Behaviour Research and Therapy 84 (2016) 45–51

Contents lists available at ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

Shorter communication

When less could be more: Investigating the effects of a brief internet-based imagery cognitive bias modification intervention in depression

A. Pictet [a, *], F. Jermann [b], G. Ceschi [a]

[a] Department of Psychology and Educational Sciences, University of Geneva, Switzerland
[b] Department of Mental Health and Psychiatry, Geneva University Hospital, Switzerland

ARTICLE INFO

Article history:
Received 19 November 2015
Received in revised form
21 July 2016
Accepted 25 July 2016
Available online 27 July 2016

Keywords:
Depression
Cognitive-bias modification
Mental imagery
Internet

ABSTRACT

Depression is a highly prevalent condition worldwide, yet multiple barriers to treatments means that the development of low intensive and easily accessible psychological interventions is crucially needed. The current study sought to investigate the efficacy of a brief, self-administered imagery cognitive bias modification (imagery CBM) procedure delivered online to a sample of 101 individuals with depressive symptoms. Compared to a closely matched control condition or a waitlist condition, imagery CBM led to greater improvements in depressive symptoms ($d = 0.86$, 95% CI = [0.33, 1.3] and $d = 1.17$, 95% CI = [0.62, 1.65]) interpretation bias and anhedonia. Despite the limitation to a two week follow-up, the study findings highlight the potential of imagery CBM as a brief, easily accessible intervention for depression that can be delivered remotely in peoples' home.

1. Introduction

Despite the scope and severity of depression worldwide, limited access to traditional forms of psychological treatments means that only a small proportion of individuals are able or willing to seek help (Collins, Westra, Dozois, & Burns, 2004). To overcome barriers such as long waiting list, costs, scheduling difficulties, or fear of stigma, developing innovative psychological interventions that are easier to access and more resource-efficient is warranted (Kazdin & Rabbitt, 2013). A recently developed cognitive training procedure called "imagery cognitive bias modification for interpretation" ("Imagery CBM": Holmes, Lang, & Shah, 2009) represent a promising candidate as its computerized format allows flexibility and remote delivery via the Internet.

Imagery CBM aims to modify interpretation bias and thus reduce symptoms of depression by encouraging people to repeatedly imagine positive resolutions of emotionally ambiguous scenarios (Holmes et al., 2009). A series of clinical studies have demonstrated significant effects of imagery CBM in reducing depressive symptoms and negative interpretation bias (Lang, Blackwell, Harmer, Davison, & Holmes, 2012; Torkan et al., 2014; Williams, Blackwell, Mackenzie, Holmes, & Andrews, 2013). However, two recent randomized controlled trials found no significant advantage for an online self-administered imagery CBM procedure compared with a closely matched control condition (Blackwell et al., 2015; Williams et al., 2015).

An important challenge in the transition of imagery CBM from a tightly controlled laboratory environment to a self-administered online intervention is to ensure that participants are sufficiently motivated and actively engaged while completing the training sessions from home (Williams et al., 2015). In the current study, a series of refinements were made to the imagery CBM procedure with the aim of maximising participants' engagement and motivation to complete the online training task. This included proposing a relatively brief and spaced training schedule to reduce the intensity and repetitiveness of training and provide opportunities to practice the trained interpretational style in between the sessions. Moreover, the task instructions were presented in a more playful manner and regular feedback was provided throughout the sessions to increase motivation and encourage the generation of vivid imagery. Instructing participants to use imagery rather than verbal language has been shown to be pivotal for the CBM to be effective, particularly in the case of individuals with depression who struggle to generate vivid imagery of positive future events (Holmes et al., 2009; Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011).

A further aim of the current study was to investigate the specific impact of the procedure on anhedonia. Symptoms of anhedonia,

* Corresponding author. Department of Psychology and Educational Sciences, University of Geneva, 40 Boulevard du Pont d'Arve, Geneva, 1211, Switzerland.
E-mail address: arnaud.pictet@unige.ch (A. Pictet).

http://dx.doi.org/10.1016/j.brat.2016.07.008
0005-7967/

which include both the inability to experience and to anticipate pleasure from positive life events, are a cardinal feature of depression, yet they are difficult to treat and predictive of poorer treatment outcomes (Dunn, 2012; Treadway & Zald, 2011). Recent findings from Blackwell et al. (2015) and Williams et al. (2015) suggest that anhedonia may be improved through imagery CBM. However, anhedonia in these studies was assessed by summing responses on two related items from the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1998), thus the results were limited by the absence of a separate measure of anhedonia. The current study sought to address this limitation by investigating anhedonia through two additional scales, one commonly used in depression research (Snaith-Hamilton pleasure scale; Snaith et al., 1995) and one assessing both consummatory and anticipatory forms of anhedonia hedonic capacity (Temporal Experience of Pleasure Scale; Gard, Gard, Kring, & John, 2006).

In order to provide a rigorous test of the efficacy of imagery CBM, we included a closely matched CBM control condition in which participants were invited to imagine ambiguous scenarios that resolved 50% positively and 50% negatively, hence removing the contingency between ambiguity and positive resolution but retaining the imagery component (as in Lang et al., 2012). Williams et al. (2015) used a similar control condition and found no superiority of the "positive" imagery CBM condition in reducing depressive symptoms and interpretation bias. Equivalent improvements were found in both conditions, which led to the suggestion that the presence of emotional ambiguity and imagery within the control condition may have led to therapeutic effects (Clarke et al., 2014). Alternatively, the possibility remains that such improvements merely resulted from natural fluctuations on depression symptoms and interpretation bias. To control for such naturally occurring fluctuations and provide a comparison for the possibly "active", control CBM condition, a "no-intervention" (waitlist) condition was included in the present study.

The primary aim of the current study was to test the efficacy of a brief, self-administered online imagery CBM procedure in a French-speaking sample of individuals with depressive symptoms. Our study tested the following hypotheses: (1) that participants in the imagery CBM condition would demonstrate significant improvements in symptoms of depression, interpretation bias and anhedonia; (2) that these improvements would be greater than those in the control CBM condition and the waitlist condition; (3) that the effects of imagery CBM on depressive symptoms would be at least partially mediated by the trained change in interpretation bias.

2. Method

2.1. Participants and recruitment

Based on the effect size for BDI-II obtained in Lang et al. (2012) for change from pre-CBM to 2-week follow up ($d = 0.67$), a sample-size calculation indicated that 30 participants per group would be needed to provide 80% power to detect a difference between imagery CBM and control CBM or waitlist at a 5% significance level. Recruitment was via flyers posted in the local University and advertisements in websites. Participants were included in the study if they scored 14 or above on the BDI-II both at screening and at baseline assessment. Further inclusion criteria involved being aged 18 to 65, being fluent in French and being able to access the internet-based intervention at home. Participants were excluded if they were currently receiving psychological therapy or had started or changed dose of antidepressant medication during the past month. The final sample included 101 participants (79% female) randomized to the imagery CBM condition (N = 34), the control CBM condition (N = 34) or the waitlist condition (N = 33) (see Table 1 for participants characteristics). Adherence to the online CBM intervention was high, with 97% of participants in the imagery CBM group and 94% in the control CBM group completing all 4 sessions of the intervention. All participants completed the follow-up assessments (see Fig. 1 for participants flow through the study).

2.2. Training interventions

In both CBM conditions, the task was introduced as a practice of imagining everyday situations as vividly as possible, using a first-person perspective and involving as many sensory modalities as possible. Participants were given several examples using photographic illustrations and then completed a practice example of the task, followed by the first session of the intervention. Both CBM interventions comprised 4 online training sessions (approximately 30 min each) completed every other day over a 6-day period. In each session, participants listened to 64 audio recordings of descriptions of everyday situations (approximately 10 s each), arranged into eight sets of 8 with a self-paced break in between each set, and were instructed to imagine themselves in the scenarios as vividly as possible, seeing them through their own eyes. The 256 situations were a selected sub-sample of the scenarios used in Blackwell et al. (2015) and were translated into French by three members of the research team. As in previous studies, the scenarios were initially ambiguous as to their emotional tone but in the imagery CBM condition they always ended up positively. For example: "It is your birthday and by midday you have heard from no one to wish you happy birthday. By the end of the day, *you have received many friendly messages* (positive resolution in italics). In the control CBM condition, 50% of the scenarios were positively and 50% negatively (e.g. by the end of the day, *you have still received no messages*). After each trial, participants were asked, "How vividly could you imagine the scenario described?" Responses were made on a scale from 1 (*not at all vivid*) to 5 (*extremely vivid*). At the end of each set, participants received feedback about their mean vividness score for the previous set, along with the following comments tailored to their performance. Participants with a mean vividness score equal or above 3.5 were told: "congratulations, keep going!" Those with a mean score between 2 and 3.5 were told: "well done!" and those with a mean score below 2 were told: "you can do better!".

2.3. Measures

The *Spontaneous Use of Imagery Scale* (SUIS; Reisberg, Pearson, & Kosslyn, 2003) was used to measure participants' current everyday use of mental imagery ($\alpha = 0.76$). The *Beck Depression Inventory-Second Edition* (BDI-II French version; Beck et al., 1998) was used to assess depressive symptoms ($\alpha = 0.90$). As in Blackwell et al. (2015), an anhedonic subscale was created by summing responses on BDI-II items associated with anhedonic symptoms: item 4 (loss of pleasure) and item 12 (loss of interest). The *Spielberger State-Trait Anxiety Inventory* (STAI-T French version; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1993) was used to assess trait anxiety ($\alpha = 0.91$). The *Ambiguous Scenarios Test for depression-related bias* (AST-D-II; Rohrbacher & Reinecke, 2014) was used to assess depression-related interpretation bias (higher scores reflect a more positive bias). Two versions of the AST-D-II were presented in counterbalanced order at baseline, post-training and follow-up (ABA vs BAB) ($\alpha = 0.73$ for version A and $\alpha = 0.70$ for version B). The *Snaith-Hamilton Pleasure Scale* (SHAPS French version; Loas et al., 1997) was used to assess state anhedonia. The *Temporal Experience of Pleasure Scale* (TEPS French version; Favrod, Giuliani, & Bonsack, 2009) was used to assess anticipatory and consummatory experiences of pleasure ($\alpha = 0.74$ for the anticipatory scale