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Published in:
Depression and Anxiety

DOI:
[10.1002/da.22598](https://doi.org/10.1002/da.22598)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2017

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Klein, N., van Rijsbergen, G., ten Doesschate, M. C., Hollon, S. D., Burger, H., & Bockting, C. (2017). Beliefs about the causes of depression and recovery and their impact on adherence, dosage, and successful tapering of antidepressants. *Depression and Anxiety*, 34(3), 227-235. <https://doi.org/10.1002/da.22598>

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RESEARCH ARTICLE

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

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Grant sponsor: ZonMw: the Netherlands Organisation for Health Research and Development; Grant number: 171002401 (to C. L. H. Bockting).

Background: Continuation of antidepressant medication (ADM) after remission is widely used to prevent depressive relapse/recurrence. Little is known about predictors of ADM 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 ADM use.

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

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

Conclusions: The results suggest that causal beliefs play little role in the use of maintenance ADM. 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 toward a more favorable view regarding ADM.

KEYWORDS

adherence, antidepressants, cognitive behavior therapy, clinical trials, depression

1 | INTRODUCTION

Depression 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 antidepressant medication (ADM) is advised as one of the relapse prevention strategies (American Psychiatric Association, 2010). In the last decade of the 20th century, the use of ADM increased four- to tenfold in various countries (Jureidini & Tonkin, 2006), and currently in the Netherlands 1.1 million people are using ADM (Foundation of Pharmaceutical Statistics, 2014). Rates of nonadherence in ADM users are high

(Pampallona, Bollini, Tibaldi, Kupelnick, & Munizza, 2002) and side effects are prevalent (Kennedy, 2006). Moreover, patients have concerns about the long-term side effects and prefer psychotherapy over ADM (Gibson, Cartwright, & Read, 2014). In the last few decades, psychotherapeutic treatment strategies have evolved to specifically protect against depressive relapse after the acute phase of depression (Guidi, Fava, Fava, & Papakostas, 2011). Therefore, alternatives seem available for patients not wanting to maintain ADM after the acute phase of depression. However, studies show contrasting results regarding relapse/recurrence rates during guided tapering. A recent study found comparable results on relapse/recurrence rates for

tapering ADM with Mindfulness Based Cognitive Therapy (MBCT) versus maintaining ADM alone (Kuyken et al., 2015). Another study shows increased relapse/recurrence rates for patients tapering versus maintaining ADM after treatment with MBCT (Huijbers et al., 2016). Moreover, studies suggest tapering ADM 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 patients are able to complete the taper (i.e., successful tapering) and what are the specific mechanisms that predict ADM usage in terms of adherence, dosage, and successful tapering.

Among the factors that could predict ADM use are patients' beliefs about the causes and treatment of depression, as these are related to adherence, time to discontinuation, and number of ADM 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 ADM) are associated with adherence (Hung, 2014; Sansone & Sansone, 2012). A study where patients with MDD were randomized to one of three Selective Serotonin Reuptake Inhibitors (SSRIs) demonstrates that baseline skepticism about ADM predicts time to discontinuation (Aikens et al., 2005). A study in patients diagnosed with MDD shows that beliefs about depression as a chronic illness and medication as an effective treatment strategy are associated with higher numbers of ADM 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 patients with MDD shows that the perceived need for ADM measured prior to treatment with ADM 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 ADM. In addition, no study examined whether beliefs in a biological cause of depression might affect use of maintenance ADM in remitted patients. One study found an association between the belief in a biological cause of depression and beliefs about the necessity of ADM (Aikens, Nease, & Klinkman, 2008). Possibly, biological causal beliefs form a more general framework that guides behavior regarding ADM use.

The current study aimed to explore beliefs about the causes of depression and recovery (i.e., causal beliefs) in remitted recurrently depressed patients and to examine whether they would predict baseline adherence, subsequent dosage, and successful tapering of maintenance ADM. 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 toward medication (Gibson et al., 2014; Jorm et al., 2000; Khalsa, McCarthy, Sharpless, Barrett, & Barber, 2011). Since at baseline the patients in our sample had experienced at least two depressive episodes and were using maintenance ADM, we expected to predominantly find biological causal beliefs and beliefs about ADM as most helpful during recovery. We hypothesized that beliefs about the causes of depression would change from external (life events) toward internal (biology or coping) beliefs with additional depressive episodes. In addition, we expected

an increased endorsement of ADM as most helpful during recovery with additional episodes. Regarding ADM use, we expected that beliefs in a biological cause of depression and in ADM as most helpful during recovery would predict higher baseline adherence. In addition, we expected that these beliefs would prospectively predict unsuccessful ADM tapering in patients advised to taper ADM and would predict a stable or increased dosage in all patients after six months. If causal beliefs predict ADM use, clinicians can use this information to predict who will be able to taper ADM and for whom it might be best to maintain ADM.

2 | METHODS

The data were drawn from a multicenter trial ($n = 238$) and an extension of this trial with additional experience sampling ($n = 51$). Remitted patients with a history of recurrent depression were randomized to maintenance ADM with additional Preventive Cognitive Therapy (PCT), tapering off of ADM with additional PCT, or maintenance ADM alone. Recruitment ran from June 2009 to January 2015, and a 24-month followup 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 et al., 2011).

2.1 | Participants

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

2.2 | Procedure

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

2.3 | Measures

2.3.1 | 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). Patients 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, patients were asked what helped most during recovery from both episodes. The categories listed were *psychotherapy/another form of therapy*, *ADM*, *perseverance*, *spontaneous recovery*, and *otherwise*. Patients were encouraged to choose one answer. If they could not choose, they were allowed to endorse multiple answers. For those patients 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 patients with multiple answers containing biology as most important cause of depression were added to the category “biology,” and answers containing ADM as most helpful during recovery were added to the category “ADM.”

2.3.2 | Use of antidepressants

The four-item Medication Adherence Questionnaire (MAQ; Morisky, Green, & Levine, 1986) was used to evaluate whether patients used their ADM as intended and as prescribed. This questionnaire was administered at baseline and assessed adherence 3 months prior to study entry. Patients 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 1, answering “no” was coded as 0. 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 ADM dosage after 6 months, the same questionnaires on ADM dosage were used. At baseline, ADM 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 patients 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 patients' ADM over a period of 4 weeks, although this period could be extended if patients strongly preferred so. Therefore, we monitored the use of ADM over a period of 6 months. Due to ethical constraints, patients were advised to taper ADM, but this was not mandatory. Successful taper was defined as either completely tapering or tapering ADM with a minimal reduction of 50%. To examine ADM dosage in all patients, a variable was constructed in which ADM dosage was defined as a decrease, no change, or an increase in ADM after 6 months.

2.4 | Statistical analyses

In total, 55% of the cases had missing data. ADM dosage after 6 months, baseline adherence to ADM, 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 ($\chi^2 = 23.2$, $P = .109$). Altogether, we assumed the data were at least partly MAR and consequently multiple imputation may have reduced bias.

2.4.1 | Causal beliefs

McNemar's test was used to compare the proportion of external and internal beliefs and beliefs about ADM 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, original degrees of freedom, and 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.

2.4.2 | 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 “nonadherent” (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 patients advised to taper ADM. In this analysis, the independent variables were the four causal beliefs clustered into biology/medication versus other beliefs. The dependent variable was successful tapering ADM (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 ADM over the 6 months after study entry in all patients, 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 ADM (“decrease” = 0, “equal dosage” = 1, and “increase” = 2). Because treatment condition is potentially associated with subsequent ADM dosage, we controlled for this in the main analysis. In addition, a secondary analysis was performed to assess whether the associations between beliefs and ADM dosage differed between the

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 ADM (% SSRI)	87.8 (251/286)

Notes: The original data are used without multiple imputation. Current or previous psychotherapy yielded current or previous cognitive therapy and/or another form of psychotherapy.

TABLE 2 Beliefs about the causes of depression and recovery

Cause of First Depressive Episode (n (%))	Cause of Last Depressive Episode (n (%))				Total
	Life Events	Biological	Coping	Other	
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 first depressive episode (n (%))	Most Helpful Last Depressive Episode (n (%))				Total
	Psychotherapy	ADM	Perseverance	Other	
Psychotherapy	15 (5.2)	13 (4.5)	14 (4.8)	18 (6.2)	58 (20.1)
ADM	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)

Notes: Using multiple imputation 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.

Instructions: The total number of patients 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 patients endorsed a specific belief about both the first and last depressive episode.

The category "other" regarding the causes of depression was composed of two answering options, namely, the following: (i) 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 episodes were life events and biology (first depressive episode: 28.6%, last depressive episode: 26.7%), life events and coping (first depressive episode: 19.0%, last depressive episode: 20.0%), and biology and coping (first depressive episode: 23.8%, last depressive episode: 26.7%). (ii) An open-ended question in which the patients 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).

The category "other" regarding what was most helpful during recovery from depression was composed of three answering options, namely, the following: (i) Spontaneous recovery (first depressive episode: $n = 33$, last depressive episode: $n = 26$). (ii) 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 last depressive episodes were psychotherapy and ADM (first depressive episode: 48.4%, last depressive episode: 52.5%), psychotherapy and perseverance (first depressive episode: 16.1%, last depressive episode: 12.5%), and ADM and perseverance (first depressive episode: 9.7%, last depressive episode: 7.5%). (iii) An open-ended question in which the patients 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: 25.0%, last depressive episode: 9.1%), changes in the environment (first depressive episode: 41.7%, last depressive episode: 18.2%), and changes in lifestyle (first depressive episode: 25.0%, last depressive episode: 36.4%). The most frequently mentioned change in lifestyle concerned having more rest or a better daily rhythm.

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.

3 | RESULTS

Patient characteristics are summarized in Table 1. Patients were predominantly female (65.4%) 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 ($SD = 6.4$).

3.1 | Causal beliefs

Causal beliefs are summarized in Table 2. The most commonly mentioned belief about the cause of both the first and last depressive episodes was negative or stressful life events. ADM was perceived as most helpful during recovery from both depressive episodes. When the patients with multiple answers including ADM were aggregated with the category ADM, a total of 34.9% endorsed ADM as most

TABLE 3 Multivariable binary logistic regression of causal beliefs on baseline adherence to ADM

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
ADM as most helpful first depressive episode	0.09	1.10	[0.53, 2.29]	.803
ADM as most helpful last depressive episode	0.22	1.25	[0.64, 2.45]	.519

Notes: The dependent variable was baseline adherence to ADM. In this multivariable model, the independent variables were perceived cause of the first and last depressive episodes and beliefs about what helped most during recovery from the first and last depressive episodes measured at baseline. The secondary analysis, where patients with multiple answers including biology and medication were collapsed with the corresponding category, showed similar results. In addition, correcting the analyses for baseline demographic and clinical characteristics resulted in similar results.

helpful during recovery from the first and 44.3% from the last depressive episode. The diagonals in Table 2 show that 43.3% mentioned the same cause for both the first and last depressive episodes and that 39.5% mentioned the same cause of recovery for both episodes.

TABLE 4 Multivariable binary logistic regression of causal beliefs on completely tapering ADM

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
ADM as most helpful first depressive episode	0.09	1.09	[0.25, 4.78]	.906
ADM as most helpful last depressive episode	-0.53	0.59	[0.15, 2.35]	.453

Notes: The dependent variable was completely tapering ADM. In this multivariable model, the independent variables were perceived cause of the first and last depressive episodes and beliefs about what helped most during recovery from the first and last depressive episode. When the analysis was repeated with the less strict measure for ADM tapering (tapering with a minimal reduction of 50%) and the secondary analysis (patients with multiple answers including biology and medication were collapsed with the corresponding category), the results were similar. In addition, correcting the analyses for baseline demographic and clinical characteristics resulted in similar results.

TABLE 5 Multivariable multinomial logistic regression of causal beliefs on ADM dosage

	Predictor Variable	B	OR	95% CI	P
No change in ADM	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
	ADM as most helpful first depressive episode	-0.31	0.73	[0.33, 1.62]	.441
	ADM as most helpful last depressive episode	0.37	1.44	[0.73, 2.88]	.297
Increase in ADM	Biological cause of first depressive episode	-0.82	0.44	[0.08, 2.43]	.348
	Biological cause of last depressive episode	0.32	1.37	[0.50, 3.78]	.543
	ADM as most helpful first depressive episode	0.38	1.47	[0.56, 3.82]	.432
	ADM as most helpful last depressive episode	0.23	1.26	[0.50, 3.22]	.623

Notes: The dependent variable was ADM dosage categorized as a decrease, no change, or an increase in ADM. A decrease in ADM is the reference category. In this multivariable model, the independent variables were perceived cause of the first and last depressive episodes (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 episodes (ADM versus other beliefs, with other beliefs as the reference category). In this analysis, we controlled for treatment condition. The secondary analysis, where patients with multiple answers including biology and medication were collapsed with the corresponding category, showed similar results. In addition, correcting the analyses for baseline demographic and clinical characteristics and adding interaction terms between causal beliefs and treatment condition resulted in similar results.

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 ($\chi^2(1) = 7.14, P = .008$, comparable with the secondary analysis). Patients more often endorsed ADM as most helpful during recovery from their last compared to their first episode (only supported by the secondary analysis ($\chi^2(1) = 4.72, P = .030$)). 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 ADM ($\chi^2(1) = 0.01, P = .920$).

3.2 | Causal beliefs and use of antidepressants

Of all patients, 51.9% ($n = 150$) scored high adherent to ADM. Table 3 shows causal beliefs did not predict baseline adherence to ADM.

Of the 85 patients randomly assigned to the tapering condition, 40.0% ($n = 34$) were able to completely taper ADM. When we additionally took into account the patients that tapered ADM with a minimum reduction of 50%, this percentage increased to 58.8% ($n = 50$). Table 4 displays the results of the logistic regression and shows that causal beliefs did not predict successful tapering of ADM.

Table 5 presents the results of the multinomial logistic regression performed in all patients and shows that after correcting for treatment condition, biological versus other causal beliefs did not predict a stable or increased dosage of ADM 6 months after study entry.

4 | DISCUSSION

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

4.1 | 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 that 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, Viglione, Stinson, Beal, Fidaleo, & Celeste, 1999; Hansson, Chotai, & Bodlund, 2012; Leydon, Rodgers, & Kendrick, 2007; Löwe, Schulz, Gräfe, & Wilke, 2006; Read, Cartwright, Gibson, Shiels, & Haslam, 2015; Read, Cartwright, Gibson, Shiels, & Magliano, 2015). On the other hand, it contrasts the finding of a systematic review that patients prefer psychotherapy (van Schaik et al., 2004). This same systematic review shows 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 patients' 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 toward internal in the last depressive episode, suggesting that with additional episodes, patients 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 relapse/recurrence change over depressive episodes (Bockting et al., 2006; Stroud, Davila, & Moyer, 2008) or that biological conceptualizations of depression in society have increased (Pilkington, Reavley, & Jorm, 2013). The post hoc analysis showed no association between the change from external to internal beliefs and the increased endorsement of ADM. This contrasts a study that found a higher endorsement of biochemical beliefs about the causes of depression in patients that were more likely to believe that ADM 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 ADM. More studies are warranted that examine the association

between beliefs about the causes of depression and factors that help during recovery.

4.2 | Causal beliefs and use of antidepressants

The results showed adherence rates consistent with the literature (Pampallona et al., 2002; ten Doesschate, Bockting, & Schene, 2009). For example, a comparable study found nonadherence rates ranging between 39.7 and 52.7% (ten Doesschate et al., 2009). Regarding successful tapering, our results showed that after 6 months less than half of the patients in the tapering condition successfully tapered off ADM. To our knowledge, only four studies report rates of successful ADM 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%, patients received MBCT with additional tapering support from their MBCT therapist and a physician, and patients were encouraged to complete the taper within 6 months. In the study mentioning 53%, patients with a preference for MBCT were recommended to taper ADM within 5 weeks after treatment with MBCT and patients received tapering support from a psychiatrist. These three studies are comparable to our study, where patients received PCT with additional tapering support from their GP and the advice to taper within four 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%, patients were guided by their GP and tapering duration was based on ADM dosage.

The finding that causal beliefs did not predict ADM 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 ADM 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 ADM, several factors might be involved in the decision-making process and subsequent behavior of patients. 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 ADM 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 ADM, and persistent use of ADM (Bauer et al., 2014; Brown et al., 2007). In the current study, we had no control over this patient-doctor relationship or any other contact with clinicians. This may have affected the decision of patients to actually taper or maintain ADM. 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).

4.3 | Limitations and clinical implications

The results should be interpreted with caution. First, they could be biased toward a biological perspective and a more favorable view toward ADM because this sample was selected on ADM use. In addition, the included patients 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. Patients were advised to continue or discontinue ADM, 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 ADM use in the maintenance phase. If causal beliefs do not influence treatment choices regarding the use of ADM, practitioners do not have to take them into consideration while providing treatment information about ADM. However, the results suggest that causal beliefs change over time, and therefore discussing beliefs while providing information to patients about evidence-based treatments might result in improved treatment choice outcome. As a substantial part of the patients were not able to completely taper ADM, 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 ADM is desirable regarding relapse/recurrence rates and who is able to taper ADM without relapsing.

ACKNOWLEDGMENTS

We are very grateful to all participants in the study. Also, we thank all recruitment sites for their efforts: Altrecht, Amsterdam Medical Center, Arkin, GGZ Centraal (Almere and Hilversum), GGZ Drenthe, GGZ Friesland, HSK, PsyQ (Amsterdam, Groningen, and Rotterdam), Indigo/Emergis Zeeland, RIAGG Maastricht, University Medical Center Groningen, participating general practitioners associated with Zorggroep Almere, and all participating pharmacists associated with UPPER, University of Utrecht. We also thank the therapists for conducting the PCT. In addition, we thank the students, volunteers, and research assistants for their help in the data-collection and coordination process.

In the current study, we worked with human subjects. We complied with the Code of Ethics of the World Medical Association and the standards established by the institutional review board and granting agency.

CONFLICT OF INTEREST

The authors have declared no conflict of interest. Funding sources did not play any role in the collection, analysis, and interpretation of the data; writing the article; or the decision to submit for publication.

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How to cite this article: Klein NS, van Rijsbergen GD, ten Doesschate MC, Hollon SD, Burger H, and Bockting CLH. Beliefs about the causes of depression and recovery and their impact on adherence, dosage, and successful tapering of antidepressants. *Depress Anxiety*. (2017);34:227–235. doi: 10.1002/da.22598.

Appendix 1. 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

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