Tackling depressive disorder: A working memory intervention

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The present study is aimed at investigating cognitive underpinnings of depression, by focusing on working memory abilities in both depressed and non-depressed individuals. These findings will be employed to design and test a therapeutic intervention...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Mood disorders and disturbances NEC
Study type	Interventional

Summary

ID

NL-OMON36328

Source
ToetsingOnline

Brief title
A working memory intervention

Condition

- Mood disorders and disturbances NEC

Synonym
depression, Major depressive disorder

Research involving
Human

Sponsors and support

Primary sponsor: Erasmus Universiteit Rotterdam
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Depression, Mood induction, Treatment, Working memory

Outcome measures

Primary outcome

Depression symptoms measured with the SCID-I, BDI-II and Hamilton Rating Scale.

Secondary outcome

- Scores on questionnaries:

RRS: Rumination because rumination is an important symptom of depression (The

RRS is a standard, well-established test to measure rumination)

AMT: Autobiographical memory test as the functioning of the autobiographical

memory is an important indicator for relapse (The AMT is as well a standard,

well-established test to measure autobiographical memory)

- Score on moodinduction

- Scores on workingmemorytests

Study description

Background summary

The life of individuals with a depressive disorder changes significantly. A depression changes the way people feel and how they perceive themselves as well as the world around them. According to the World Health Organisation (WHO), around 12% of the population is suffering from clinical depression, making it among the most prevalent psychiatric disorders. The WHO estimates that this number is increasing, and that by the year 2020, depression will be the most prevalent disorder causing disability for all ages in men and women. In addition to the distress depression causes to individuals and their families, this emotional disorder also incurs extensively direct and indirect economic costs, which for instance in the Netherlands exceeds one billion Euros annually and in the United States of America 65 billion dollars. Clearly, more research is needed to increase the understanding of the causes and maintenance of this

disorder, and to enhance prevention and treatment. Therefore the current proposal is aimed at examining crucial underpinnings of depression and also aspires to yield a novel approach of clinical treatment by targeting these deficits.

Apart from important neurobiological research examining the onset and maintenance of depression, a dominant focus in the past 30 years has been on cognitive models of depression. These posit that selective information processing plays a crucial role in the development and maintenance of this disorder (for a review, see Williams, Watts, MacLeod, & Mathews, 1988, 1997). That is, how people think, make inferences, approach certain situations, attend to certain events, and how they recall these events determine their emotional responses and, as a consequence, whether or not they are likely to incur a depression. Clearly, cognitive processes play a crucial role in how much people are affected by negative experiences and determine whether these events will be followed by quick recovery or by recurring depressive episodes. These models, therefore, make the important assumption that investigating the content of cognition and the nature of cognitive processes in depression is essential for our understanding of the onset and maintenance of this disorder.

The extensive research programs generated by these cognitive models have shown that depressed individuals are characterised by preferential processing of negative material, difficulties in disengaging attention from negative information, interpreting ambiguous information in a negative way and recalling events in a more negative and more general fashion than they originally were (Mathews & MacLeod, 2005). Recently, new procedures (i.e., cognitive bias modification; CBM) have been developed and studied to manipulate these biases and the first steps have now been made to experimentally employ these CBM procedures for improving cognitive deficits in depression. For instance, Watkins, Baeyens, and Read (2009) administered a concreteness training that successfully overcame the depression-related cognitive bias to process self-relevant information in an overgeneralised manner. In a similar vein, Holmes and colleagues demonstrated that modifying maladaptive interpretations reduces depressive intrusions (e.g., Holmes, Lang, & Shah, 2009).

An important concept in understanding these dysfunctional cognitive processes is working memory. Working memory is commonly described as a system for the active maintenance and manipulation of information in memory and for the control of attention (Baddeley & Hitch, 1974). The capacity of this system is limited; therefore it is important that its contents are updated efficiently, which is controlled by executive processes (e.g., Friedman & Miyake, 2004). Executive processes direct the access to working memory, by removing information that is no longer relevant, as well as protecting it from intrusions. If these processes perform poorly, cognitive and emotional functioning are likely to be affected. For example, poor interference resolution may lead to more intrusive thoughts. In fact, increased interference from irrelevant intrusions has been suggested as a source of low working memory

capacity (Geraerts, Merckelbach, Jelicic, & Habets, 2007). Irrelevant negative intrusions are an important characteristic of depression. Indeed, such deficient executive functioning has been linked to depression (Joormann, 2010). Emerging evidence now shows that depression is characterized by difficulties in the inhibition of mood-congruent material, resulting in prolonged processing of negative, goal-irrelevant aspects of presented information. This in turn hinders recovery from negative mood and leads to sustained negative affect, which is typical for depressive episodes.

Accordingly, theorists have suggested that deficits in executive functioning lie at the heart of biases in attention, interpretation, and memory in depression. They are said to lead to ruminative responses to negative events and, consequently, negative mood states. Indeed, a study by Joormann and Gotlib (2008) has shown that interference control was decreased in depressive patients. This means that they experienced difficulty from removing irrelevant material from working memory. Noticeably, this increased interference was linked to rumination, one of the hallmark symptoms of depression. This association was still evident after a 6-month period (Zetsche & Joormann, in press). Similarly, Goeleven, de Raedt, Baert, and Koster (2006) found that depressed patients showed strongly impaired inhibition of negative affect. These findings of executive deficits in depression have been backed up by neuroscientific work, which indicated abnormalities in neural function underlying difficulties in inhibition of negative thoughts in depressed individuals (Koster, De Lissnyder, Derakshan, & De Raedt, in press).

One wonders whether such executive deficits can be trained in the same manner as those deficits targeted in cognitive bias modification procedures. Is it possible to improve executive processes, which then in turn influence higher-order cognitive abilities and even overt behaviour? Seminal work by Klingberg and colleagues has demonstrated that this is possible. These researchers showed that training of working memory in both children and adults improved their executive functioning and higher-order abilities such as reasoning (Klingberg, Forssberg, & Westerberg, 2002). This improvement was related with changes in cortical activity (McNab et al., 2009). Interestingly, in a sample of children with attention deficit/hyperactivity disorder (ADHD) a working memory training improved executive functioning but also led to a significant reduction in the severity of ADHD symptoms (Klingberg et al., 2005). Likewise, Jaeggi, Buschkuehl, Jonides, and Perriq (2008) showed that a working memory training improved participants* reasoning and problem solving skills.

Noticeably, these different lines of research all point towards one conclusion: individual differences in the ability to control the contents of working memory may be related to the onset and maintenance of depressive disorder. Improving working memory abilities could therefore tackle what may be at the root of depression.

Study objective

The present study is aimed at investigating cognitive underpinnings of depression, by focusing on working memory abilities in both depressed and non-depressed individuals. These findings will be employed to design and test a therapeutic intervention targeting working memory deficits in depressed patients, both on a short and longer term. In doing so, this project ought to yield novel approaches of clinical treatment by targeting cognitive deficits related to depression, in that way bridging the gap between basic cognitive science and clinical psychological treatments for depression.

Study design

This study will focus on the outcome of a working memory intervention in a large sample of individuals with major depressive disorder. Additionally, it will be studied whether the outcome effects are resistant to a mood provocation test.

A randomised controlled trial (RCT) will be used in people diagnosed with major depressive disorder: 120 individuals will be randomly allocated to either a working memory training or a bogus working memory training (i.e., simple arithmetic tasks that do not significantly load working memory ability). All participants will be recruited from mental health care centres in which they are waiting for a treatment after having had a diagnostic intake for depression . During an initial session (i.e., Pretest), the researcher -blind to condition- will use the Structured Clinical Interview for DSM-IV disorders (SCID) to confirm the diagnosis of major depressive disorder. Also, the BDI-II and the Hamilton Rating Scale will be used as self-report measures of the severity of individuals* depressive symptomatology. The RRS and AMT will be performed in order to examine whether the effects of the intervention transfer to other important depression-related cognitive characteristics (i.e., rumination and overgeneral memory, respectively).

In the four weeks following this pretest, participants will receive the working memory intervention three times a week. This intervention will take about half an hour and is easily accessible via a website that participants can access from their computer at home. The researcher monitors whether participants have performed the training and will alert participants in case they have missed a session. The training will systematically teach individuals to utilize their working memory on a variety of domains. The tasks will target the specific working memory abilities that are poor in depression.

After the four-week intervention, the researcher and the participant meet again (i.e., Posttest). In this posttest, the same measures will be performed as during the pretest (i.e., SCID, BDI-II, Hamilton Rating Scale, RRS, AMT, and appropriate working memory tests). It is predicted that participants who

received the working memory training will show an increased performance on working memory tests and a decrease in depressive symptoms (SCID, BDI-II, Hamilton Rating Scale), relative to pretest and to control participants. As deficits in executive functioning have been linked to rumination and overgeneral memory deficits in depression, it is expected that individuals who underwent the working memory intervention will show transfer effects by having a lessened ruminative thinking style (RRS) as well as overgeneral memory (AMT).

One of the essential questions is whether this pattern of reduced symptomatology holds when confronted with stressors. Would our participants still react with increased working memory performance and reduced depressive symptomatology when they are temporarily brought into a dysphoric state? To examine this issue, a sad mood provocation (i.e., Velten mood procedure; Velten, 1968) will be used. Indeed, recent research has shown that relapse can best be predicted by performance on such a mood induction procedure (Segal et al., 2006). If the working memory training appears to be successful, one would expect that compared to controls, individuals in the intervention condition are more resistant to the mood induction and still show increased working memory performance (hypothesized to be similar as in the posttest), indicating that relapse is unlikely.

A follow-up test (Follow-up I) after two months will be the final step. Assuming that individuals in the training condition have benefited from the working memory intervention, one would assume that their depressive symptoms (SCID, BDI-II, Hamilton Rating Scale) and depression-related characteristics (RRS and AMT) would still be lower after such a time interval, relative to individuals in the control condition. Additionally, one would assume that their working memory ability is still improved, indicated by a better performance on the working memory tasks.

Intervention

Workingmemory tasks at pre- and posttests and at home:
- AB-AC-AD taak
- Number-letter taak

Workingmemory task only at pre- and posttests:
Sternberg taak

Moodinduction

Study burden and risks

No risks are associated with participation. The benefit is an earlier treatment and a possible effective treatment.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Suffering a major depressive disorder
- Waiting on a waitinglist in one of the participating centra

Exclusion criteria

- Suffering a bipolar disorder
- Suffering from psychotic complaints
- Drugs or alcohol abuse

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Placebo
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	23-04-2012
Enrollment:	120
Type:	Actual

Ethics review

Approved WMO Date:	29-08-2011
Application type:	First submission
Review commission:	METC Erasmus MC, Universitair Medisch Centrum Rotterdam (Rotterdam)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL34376.078.10