



Implementation and Effects of the Broad-Minded Affective Coping (BMAC) Technique: a Pilot Study

Alejandro Miguel-Alvaro¹ · M. Mar Gómez-Gutiérrez¹ · Carlos Hornillos¹ · M. José Hernández-Lloreda¹ · María Crespo¹ 

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Abstract

This study aims to develop and test a 3-session version of the Broad-Minded Affective Coping (BMAC) technique and to explore the relationship between implementation (features of the positive memory evoked, satisfaction, and engagement) and outcome. The BMAC was delivered to 31 female university students in three sessions over 7–10 days. Positive and negative affect, and difficulties in regulation of negative and positive emotions were assessed pre-treatment and post-treatment. The intervention resulted in a significant reduction in negative affect and in difficulties in negative emotion regulation. No significant effects were found on positive affect or on difficulties in positive emotion regulation. Moreover, the memories chosen were found to be highly central, and patient and therapist levels of satisfaction and engagement in the technique were very high throughout the three sessions. No significant relationships were found between implementation and outcome. This leads to the conclusion that the technique may be suitable for inclusion in broader treatment packages.

Keywords Positive emotions · BMAC · Psychological treatment · Effectiveness

Introduction

Autobiographical memories are retrieved episodes from an individual's life that combine memories of specific episodes (i.e., episodic memory) with generic and schematic knowledge about words (i.e., semantic memory) (Williams et al., 2008). A number of features of autobiographical memories have been linked to psychopathological conditions, such as memory overgenerality and depression (Williams et al., 2007). It has recently been suggested that biases in autobiographical memory may

✉ María Crespo
mcrespo@psi.ucm.es

¹ Facultad de Psicología, Universidad Complutense de Madrid, Campus de Somosaguas, S/N, 28223 Madrid, Spain

act as transdiagnostic processes, as they perpetuate a negative, distorted self-image (Romano et al., 2020).

Research has primarily focused on autobiographical memory of events with negative emotional valence and its relation to various psychopathological conditions (Brown et al., 2016). More recent studies suggest that difficulties in positive memory processes (such as retrieval) might also be related to psychopathology, such as depressive disorders (Dalgleish & Werner-Seidler, 2014) and post-traumatic stress disorder (PTSD) (Contractor et al., 2018). Moreover, the lack of memories of positive valence may also play a critical role in the onset and maintenance of a wide range of severe and chronic psychiatric disorders and predict maladaptive behavioural outcomes in both cross-sectional and longitudinal designs (e.g., Gruber, 2019). Research shows the beneficial effects of retrieving and processing positive memories, such as an increased positive affect and a decreased negative affect (Joormann et al., 2007; Josephson, 1996; Rusting & DeHart, 2000). These, in turn, may trigger a positive interpretation of events and evoke further pleasant memories (Blaney, 1986; Rusting & DeHart, 2000; Rusting & Larsen, 1998), as well as a reduction in maladaptive post-traumatic cognitions, resulting in an improved affect and other downstream consequences (Askelund, et al., 2019). Specifically, one of the most widely accepted aspects of working with positive memories is that it increases positive affect, which has shown to have an adaptive function and to be related to various aspects of wellbeing, such as life satisfaction (Przepiorka et al., 2020), successful ageing (Fernández-Ballesteros et al., 2010), and adaptive responses to negative events (Waugh, 2020). Moreover, Vazquez (2017) shows that, beyond getting rid of their symptomatology, for many psychiatric patients it is a priority for their recovery to enjoy life, be satisfied with themselves, or find meaning in life.

These findings have led to a growing interest in the development of interventions focusing on positive memories with the aim of promoting life satisfaction and wellbeing and enhancing affect (Hendriks et al., 2019). In this vein, Contractor et al. (2018) highlight that these types of techniques could have a direct effect on the person's symptomatology, could facilitate the implementation of other types of interventions (e.g. increasing readiness to start a trauma-focused intervention), and could foster transversal strategies to any psychotherapeutic process by increasing coping strategies and positively influencing self-concept and identity. In addition, they could promote a nicer and safer therapeutic space for patients, thus reducing dropout rates, which can be high in some populations.

The techniques proposed to date are very heterogeneous regarding their theoretical foundations, content, formats, applications, and level of supporting evidence. Moreover, they comprise different objectives such as increasing accessibility and attention to positive memories, changing the quality and characteristics of these memories and even eliciting specific changes (Miguel-Alvaro et al., 2021).

Among the techniques aimed to increase accessibility and attention to positive memories the one with the broadest empirical evidence is the *Broad-Minded Affective Coping* (BMAC) (cf. Miguel-Alvaro et al., 2021). While techniques as the *Re-experiencing of Pleasant Memories using Mental imagery* (Bryant et al., 2005), *Writing about a Peak Positive Experience* (Burton & King, 2004) or *Sharing Positive Narratives with a Partner* (Lambert et al., 2013) have only been tested with

university students or community samples, the BMAC has been applied to patients on the schizophrenia spectrum (Johnson et al., 2012; Mote & Kring, 2019), individuals with PTSD (Panagioti et al., 2012), adults with a suicidal crisis or suicidal ideation (Knagg et al., 2022; Pratt et al., 2022), as well as to university students through an online application (Holden et al., 2017).

The BMAC was first proposed by Tarrier (2010) as a cognitive-behavioural technique to facilitate positive emotions. It is based on the broaden-and-build theory of positive emotions, which states that positive emotions (e.g., happiness, hope, joy, etc.) broaden individuals' thought and action repertoires and help them to build physical and social bonds and resources promoting emotional wellbeing (Fredrickson & Branigan, 2005; Fredrickson & Joiner, 2002). To do this, the BMAC focuses on re-experiencing positive memories through mental imagery exercises, while encouraging patients to try to recall the positive emotions accompanying these memories. The objectives of these exercises are as follows: (1) to learn to focus on a positive memory rather than on a negative, unpleasant, or traumatic memory, and to experience a balance between positive and negative memories; (2) to learn to control emotions and enjoy positive emotions and their benefits; (3) to gain control over attention and thoughts; (4) to help to cope with stress and low mood; and (5) to raise awareness of how thought processes can affect emotions.

Before starting the technique, patients are asked to recall an event or a time when they enjoyed themselves, had fun or felt happy. Although there are no strict rules for quick results, the use of a more recent event rather than a more distant one is recommended, as recent memories are likely to be more vivid and more integrated into the senses. The procedure includes the following sequential steps: preparation, guided imagery of positive memories, involvement of the senses, re-experiencing associated emotions, feedback, and debriefing.

When the BMAC was used to treat PTSD (Panagioti et al., 2012), it was administered in a 15–20-min session and compared to writing a detailed description of a positive memory for 15 min (control group). The results showed that, in the post-induction assessment, individuals in the BMAC group reported higher levels of positive emotions and a greater reduction in self-reported levels of negative emotions. In fact, the control task did not result in a substantial improvement in mood. According to these authors, given that both tasks (BMAC and control) involved active recall of past positive events, their differential impact on mood suggests that the BMAC has a specific therapeutic value. However, two hours later, there was no significant impact (BMAC vs. control) on positive or negative emotions after controlling for baseline levels of prior emotions, nor two days later, suggesting that the effect is only temporary. According to the authors, the BMAC has the potential to facilitate the therapeutic process if used in addition to other psychological interventions.

Two different studies (Johnson et al., 2012; Mote & Kring, 2019) using the BMAC have also reported an increase in patients' positive affect following the administration of the technique in schizophrenic patients. In Johnson et al. (2012), the BMAC was delivered in a 20-min session and compared to a time-matched task of listening to classical music (control). In the post-induction assessment, participants in the BMAC group showed a greater increase in hope and happiness,

as measured by two visual analogue scales. In turn, the study by Mote and Kring (2019) compared the effects of the BMAC on individuals with and without schizophrenia (sessions lasted ~35 min). The BMAC significantly increased positive affect in both groups but failed to influence negative affect.

Recently, Knagg et al. (2022) conducted a pilot study with 11 college students with suicidal ideation. After applying six sessions of BMAC, they observed a large effect size in the reduction of suicidal ideation and other clinical variables such as depressive symptoms. Pratt et al. (2022) conducted a pilot study in which they applied a BMAC session to nine adults who had had a suicide attempt in the last three months. In this case, a reduction in suicidal ideation (with a large effect size) and depressive symptoms (with a moderate effect size) was observed one month after the intervention.

Finally, Holden et al. (2017) introduced several changes in the administration of the BMAC in university students: a focus on positive social memories (labelled as “social BMAC”) and an online format. In their study, 123 college students were asked to recall a recent positive social memory. They were provided with audio instructions guiding them through an initial relaxation exercise before listening to the recorded social BMAC. The session lasted ~45 min. The results showed significant (small to moderate) increases in positive affect, feelings of social confidence, and pleasure, and a significant (small to moderate) decrease in negative affect at the end of the session. However, caution should be exercised when interpreting these results, as the study did not include a control group and changes were not sustained during the 2-week follow-up period.

While these studies provide evidence of the effects of the BMAC, there are several aspects of this technique that have not yet been empirically explored. Firstly, although the original protocol proposed by TARRIER (2010) states that the technique should be implemented in 1–3 sessions (emphasizing the importance of home practice between sessions), it is striking that in almost all the studies published to date, protocols consisted only of one session, and that, in some cases, this has been very brief. Secondly, existing research has overlooked aspects such as participants’ and therapists’ satisfaction with the technique or the characteristics of the implementation process, such as the valence or intensity of the emotions relived during recall. Thirdly, there are no studies shedding light on the characteristics of the memories used during the implementation of the technique and their potential relationship with the effects obtained. Finally, the existing studies do not consider emotion regulation (both positive and negative) as a variable of interest, a striking aspect if we consider, as mentioned above, that one of the aspects on which techniques such as BMAC have the greatest impact is the elicitation of positive emotions. By exploring these aspects, we can obtain a more in-depth understanding of the mechanisms underlying the functioning of these techniques, allowing us to increase their scope, adjust them to enhance their effects, and justify their incorporation into established treatments.

Therefore, the present study aims to explore the effects of a 3-session version of BMAC on positive and negative affect and emotional regulation, both for negative and positive emotions. In addition, it aims to assess the implementation of the technique including: features of the positive memory selected (i.e. centrality, number of emotions reflected) and of its evocation (valence and intensity of emotions); patient’s engagement in the different

components of the technique (i.e. memory evocation, relaxation and visualization); and satisfaction (considering comfort during sessions, utility of sessions, satisfaction with the therapeutic relationship, willingness to come back to the following session, completion and usefulness of homework, and overall satisfaction with the technique).

Based on previous research, we hypothesised that participants would experience an increase in levels of positive affect and a decrease in levels of negative affect following the application of the technique. Although there is no previous evidence on this aspect, we also expected less difficulty in regulating positive and negative emotions and we hypothesised that the technique would be positively rated and accepted by both participants and therapists without diminishing their satisfaction over the course of the sessions. Furthermore, in line with the recommendations of the BMAC protocol, we expected greater effects of the BMAC when the evocation of positive memories is focused on more recent events (making this evocation more vivid), when these memories are more central to the person's life and when participants are more compliant with practice between sessions.

Method

Participants

Participants were recruited through the collaborative research platform for the students of the Faculty of Psychology at the Complutense University. The eligibility criteria were: being female; being aged 18 and above; having a smartphone with audio recording capability; and not currently receiving any psychological treatment. Participation in the study was voluntary. Since this study is part of a wider project that aims to develop and test the effect of adding a positive memory module, based on the BMAC, to trauma-focused cognitive-behavioural treatment for female survivors of intimate partner violence (see Crespo et al., 2022), only female participants were considered here. Participants were informed about the study objectives and reassured that their data would be always kept confidential. Students could obtain academic credits for participating in the study.

The final sample consisted of 31 female students with a mean age of 21.55 years ($SD=6.6$; range = 18–49).

Design and Variables

A within-group experimental design was used with repeated pre-treatment and post-treatment measures.

We assessed the effects of the BMAC on the following dependent variables: negative affect, positive affect, and emotional regulation (general emotional regulation and regulation of positive emotions). Measures of the characteristics of the memories evoked (i.e., centrality and number of emotions reflected) and the characteristics of the implementation of the technique were also included. Participants' and therapists' levels of satisfaction with the technique and its application were also assessed.

Measures

In order to assess the effects of the technique, the following instruments were administered before and after treatment:

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) in the Spanish version by Sandín et al. (1999). This consists of two scales designed to measure Positive Affect (PA) and Negative Affect (NA). Respondents are asked to read 20 words describing a series of feelings and emotions and indicate the extent to which they tend to feel them on a Likert scale ranging from very slightly or not at all (1) to extremely (5). Scores on each scale range from 10 to 50, with higher values indicating more intense positive or negative affect. Internal consistency estimates range from $\alpha=0.86$ to $\alpha=0.90$ for the PA scale and from $\alpha=0.84$ to $\alpha=0.87$ for the NA scale (Watson et al., 1988). In this study, the pre-PA scale α value was 0.88, the pre-NA scale α value was 0.86, the post-PA scale α value was 0.81, and the post-NA α value was 0.89.

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) in the Spanish version by Hervás and Jódar (2008). This is a 36-item self-report measure with a 5-point Likert scale assessing individuals' typical levels of emotional dysregulation across six domains: (a) nonacceptance of negative emotions (range=6–30); (b) difficulties engaging in goal-directed behaviours when distressed (range=5–25); (c) difficulties controlling impulsive behaviours when distressed (range=6–30); (d) limited access to emotion regulation strategies perceived as effective (range=8–40); (e) lack of emotional awareness (range=6–30); and (g) lack of emotional clarity (range=5–25). It also includes an overall score (range=36–180). In all its domains, higher scores indicate greater difficulties in emotion regulation. In the present study, both the subscales and total scores were calculated. The DERS has been shown to have good test–retest reliability and adequate construct and predictive validity (Gratz & Roemer, 2004; Gratz & Tull, 2010). In this study, Cronbach's α of the total scale was 0.94 in the pre-treatment measure and 0.92 in the post-treatment measure. The subscales obtained a Cronbach's α value between 0.84 and 0.93 in the pre and between 0.77 and 0.89 in the post.

The Difficulties in Emotion Regulation Scale–Positive (DERS-P; Weiss et al., 2015) in the Spanish version based on Hervás and Jódar (2008). This is a 13-item self-report measure with a 5-point Likert scale assessing clinically relevant difficulties in regulating positive emotions. The DERS-P was modelled after the original DERS (Gratz & Roemer, 2004) and focuses on difficulties in: (a) acceptance of positive emotions (range=4–20); (b) ability to engage in goal-directed behaviours when experiencing positive emotions (range=4–20); and (c) ability to control impulsive behaviours when experiencing positive emotions (range=5–25). It also includes an overall score (range=13–65). In all its domains, higher scores indicate greater difficulties in regulating positive emotions. Weiss et al. (2015) confirmed its three-factor structure and demonstrated the internal consistency and construct validity of the total and subscale scores. In the present study, both the subscales and total scores were calculated. Cronbach's α values were 0.69 in the pre-treatment measure and 0.74 in the post-treatment measure for the scale. Subscales obtained Cronbach's

alphas between 0.69 and 0.72 in the pre-treatment measure and between 0.75 and 0.80 in the post-treatment measure.

The following instruments were used to determine the characteristics of the evoked memories:

The Centrality of Event Scale (CES; Berntsen & Rubin, 2006) in the Spanish version by Fernández-Lansac & Crespo (2017). This measures the extent to which a memory is central to an individual's personal identity and acts as a reference point for the attribution of meaning to other experiences. The shortened 7-item version was used, with scores ranging from 7 to 35 and higher scores indicating greater centrality of the event to the individual's identity. In this study, Cronbach's α was 0.90.

Micro-formulation of Imagery (based on Hackmann et al., 2011). This instrument operates on the basis that mental images can be better scrutinised and understood when mapped into a "micro-formulation". In this way, the therapist can ensure that the patient's memory has sufficient elements to carry out the BMAC successfully in addition to facilitating recall. The instrument was translated into Spanish by the authors of the study, and it was filled out jointly by the therapist and the patient, and contained the following sections: 1) The image itself (What is it of?); 2) The source of the image (Where did the image come from?); 3) Appraisals and emotions (What are the hot cognitions associated with the image?); 4) Current impact (What is the overall effect of the above?); 5) Maintenance factors (What keeps me from forgetting the image?). To adapt it to the context of positive memories, only Sect. 5 (maintenance factors) was modified, since the original micro-formulation asked which aspects made the memory continue to be annoying or problematic; here this section asked about the factors that made the memory continue to be remembered and be relevant.

The micro-formulation was completed in each session by referring to the memory evocation in that specific session. Based on these data, the following variables were considered for analysis: detail-rich memory (yes/no), inclusion of additional details in sessions 2 and 3 (yes/no), and number of emotions associated with the memory. A memory was rich in detail if it contained information about where and when the event occurred, and who was involved in it and how, as well as descriptive elements at the sensory level and other elements relating to the memory, such as specific details. In addition, the first session included specific questions about the particularities of the positive event evoked and when it occurred.

The following instruments were used to assess the application of the techniques and the levels of satisfaction among participants and therapists:

Several ad hoc *Likert scales* were administered in each to the participants and the therapist to assess the following: (1) characteristics of positive memory evocation: emotional valence according to participants and therapists (0 = negative; 10 = positive), emotion intensity as reported by participants and therapists (0–10), and therapists' assessments of participants' degree of involvement in the task (0–10); (2) participants' self-reported involvement in the warm-up tasks (0–10), specifically relaxation and visualisation exercises; and (3) satisfaction with and assessment of the sessions, including participants' and therapists' reports (0–10) on: feelings of comfort during the session, utility of the session, satisfaction with the therapeutic relationship during the session, and the participant's willingness to come back to the

following session. Additionally, in sessions 2 and 3, participants also rated the utility of homework (0–10). In all cases, 0 = none and 10 = maximum.

A *self-report record of the homework practice* was used to monitor the practice of the technique between sessions. Based on this data, the number of practice sessions between sessions 1 and 2, and 2 and 3, was calculated.

Finally, the *Client Satisfaction Questionnaire* (CSQ-8; Larsen et al., 1979) in the Spanish version by Echeburúa and Corral (1998) was administered at post-treatment to ascertain participants' overall satisfaction with the technique. The CSQ-8 has been shown to have high internal consistency and concurrent validity in mental health outpatient settings (de Wilde & Hendriks, 2005). In this study, Cronbach's α was 0.85.

Procedure

A protocol based on the BMAC was developed, including a detailed description of the tasks. It consists of 3 sessions lasting approximately 50 min each to be implemented over a period of 7 to 10 days with a minimum of one day between sessions.

The first session begins with the therapist introducing herself, the informed consent form being signed, and the pre-treatment assessment being completed. The therapist then provides a detailed explanation of the technique and its objectives. The application of the technique follows these steps: (1) selection of the positive memory by the participant, under the instruction to select a moment in which she was happy or enjoying, and specification of its characteristics using micro-formulation and CES; (2) two warm-up exercises focusing attention on breathing and visualisation; (3) guided evocation of the positive memory previously selected for 8–10 min (being audio-recorded on the participants' cell phones); (4) debriefing on the evocation experience; and (5) homework assignment, which consisted of listening to the recording at least once a day between sessions.

The second and third sessions follow the same structure but include the administration of intra-treatment questionnaires, and the micro-formulation focused on providing additional information about the evoked memory. This was the same in all three sessions, but the memory could be enhanced with new elements using the micro-formulation. The post-treatment assessment was carried out after the third session.

The warm-up exercises were guided by the therapist. In the breathing attention exercise the participant was required to focus her attention on the friction of the air entering through the nose. The visualization exercise consisted of the patient visualizing an orange and perceiving it with each of her 5 senses through the guidance of the therapist. Each exercise lasted between 2 and 3 min.

Participants were recruited through advertisements displayed at the Faculty of Psychology in the Complutense University. Women who were interested in taking part registered via an online form and were then contacted by the first author for an initial screening to ensure eligibility. Their hourly availability was recorded so that they could be assigned to one of the available therapists.

The technique was applied by 8 female therapists who were master's degree students and received prior training in the implementation of the BMAC in a 3-h

session. The researchers also held two 2-h supervision meetings with the therapists during the study period.

The study was approved by the Complutense University Ethics Committee (number 2019/20–015).

Data Analysis

A descriptive analysis was carried out for each of the study variables. The effects of the therapy were analysed using *t*-tests for repeated measures with each ‘moment’ (pre/post) as factors, and emotional aspects as dependent variables. The assumptions of normality and homoscedasticity were assessed and, if not fulfilled, the Wilcoxon test was performed. The Bonferroni correction was applied separately for each construct. In the case of PANAS, as there were only two comparisons, the *p*-value at which statistically significant results were obtained was $0.05/2=0.025$. In the case of emotional regulation (measured by the DERS), given that 11 comparisons were made, the *p*-value was set at $0.05/11=0.0045$. Effect sizes were calculated for the outcome variables using Cohen’s *d*. Differences in the effect obtained by the different therapists were also calculated using the Kruskal–Wallis test.

The effects of each session were analysed using a one-way ANOVA with repeated measures with each ‘session’ as factors and measures of the characteristics of the therapy as dependent variables. The assumptions of normality and homoscedasticity were assessed and, if not fulfilled, degrees of freedom were corrected. In order to assess the level of agreement between patients’ and therapists’ reports on the evocation of positive memories (average valence and intensity of emotions), the intraclass correlation coefficient (ICC) was calculated.

Pearson’s correlation was used as a measure of the relationship between the characteristics of the application of the technique and its effectiveness. The statistical significance threshold was set at *p*-value < 0.05. Data were statistically processed using SPSS software (version 27.0, SPSS Inc., Chicago, Illinois).

Results

Effectiveness of the Technique

As shown in Table 1, the negative affect (PANAS) score showed significant pre-post decreases ($p=0.02$) as well as the DERS total score, and scores on the nonacceptance, strategies, and clarity subscales of the DERS ($p<0.001$). Effect sizes (*d*) for the pre-post difference were 0.62 for negative affect and 0.85 for the DERS total score. Strategy (standing for limited access to emotion regulation strategies) was the DERS subscale with the largest effect size ($d=0.91$). In contrast, there were no significant differences in positive affect (PANAS) or in difficulties in regulating positive emotions (DERS-P) in neither of the total scores or the DERS-P subscales. No differences in any of these variables were identified between therapists ($p>0.05$).

Table 1 Means, standard deviations, and repeated-measures *t*-tests for dependent variables (*n* = 31)

| | Pre <i>M</i> (<i>SD</i>) | Post <i>M</i> (<i>SD</i>) | <i>t</i> (<i>p</i>) | <i>p</i> | Effect size (<i>d</i>) |
|--|-------------------------------|--------------------------------|-----------------------|----------|--------------------------|
| PANAS (+) (range = 0–50) | 34.13 (3.69) | 35.65 (5.54) | -1.635 | .113 | -.29 |
| PANAS (-) (range = 0–50) | 23.06 (7.10) | 18.94 (7.38) | 3.443 | .02* | .62 |
| DERS (total) (range = 36–180) | 93.42 (25.16) | 78.06 (18.63) | 4.754 | < .001** | .85 |
| DERS (nonacceptance) (range = 6–30) | 15.39 (7.34) | 11.87 (4.86) | 4.253 | < .001** | .76 |
| DERS (goals) (range = 5–25) | 15.77 (5.16) | 14.41 (4.75) | 1.880 | .70 | .34 |
| DERS (impulse) (range = 6–30) | 14.61 (5.5) | 11.45 (3.97) | 3.478 | .02 | .62 |
| DERS (awareness) (range = 6–30) | 14.29 (5.09) | 13.38 (4.33) | 1.34 | .19 | .24 |
| DERS (strategies) (range = 8–40) | 20.71 (6.98) | 16.58 (5.18) | 5.076 | < .001** | .91 |
| DERS (clarity) (range = 5–25) | 12.65 (4.05) | 10.35 (3.39) | 4.017 | < .001** | .72 |
| DERS-P (total) (range = 13–65) | 17.23 (3.31) | 16.42 (3.05) | 1.317 | .198 | .24 |
| DERS-P (nonacceptance) (range = 4–20) | 4.32 (0.75) | 4.19 (0.40) | 1.161 | .255 | .21 |
| DERS-P (goals) (range = 4–20) | 6.23 (2.12) | 6.03 (1.8) | .537 | .595 | .09 |
| DERS-P (impulse) (range = 5–25) | 6.68 (1.83) | 6.19 (1.94) | 1.348 | .188 | .24 |

DERS = Difficulties in Emotion Regulation Scale; DERS-P: Difficulties in Emotion Regulation Scale-Positive; PANAS = Positive and Negative Affect Schedule

p* < .025; *p* < .0045

Characteristics of the Selected Positive Memories

The positive memories evoked by the participants were primarily of events that had occurred once at a particular time and place (64.5%), while 19.4% of them were a synthesis or combination of related events, and 16.1% were events that had occurred over a fairly continuous period of time lasting more than one day. Memories alluded to events that were very central to the individual's life (CES: *M* = 24.03; *SD* = 7.35; mode = 31). Only 2 participants (6.5%) obtained CES scores below 15. The related events had occurred recently (i.e., in the past 3 months) for 29% of the participants, within the past year for 22.6% of them, and more than a year ago for almost half of the sample (48.4%).

Memory evocation was rich in detail for most participants (93.5%). In addition, 51.6% (*n* = 16) of the participants added details in the second session and 35.5% (*n* = 11) did so in the third session. The mean number of emotions related to the events reported by the participants was 3.55 (*SD* = 1.57).

Characteristics of the Evocation of Positive Memories and Intersessional Practice

As shown in Table 2, the valence of emotions during memory recall was very positive for participants (mean value for all three sessions: *M* = 8.54; *SD* = 1.04) and therapists alike (mean *M* = 8.32; *SD* = 1.11). Moreover, both participants and

Table 2 Characteristics of the implementation of the technique according to the participants (n = 31) and the therapists' reports for each participant (n = 31)

| | Participants | | | | Therapists | | | | F (p) |
|---|--------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------------------------|
| | S1 | S2 | S3 | Average | S1 | S2 | S3 | Average | |
| Positive memory evocation (range = 0–10) | | | | | | | | | |
| Valence of emotions* <i>M</i> (<i>SD</i>) | 8.80 (1.30) | 8.35 (1.02) | 8.52 (1.02) | 8.54 (1.04) | 2.24 (.12) | 8.48 (1.35) | 8.13 (1.3) | 8.34 (1.26) | 8.32 (1.11) 1.87 (.18) |
| Intensity of emotions <i>M</i> (<i>SD</i>) | 7.74 (1.39) | 8.00 (1.21) | 7.77 (1.71) | 7.84 (1.02) | 0.39 (.68) | 7.31 (1.67) | 7.67 (1.45) | 7.93 (1.36) | 7.64 (1.17) 2.79 (.07) |
| Engagement in memory evocation <i>M</i> (<i>SD</i>) | - | - | - | - | - | 8.86 (1.16) | 8.63 (1.35) | 9.24 (1.06) | 8.91 (0.88) 3.37 (.06) |
| Warm-up exercises (range = 0–10) | | | | | | | | | |
| Engagement in relaxation <i>M</i> (<i>SD</i>) | 8.06 (1.65) | 8.23 (1.20) | 7.94 (1.24) | 8.13 (1.01) | 0.48 (.62) | - | - | - | - |
| Engagement in visualisation <i>M</i> (<i>SD</i>) | 8.03 (1.22) | 8.39 (1.38) | 8.42 (1.31) | 8.23 (0.96) | 1.68 (.20) | - | - | - | - |
| Satisfaction and assessment (range = 0–10) | | | | | | | | | |
| Comfort during the session <i>M</i> (<i>SD</i>) | 9.13 (1.15) | 9.16 (0.86) | 9.35 (0.95) | 9.21 (0.80) | 0.89 (.42) | 8.97 (1.33) | 8.94 (1.24) | 9.67 (0.66) | 9.18 (0.87) 6.83 (.002**) |
| Utility of the session <i>M</i> (<i>SD</i>) | 8.84 (1.34) | 8.55 (1.34) | 8.45 (1.67) | 8.61 (1.27) | 1.64 (.20) | 8.77 (1.12) | 8.16 (1.3) | 8.47 (1.28) | 8.46 (1.01) 4.03 (.02*) |
| Satisfaction with the therapeutic relationship <i>M</i> (<i>SD</i>) | 9.45 (0.89) | 9.58 (0.62) | 9.65 (0.71) | 9.56 (0.63) | 1.23 (.28) | 8.68 (1.17) | 9.13 (1.02) | 9.63 (0.62) | 9.14 (0.73) 11.52 (<.001***) |
| Motivation to return to the next session <i>M</i> (<i>SD</i>) | 9.20 (1.19) | 9.19 (.833) | - | 9.12 (1.01) | 1.15 (.30) | 8.77 (1.15) | 8.61 (1.31) | 8.56 (1.00) | 0.57 (.46) |
| Utility of homework <i>M</i> (<i>SD</i>) | - | 7.68 (2.02) | 7.97 (1.96) | 7.82 (1.95) | 3.85 (.06) | - | - | - | - |

* 0 = Negative – 10 = Positive.; S1 = Session 1; S2 = Session 2; S3 = Session 3. **p* < .05; ***p* < .01

therapists reported that the intensity of the emotions they experienced was high. The mean intensity values for all three sessions were $M=7.84$ ($SD=1.02$) and $M=7.64$ ($SD=1.17$), respectively. Therapists perceived that participants were highly engaged in the memory evocation ($M=8.91$; $SD=0.88$). There were no significant differences between sessions in any of these variables. In addition, participants and therapists showed high and significant agreement in their reports of mean valence of emotions [$ICC=0.86$ (95% $CI=0.71-0.93$), $F(31)=7.03$, $p<0.001$] and mean intensity of emotions during memory recall [$ICC=0.68$ (95% $CI=0.35-0.85$), $F(31)=3.16$, $p=0.001$].

Participants performed a mean of 2.77 positive memory recall trials (range=0–7; $SD=1.59$) between sessions 1 and 2, and 2.74 (range=0–6; $SD=1.41$) between sessions 2 and 3. The difference between the two values was not statistically significant ($p>0.05$). The total number of trials performed at home throughout the treatment was 5.52 (1–11; $SD=1.86$). Specifically, the mode was 5 trials (i.e., approximately one trial per day); 67.8% of the participants performed 4 to 6 trials at home, while 22.5% reported practising more intensely (i.e., 7 or more trials). In contrast, only 9.7% reported practising occasionally (i.e., 3 or fewer trials), although all participants practised at home at least once.

Engagement in Warm-up Exercises

Table 2 also shows the mean scores for the participants' assessment of the warm-up exercises. In both exercises (relaxation and visualisation), the degree of compliance was highly rated by the participants themselves, with no significant differences between sessions. The mean score for the perceived degree of compliance was $M=8.13$ ($SD=1.01$) for the relaxation exercise and $M=8.23$ ($SD=0.96$) for the visualisation exercise.

Satisfaction with the Technique

The participants reported being very satisfied with the technique and the sessions. The CSQ-8 mean score was 25.97 ($SD=3.69$) and, in general, as shown in Table 2, very high mean scores were observed in all the aspects addressed, with no significant differences between sessions.

Similarly, therapists' assessments of these aspects were also very positive. Therapists' levels of comfort with the technique increased significantly across sessions, with significant differences between sessions 1 and 3 ($t=-2.97$, $p=0.006$) and between sessions 2 and 3 ($t=-3.52$, $p=0.001$). Therapists also reported an improvement in the quality of the relationship across sessions, with significant differences between sessions 1 and 3 ($t=-4.57$; $p<0.001$) and between sessions 2 and 3 ($t=-3.18$; $p=0.003$).

Relationship Between the Implementation of the Technique and its Effectiveness

No significant relationships were found between, on the one hand, the characteristics of the positive event (centrality of the memory), the characteristics of the memory evocation (number of emotions reflected in the micro-formulation, valence and intensity of emotions, engagement in the memory evocation, the visualization and the relaxation, and number of trials between sessions), or satisfaction (overall satisfaction with the technique, comfort during sessions, usefulness of the sessions and homework, satisfaction with the therapeutic relationship, and willingness to come back to the following session) and, on the other hand, outcome on affect (positive and negative affect) or on difficulties in emotion regulation (general and positive emotions measured). The values of all correlations can be found in Table 3. Only two correlations involving warm-up exercises were statistically significant: the correlation between engagement in the relaxation and effects on difficulties in emotion regulation ($r=-0.38$, $p=0.04$), and between engagement in the visualisation and effects on negative affect ($r=0.44$, $p<0.01$).

Table 3 Pearson correlations between technique implementation and efficacy variables

| | PANAS (+) | PANAS (-) | DERS | DERS-P |
|--|-----------|-----------|--------|--------|
| CES (Centrality of the memory) | -.274 | .215 | .261 | .329 |
| CSQ-8 (Participant satisfaction) | -.036 | -.188 | .164 | .150 |
| Valence of emotions (participant) | .095 | .189 | -.328 | -.267 |
| Valence of emotions (therapist) | .012 | .200 | -.114 | -.187 |
| Intensity of emotions (participant) | .088 | .185 | -.300 | -.229 |
| Intensity of emotions (therapist) | .113 | .216 | -.123 | -.234 |
| Engagement in memory evocation (therapist) | .086 | .098 | -.212 | -.294 |
| Engagement in relaxation (participant) | .087 | .096 | -.373* | -.216 |
| Engagement in visualisation (participant) | .085 | .445** | -.172 | -.159 |
| Comfort during the session (participant) | .085 | .084 | -.254 | -.317 |
| Comfort during the session (therapist) | .221 | .044 | -.016 | -.136 |
| Utility of the session (participant) | .111 | .133 | -.271 | -.051 |
| Utility of the session (therapist) | .136 | .134 | -.181 | -.179 |
| Satisfaction with the therapeutic relationship (participant) | .124 | .010 | -.224 | -.342 |
| Satisfaction with the therapeutic relationship (therapist) | .125 | .111 | .069 | -.011 |
| Motivation to return to the next session (participant) | .116 | .287 | -.216 | -.196 |
| Motivation to return to the next session (therapist) | .251 | .166 | -.173 | -.192 |
| Utility of homework (participant) | .038 | .320 | -.130 | -.022 |
| Number of total trials between sessions | -.109 | .035 | -.165 | -.132 |
| Number of emotions reflected in the micro-formulation | .219 | .128 | .060 | .217 |

* $p < .05$; ** $p < .01$

Discussion

This study describes a 3-session version of the BMAC that was delivered to university students to assess its effects on emotional variables, the characteristics of its implementation, and the relationship between these two aspects. This is the first time a 3-session version of the BMAC has been implemented, as almost all previous studies have described single-session implementations (Holden et al., 2017; Johnson et al., 2012; Mote & Kring, 2019; Panagioti et al., 2012; Pratt et al., 2022). Moreover, the different characteristics and components of the BMAC and of the positive memory evoked were also analysed taking into account both participants' and therapists' perspectives.

In contrast to previous studies (Johnson et al., 2012; Holden et al., 2017; Mote & Kring, 2019; and Panagioti et al., 2012) and the initial hypothesis, no significant effects on positive emotions were obtained. This could be related to a possible 'ceiling effect', as the scores for these emotions at pre-treatment were already high in this sample. Alternatively, these discrepancies could be related to differences in the assessment instruments used to measure positive emotions: the PANAS used in this study and in Mote and Kring (2019), the Types of Positive Affect Scale (Gilbert et al., 2008) used in Holden et al. (2017), and the visual analogue scales for specific positive emotions used in Johnson et al. (2012) and Panagioti et al. (2012). Finally, these differences could be related to the study samples: university students in this study and in Holden et al. (2017), individuals with PTSD in Panagioti et al. (2012), and individuals with schizophrenia in Johnson et al. (2012) and Mote & Kring (2019).

In contrast, the results showed a significant effect of the BMAC on the reduction of negative emotions. The findings of previous research on this topic are heterogeneous. Panagioti et al. (2012), focusing on participants with PTSD, and Holden et al. (2017), focusing on university students, found a significant effect on negative affect, whereas Mote & Kring (2019), working with schizophrenic patients, did not, and Johnson et al. (2012), also using schizophrenic patients, did not even consider these variables. In fact, the effect obtained in this study is greater than that achieved by Holden et al. (2017), also focusing on university students ($d=0.62$ vs. $d=-0.47$), suggesting an improvement in the effect of the BMAC on negative emotions when the number of sessions and the intensity of the treatment are increased, or a greater effect of its face-to-face vs. online implementation, as in Holden et al. (2017). In this line, recently Knagg et al. (2022) have shown great reduction in depression symptoms in college students with suicidal ideation after 6-sessions application of the BMAC.

Furthermore, despite their diversity, there were no significant differences between therapists in terms of the effect obtained. This could be related to the pre-treatment training and supervision meetings conducted throughout the implementation of the BMAC. Moreover, therapists showed a gradual increase in their levels of comfort with the technique and satisfaction with the relationship throughout the sessions, suggesting a progressive mastery of and increased confidence in the implementation of the technique. These could explain, in part, the incremental effect of

implementing a 3-session BMAC versus a single-session BMAC. In this vein, comparison with another version including up-to six sessions (Knagg et al., 2022) would deserve further research.

As expected, both therapists' and participants' levels of engagement in and satisfaction and motivation with the technique were high. Moreover, participants' satisfaction and motivation did not change significantly over the three sessions, suggesting that fatigue, boredom, and habituation were not present in this 3-session implementation of the technique (despite all three sessions focusing on the same positive memory). Furthermore, the participants' engagement in the different tasks (relaxation, visualisation, and memory recall) was high and did not decrease over the course of the sessions. Participants' high levels of involvement in the technique were also manifested in the high rate of homework completion. In short, these data show positive acceptance of the technique.

The sustained high levels of satisfaction and engagement, in addition to the larger effect size compared to previous single-session implementations, may be indicative of the potential benefits of the 3-session version of the BMAC described in this study. The brevity and applicability of this technique suggest that the BMAC could be used to facilitate the implementation and enhance the effect of several techniques aiming to reduce the negative affect that are less well-received by patients, such as trauma-focused techniques used to treat PTSD (Contractor et al., 2018). Although our results do not show an increase in positive emotions, as proposed by TARRIER (2010), the reduction of negative emotions would facilitate the therapeutic process and support the use of the BMAC in conjunction with other techniques or as part of broad psychological therapies. That would allow to improve processes such as emotional regulation, the increase of coping strategies or the therapeutic alliance with the expected positive consequences in the therapeutic process that this would entail (Hofmann & Hayes, 2019). In this sense, further research to test the effect of BMAC in isolation or as a complement to already established treatment packages would be enlightening.

As a novelty, this study analyses the characteristics of the positive memory evoked and their potential influence on the effect of the BMAC. Although several authors suggest that more recent positive memories should be selected for enhanced vividness (Contractor et al., 2018; TARRIER, 2010), our results did not reveal any significant relationship between memories, evocation features, involvement, and satisfaction, on the one hand, and the effect of the BMAC, on the other hand. This could be explained by the low variability of these variables (e.g., centrality of the positive event evoked and satisfaction and involvement scores) in our sample. Further research into the effect of these phenomena is needed to better understand how the technique works and how best to apply it.

It is also important to highlight the utility of the micro-formulation for exploring and defining positive memories. This procedure, which has been included in this version of the BMAC, was originally developed for dealing with negative memories (Hackmann et al., 2011). In this study, most of the micro-formulations were rich in detail and served as a basis for adding extra detail in later sessions to make the recall more accurate. The data suggest that the micro-formulation has been successfully integrated into the protocol for the technique and has helped in its implementation.

The use of standardised tools such as this could be helpful for therapists who are unfamiliar with the technique and could help patients perform the task more satisfactorily. However, further research into its effect and usefulness is required.

Our study has several limitations that should be taken into consideration. Firstly, the sample size was very limited, and no control group was used. This, together with the low variability of some of the scores, may have meant that correlations of interest to the study (e.g., correlations relating to the characteristics of the selected memories) were not detected. In addition, the small sample size means that the power of the analyses of the effect of the technique is very low, which may have increased the type 2 error. Secondly, no monitoring was conducted to ascertain whether the effects found persist over time. This is a prevalent problem in BMAC research, with only Panagioti et al. (2012) and Holden et al. (2017) including two-day and two-week follow-ups respectively; both studies found that the effects were temporary. Only Pratt et al. (2022) considered a significant follow-up period (i.e., one month), finding significant effect in a small sample of only 9 participants. Therefore, this issue should be improved in future research. Thirdly, this study was conducted with a non-clinical, all-female population, which limits the generalisability of the results and the effect of the technique. It could be expected a greater effect with clinical non-schizophrenic samples. In addition, variables of interest, such as whether the participants had had previous psychotherapeutic treatments or the presence of psychopathological symptomatology, were not measured. Finally, variables about the implementation of the technique have been measured with ad hoc Likert-type scales that have not been validated in previous studies. What is more, Cronbach's alpha of the DERS-P was just within the limit of acceptability. This issue could have affected the results.

In conclusion, this study has provided data on aspects of the implementation of the BMAC that had not been addressed in previous research, demonstrating that the 3-session version of this technique does not decrease satisfaction or motivation among therapists or patients (levels were high at all times) and reporting significant results on the reduction of negative affect and difficulties in regulating negative emotions (with large effect sizes). These results suggest that the incorporation of BMAC, a concise and widely accepted technique in our study, into comprehensive treatment packages could be potentially useful. It would possibly contribute to enhancing therapeutic effects and facilitate the application of other techniques that could cause emotional distress and lead patients to refuse or abandon treatment. Nonetheless, the potential of BMAC as an adjunctive treatment for several problems remains to be explored.

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Declarations

Conflicts of Interest The authors declare that they have no competing interests.

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