. Multivariable binary logistic regression of causal beliefs on completely tapering antidepressants

Predictor variable	B	OR	95% CI	p
Biological cause of first depressive episode	-0.09	0.91	[0.15, 5.41]	.919
Biological cause of last depressive episode	0.99	2.70	[0.66, 11.15]	.169
Antidepressants as most helpful first depressive episode	0.09	1.09	[0.25, 4.78]	.906
Antidepressants as most helpful last depressive episode	-0.53	0.59	[0.15, 2.35]	.453

Note. The dependent variable was completely tapering antidepressants. In this multivariable model, the independent variables were perceived cause of the first and last depressive episode and beliefs about what helped most during recovery from the first and last depressive episode.

Note. When the analysis was repeated with the less strict measure for antidepressant tapering (tapering with a minimal reduction of 50%) and the secondary analysis (participants with multiple answers including biology and medication were collapsed with the corresponding category), the results were similar. In addition, correcting the analyses for baseline and clinical characteristics resulted in similar results.

Table 5. Multivariable multinomial logistic regression of causal beliefs on antidepressant dosage

	Predictor variable	B	OR	95% CI	p
No change in antidepressants	Biological cause of first depressive episode	0.04	1.04	[0.43, 2.54]	.926
	Biological cause of last depressive episode	0.28	1.32	[0.58, 2.98]	.509
	Antidepressants as most helpful first depressive episode	-0.31	0.73	[0.33, 1.62]	.441
	Antidepressants as most helpful last depressive episode	0.37	1.44	[0.73, 2.88]	.297
	Increase in antidepressants	Biological cause of first depressive episode	-0.82	0.44	[0.08, 2.43]
	Biological cause of last depressive episode	0.32	1.37	[0.50, 3.78]	.543
	Antidepressants as most helpful first depressive episode	0.38	1.47	[0.56, 3.82]	.432
	Antidepressants as most helpful last depressive episode	0.23	1.26	[0.50, 3.22]	.623

Note. The dependent variable was antidepressant dosage categorized as a decrease, no change, or an increase in antidepressants. A decrease in antidepressants is the reference category. In this multivariable model, the independent variables were perceived cause of the first and last depressive episode (biological versus other beliefs with other beliefs as the reference category) and beliefs about what helped most during recovery from the first and last depressive episode (antidepressants versus other beliefs, with other beliefs as the reference category). In this analysis, we controlled for treatment condition.

Note. When the analysis was repeated with the secondary analysis, where participants with multiple answers including biology and medication were collapsed with the corresponding category, the results were similar. In addition, correcting the analyses for baseline and clinical characteristics and adding interaction terms between causal beliefs and treatment condition resulted in similar results.

Discussion

In this study, we examined whether causal beliefs would predict the use of maintenance antidepressants. As a first step, we examined the causal beliefs of remitted recurrently depressed participants using maintenance antidepressants.

Causal beliefs

The most commonly mentioned cause of depression was stressful life events, which is in line with studies in the general population and in patients (Angermeyer & Dietrich, 2006; Prins et al., 2008). This persistent psychosocial view could be a reflection of the general perspective in society or the fact that psychosocial explanations are easier to comprehend than biological explanations (Buus, Johannessen, & Stage, 2012). The biologically oriented view which we expected was prevalent in the beliefs about what helped most during recovery, where medication was mentioned most often. On the one hand, this finding is consistent with the current literature, where medication and other forms of treatment are often mentioned as factors of recovery

(Badger & Nolan, 2007; Brown et al., 2007; Budd, James, & Hughes, 2008; Friedberg et al., 1999; Hansson, Chotai, & Bodlund, 2012; Leydon, Rodgers, & Kendrick, 2007; Löwe, Schulz, Gräfe, & Wilke, 2006; Read, Cartwright, Gibson, Shiels, & Haslam, 2014; Read, Cartwright, Gibson, Shiels, & Magliano, 2015). On the other hand, it contrasts the finding of a systematic review that individuals prefer psychotherapy (van Schaik et al., 2004). This same systematic review showed that treatment experience is associated with a preference for the corresponding treatment modality. The authors suggest that this phenomenon might be explained by cognitive dissonance reduction, where people tend to match their preferences with the choices they make. This is in line with a systematic review that found individuals' judgement regarding recovery can be inaccurate due to several biases (Redelmeier & Dickinson, 2011).

Beliefs about the causes of depression seemed to change from external in the first towards internal in the last depressive episode, suggesting that with additional episodes, individuals might settle into the belief that depression is caused by internal rather than external factors. With more episodes, it might be harder to believe in external causes of depression, which is in line with studies showing that experience with depression is associated with biological and characterological causal beliefs (Gibson et al., 2014; Jorm et al., 2000; Khalsa et al., 2011). Other explanations might be that risk factors for recurrence change over depressive episodes (Bockting, Spinhoven, Koeter, Wouters, & Schene, 2006; Stroud, Davila, & Moyer, 2008). The post-hoc analysis showed no association between the change from external to internal beliefs and the increased endorsement of antidepressants. This contrasts a study that found a higher endorsement of biochemical beliefs about the causes of depression in individuals that were more likely to believe that antidepressants reduced their depression (Khalsa et al., 2011). A possible explanation for not finding an association in the current study might be that internal beliefs yielded both biological and characterological beliefs, which might differently impact beliefs about antidepressants. More studies are warranted that examine the association between beliefs about the causes of depression and factors that help during recovery.

Causal beliefs and use of antidepressants

The results showed adherence rates consistent with the literature (Pampallona et al., 2002; ten Doesschate, Bockting, Koeter, & Schene, 2009). For example, a comparable study found non-adherence rates ranging between 40% and 53% (ten Doesschate et al., 2009). Regarding successful tapering, our results showed that after 6 months less than half of the participants in the tapering condition successfully tapered off antidepressants. To our knowledge, only four studies report rates of successful antidepressant taper, mentioning 75% (Kuyken et al., 2008), 71% (Kuyken et al., 2015), 53% (Huijbers et al., 2016), and 6% (Eveleigh et al., 2014). The different rates could be explained by differences in guidance. In the studies mentioning 75% and 71%, participants received MBCT with additional tapering support from their MBCT therapist and a physician, and participants were encouraged to complete the taper within 6 months. In the study mentioning 53%, individuals with a preference for MBCT were recommended to taper antidepressants within 5 weeks after treatment with MBCT and participants received tapering support from a psychiatrist. These three studies are comparable to our study, where participants received PCT with additional tapering support from their GP and the advice to taper within 4 weeks. However, in our study the tapering process was monitored less strictly, which might explain the lower rates of successful tapering. In the study mentioning 6%, participants were

guided by their GP and tapering duration was based on antidepressant dosage.

The finding that causal beliefs did not predict antidepressant use is surprising, as studies show that beliefs about the causes and treatment of depression are associated with adherence, time to discontinuation, and number of antidepressant prescriptions (Aikens et al., 2005; Horne et al., 2013; Hung, 2014; Lynch et al., 2015; Sansone & Sansone, 2012). One reason for not finding an effect might be that we did not use a comprehensive psychological framework regarding determinants affecting the decision-making process. Especially regarding the complex process of tapering antidepressants, several factors might be involved in the decision-making process and subsequent behavior of individuals. An example of a well-studied framework is the theory of planned behavior, hypothesizing that attitudes, subjective norms, and behavioral control determine behavior (Ajzen, 1988). Another possible explanation for the absence of an effect concerns the guidance of the GP. Studies show that GP guidance regarding the tapering of antidepressants varies widely (Bosman et al., 2016; Leydon et al., 2007; Verbeek-Heida & Mathot, 2006). In addition, the quality of the relationship with the prescribing GP is associated with, for example, specific causal beliefs, adherence to antidepressants, and persistent use of antidepressants (Bauer et al., 2014; Brown et al., 2007). In the current study, we had no control over this patient-doctor relationship nor any other contact with clinicians. This may have affected the decision of participants to actually taper or maintain antidepressants. Finally, factors inherent to the design may have played a role. The current study focused on the most important causal beliefs and did not take into account the more complex and multifaceted structure of causal beliefs that some studies suggest (Prins et al., 2008).

Limitations and clinical implications

The results should be interpreted with caution. First, they could be biased towards a biological perspective and a more favorable view towards antidepressants because this sample was selected on antidepressant use. In addition, the included participants were interested in receiving a psychological intervention. Second, causal beliefs were retrospectively assessed after recovery from the last depressive episode, which does not necessarily reflect actual beliefs during the first or last episode of depression. Beliefs could have changed and become more similar due to, for example, additional depressive episodes or treatment experience. Third, this is not a naturalistic study. Participants were advised to continue or discontinue antidepressants, and therefore the results must be interpreted with caution.

Despite these limitations, this is the first study that distinguished between beliefs for different depressive episodes and that examined the influence of these beliefs on antidepressant use in the maintenance phase. If causal beliefs do not influence treatment choices regarding the use of antidepressants, practitioners do not have to take them into consideration while providing treatment information about antidepressants. However, the results suggest that causal beliefs change over time, and therefore discussing beliefs while providing information to individuals about evidence-based treatments might result in improved treatment choice outcome. As a substantial part of the participants were not able to completely taper antidepressants, more information is needed on factors predicting successful tapering to inform and increase the evidence base of clinical guidelines. In addition, more studies are needed to examine whether tapering maintenance antidepressants is desirable regarding recurrence rates and who is able to taper antidepressants without relapsing.

Appendix: questionnaire ‘attributions about depression’

Introduction of the questions

‘I am going to ask four questions that have multiple options to answer.’

1. What do you think was the most important cause for your **first** depressive episode?
 - a. Negative or stressful life events. Which events? and when did this take place?
.....
 - b. Biological cause. Can you explain this?
 - c. Thoughts and way of dealing with stressful life events
 - d. Different

2. What do you think was the most important cause for the **last (most recent)** depressive episode you have experienced?
 - a. Negative or stressful life events. Which events? and when did this take place?
.....
 - b. Biological cause. Can you explain this?
 - c. Thoughts and way of dealing with stressful life events
 - d. Different

3. What did you think helped you the most during recovery from your **first** depressive episode?
 - a. Psychotherapy or another form of therapy. Which form?
 - b. Medication (antidepressants)
 - c. Perseverance (using your own strength)
 - d. Spontaneous recovery (no direct cause)
 - e. Otherwise

4. What did you think helped you the most during recovery from your **last (most recent)** depressive episode?
 - a. Psychotherapy or another form of therapy. Which form?
 - b. Medication (antidepressants)
 - c. Perseverance (using your own strength)
 - d. Spontaneous recovery (no direct cause)
 - e. Otherwise

Instructions for the interviewer

Participants have to choose one of the options that are mentioned. When the participant answers with multiple options, try to find out which of the options is most suitable. When the participant indicates that multiple answers are equally suitable, allow endorsement of multiple answers by exception.

