

# A Therapeutic Tool for Boosting Mood: The Broad-Minded Affective Coping Procedure (BMAC)

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**Abstract** The broaden-and-build theory of emotions suggests that positive emotions such as happiness and hope expand thought-action repertoires and support the building of resources and resilience to a variety of psychological disorders. Even brief, transient experiences of positive emotions have been found to increase resilience measured one month later, suggesting a role for clinical mood inductions. This study presents a preliminary test of the new Broad-Minded Affective Coping (BMAC) procedure, a positive emotion induction technique involving the recall of positive autobiographical memories. Fifty people with schizophrenia-spectrum disorders were randomly allocated to a condition where they either experienced the BMAC or a control procedure. Participants who took part in the BMAC showed greater increases in both hope and happiness. These results suggest that the BMAC represents a practical and effective method for boosting mood amongst individuals with psychosis-spectrum disorders.

**Keywords** Broaden-and-build · Positive emotions · Psychosis · Schizophrenia · Resilience · Positive clinical psychology

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This research was conducted whilst the first and fifth authors were based at the University of Manchester.

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## Introduction

The broaden-and-build theory of emotions (Fredrickson 1998, 2001) suggests that positive emotions, such as happiness, hope and contentment, serve to expand the range and scope of thoughts and actions in which an individual engages (Fredrickson and Branigan 2005). These broadened thought-action repertoires are believed to support the building of social and physical resources and trigger upward spirals into wellbeing (Fredrickson and Joiner 2002). Recently, it has been suggested that positive emotions may also support the therapeutic process by enabling the individual to reflect more positively, to integrate these positive reflections into their self-concept and worldview, and to take positive actions (Tarrrier 2010).

The newly developed broad-minded affective coping (BMAC) method is a mood induction technique which aims to boost mood through the recall of past positive memories (Tarrrier 2010). The BMAC is designed to be used in conjunction with psychological therapy in order to facilitate the therapeutic process, and may be useful for increasing feelings such as happiness and hope in therapeutic settings (Tarrrier 2010). The current research aimed to conduct the first empirical study investigating whether the BMAC is an effective positive mood induction technique. In particular, the research aimed to test whether the BMAC was more effective for the short term boosting of feelings of happiness and hope compared to a control task amongst a sample of individuals with psychosis.

Traditionally, psychological therapies have tended to focus on the reduction or elimination of negative experiences, thoughts and emotions. This may be an intuitive response when faced with individuals suffering from depression, anxiety or positive symptoms of psychosis (Sheldon and King 2001), but it has been suggested that the

incorporation of interventions designed to boost positive emotions could optimise treatment (Seligman et al. 2005; Wood and Tarrrier 2010). Consistent with this, the broaden-and-build theory of emotions suggests that positive emotions may have several benefits which could enhance well-being. Specifically, it proposes that whilst negative emotions tend to narrow cognitions and actions, positive emotions are associated with broadened cognitions and behaviours (Fredrickson 2001). For example, whereas fear results in the desire to escape, joy is thought to lead to creativity and the urge to play (Fredrickson 2001). These broadened thought-action repertoires are thought to assist the individual in building social and material resources which, in turn, are thought to support the experience of positive emotions (Fredrickson 2001; Garland et al. 2010).

The broaden-and-build theory has since been supported by a wide body of research. This has found that positive affect or subjective happiness is associated with a range of positive outcomes such as mental well-being, physical health and occupational success both cross-sectionally and longitudinally (for a review, see Lyubomirsky et al. 2005). Furthermore, the benefits of positive emotions are not negated by the presence of negative emotion (Cohn et al. 2009) and positive emotions may have an ‘undoing’ impact on the effect of negative emotions (Fredrickson and Levenson 1998). Indeed, even brief, transitory experiences of positive affect have been found to have a positive impact on subsequent life satisfaction and resilience (Cohn et al. 2009).

Findings from research into the broaden-and-build theory of positive emotions may have particular relevance amongst individuals with diagnosis of a psychosis-spectrum disorder. This group demonstrate increased levels of negative affect (MacDonald et al. 1997; Salkovskis et al. 2000; Smith et al. 2006), and Anhedonia. Anhedonia is known to increase the likelihood of subsequently developing psychosis amongst at-risk individuals (Kwapil 1998), and predicts a more chronic course of the disorder in diagnosed individuals (Herbener et al. 2005).

Anhedonia has been described as the inability to experience positive emotions (Blanchard et al. 1998; Harvey et al. 2009), but a review of the research suggests that this may be an oversimplification of the data (Kring and Moran 2008). Instead, it is suggested that individuals with psychosis may *anticipate* experiencing less pleasure in response to positive experiences, but could in fact experience similar levels of positive emotion “in the moment”, in response to positive experiences to controls (Kring and Moran 2008). A recent study has extended this research by measuring electrophysiological responses to differently valenced stimuli amongst individuals with schizophrenia and controls (Horan et al. 2010). Results demonstrated similar patterns of electrophysiological response to

positive, negative and neutral images “in the moment”, but suggested that individuals with schizophrenia may have a disruption in sustained emotion processing (Horan et al. 2010). From these studies it could be postulated that the reduction in reported positive emotion amongst individuals with psychosis may be due to a deficit in sustained emotional processing and may lead to reduced anticipatory pleasure.

In order to address negative affect and Anhedonia, therapeutic techniques should aim to help individuals with psychosis to understand the role of positive experiences in generating positive emotions, as this may help to increase pleasure anticipated in response to these events (anticipatory pleasure). Furthermore, it may be useful to use therapeutic techniques which enable individuals to experience positive emotions for extended periods of time. This could (a) demonstrate this link between positive experience and positive emotion in situ, and (b) enable individuals to rehearse the processing of positive emotional stimuli, potentially increasing the ability to sustain attention and process emotions experienced in relation to such stimuli. By addressing the difficulties associated with Anhedonia, techniques which incorporate these aspects may help individuals with psychosis to help build resources which could both aid recovery and support the development of resilience in this group.

One method which may help individuals to both experience positive emotions and understand the link between positive experience and positive emotions could be the recently developed broad-minded affective coping procedure (BMAC; Tarrrier 2010). Based on evidence of an association between autobiographical memories and current affect (Ruiz Caballero and Moreno 1993) and a role of mental imagery in emotional disorders (Hackmann et al. 1998), the BMAC is a brief mood induction technique which aims to boost mood through the cued recall and reliving of a personal positive memory. When taking part in the BMAC, the client receives prompts in the form of questions or suggestions from the therapist to assist them in scaffolding the visual, sensory, emotional and cognitive aspects of the memory. The aim of this is to enable the individual to recall the memory in as much detail, and as vividly as possible.

Tarrrier (2010) suggests that there may be several benefits of using the BMAC as an adjunct to psychological therapy. In particular, it may: (a) facilitate engagement with the client by performing a positive task, (b) enable the development of a greater ability to focus attention on positive memories and achieve a balance of positive and negative memories, (c) improve emotional regulation ability, (d) improve attentional control, (e) enable the development and implementation of a coping strategy, (f) increase awareness of how cognition and attention

affect emotions, and (g) act as a behavioural experiment to challenge negative expectations of emotional control and experience. The effectiveness of the BMAC as a mood induction technique in clinical settings has been supported by narrative case-study evidence (Tarrier 2010), but it has yet to be investigated empirically.

A further benefit of the BMAC technique is that it may be particularly effective for boosting feelings of hopefulness, due to its use of the client's autobiographical memories. This proposition is based on research which suggests that specific autobiographical memory recall is linked to the ability to generate positive future expectancies (D'Argembeau et al. 2008; Evans et al. 1992; Williams et al. 1996). This possibility is particularly important amongst individuals with psychosis who show lower levels of hope (Aguilar et al. 1997) and in whom reduced hope is associated with poor clinical outcomes and suicide risk (Tarrier et al. 2004).

Thus, the BMAC may represent a useful clinical tool to use in adjunct to psychological therapy. In particular, it may be an effective technique to use amongst individuals with psychosis. However, the BMAC has yet to be empirically tested amongst this group and its effectiveness cannot be assumed for four main reasons. First, individuals with non-affective psychosis tend to demonstrate increased levels of negative affect (Salkovskis et al. 2000) and Anhedonia (Blanchard et al. 1998; Harvey et al. 2009). Indeed, Anhedonia is thought to be a clinically significant aspect of schizophrenia which is inadequately treated by the majority of psychosocial and pharmacological treatments currently available (Horan et al. 2006). As Anhedonia has also been found to predict a more chronic course of schizophrenia, (Herbener et al. 2005), this could be a key area for interventions to address. However, the treatment-resistant nature of Anhedonia could potentially limit the effectiveness of direct mood-boosting inductions such as the BMAC. Second, individuals with psychosis have been found to have a reduced ability to access autobiographical memory (Corcoran and Frith 2003; Neumann et al. 2007). In particular, it has been found that they produce fewer autobiographical memories in response to prompts than controls, and fewer specific memories (Neumann et al. 2007). As the BMAC requires clients to recall memories in a high level of detail, including sensory and emotional aspects, it might be expected that individuals with psychosis would find it difficult to engage with the mood induction process. Third, individuals with psychosis have been found to demonstrate a reduced ability to sustain attention (Addington and Addington 1997; Holmén et al. 2010). This may limit the extent to which individuals can focus on the BMAC which requires sustained attention for around 10–20 min, and so limit the impact of the mood induction. Fourth, individuals with psychosis report

experiencing a higher rate of negative life experiences than the general population (Bebbington et al. 1993). Although the BMAC requires clients to access positive memories, individuals in this group could be expected to find this difficult and there is the possibility that clients will instead find themselves reminded of negative memories.

These reasons are unsubstantiated possibilities, but they do emphasise the importance of providing evidence that the BMAC is an effective tool in this group, as this cannot be assumed. To date, evidence for the effectiveness of the BMAC has been provided by Tarrier (2010), who reports a case-series conducted amongst individuals with PTSD and depression. However, the BMAC has yet to be tested empirically and it has yet to be investigated amongst individuals with schizophrenia-spectrum disorders. Consequently, the current study aimed to investigate whether the BMAC was a more effective technique for boosting feelings of happiness and hopefulness amongst individuals with psychosis than a control condition. It was predicted that participants allocated to the BMAC condition would show significantly greater increases in both happiness and hope following the mood induction than individuals in the control condition.

## Methods

### Participants

Participants were outpatients in mental health services in the North West of England who were recruited as part of a wider research study into psychosis and suicidality through contact with their keyworker or appropriate health care professional. Community mental health teams, early intervention services, assertive outreach teams, supported housing associations and voluntary organisations assisted with recruitment. After referral, participants were interviewed by a research psychologist (JJ). There were four criteria for the study, (1) a clinical diagnosis of a schizophrenia spectrum disorder based on ICD-10 confirmed by the research team (e.g., schizophrenia, psychosis not otherwise specified, schizoaffective disorder), (2) aged 18 years or over; (3) English-speaking; (4) able to provide informed consent as judged by their keyworker or appropriate healthcare professional. Participants were excluded if organic disorder or drug use was judged to be the primary diagnosis and main cause of the psychosis. The study was approved by an NHS research ethics committee.

### Sample Size Calculation

In order to estimate an appropriate sample size, a power analysis was conducted using G\*Power 3 computer

software (Faul et al. 2007). The analysis estimated the necessary sample size for an ANCOVA with two conditions and one covariate for an independent variable to detect a large effect size ( $f = 0.5$ ). A large effect size was predicted due to (a) a large body of literature suggesting a strong association between memory and mood (e.g., Johnson et al. 2008; Kliegel et al. 2005; MacCallum et al. 2000; Ruiz Caballero and Moreno 1993) and (b) recent research which found a large effect size for the difference in mood between participants asked to recall either positive or negative autobiographical memories (Gillihan et al. 2007). Further, we were not interested in detecting anything less than a large effect size as this was the size at which we deemed the technique would be of use to clinical practice. This analysis suggested that a total sample of size of 55 would be sufficient to detect this effect.

## Measures

### *Beck Depression Inventory-II (BDI-II; Beck et al. 1996)*

This 21-item scale aims to measure symptoms of depressed mood such as “sadness” and “worthlessness” which have been experienced over the past 2 weeks. Items are responded to on a four-point scale which is scored from 0 to 3. For example, for the item “sadness”, possible responses include (a) I do not feel sad, (b) I feel sad much of the time, (c) I am sad all the time, and (d) I am so sad or unhappy that I can’t stand it. Possible scores range from 0 to 63. BDI-II scores have been found to distinguish individuals with a diagnosis of Major Depressive Disorder from individuals without depression ( $d = 2.51$ ; Arnau et al. 2001), and amongst individuals with a diagnosis of schizophrenia, BDI-II scores have been found to converge with clinician-rated depression ( $r = .45$ ,  $p < 0.001$ ; Chemerinski et al. 2008).

### *Suicidal Behaviours Questionnaire-Revised (SBQ-R; Osman et al. 2001)*

This four item questionnaire measures past history of suicidal thoughts and behaviours, recent suicidal thoughts and future likelihood of suicide attempt. Questions include “Have you ever thought about or attempted to kill yourself?” and “How often have you thought about killing yourself in the past year?”. Total scores indicate where an individual lies on the continuum of suicidality (range = 3–18). SBQ-R scores have been found to distinguish between suicidal and non-suicidal individuals in samples of high school students ( $d = 2.91$ ), undergraduate students ( $d = 2.56$ ), adolescent psychiatric inpatients ( $d = 2.56$ ) and adult psychiatric inpatients ( $d = 1.86$ ; Osman et al. 2001).

## *Measure of Current Mood*

Participants were asked to mark their mood on two visual analogue scales (VASs) measuring how hopeful and happy they were feeling at that moment. Each VAS was a 100 mm vertical line, with the bottom of the line representing an absence of the emotion (e.g. “Not at all hopeful”) and the top of the line representing high levels of the emotion (e.g. “Very hopeful”). Participants were required to draw a dash across the line at any point which reflected their current mood. VASs were chosen as they represent a brief method for measuring mood amongst clinical samples which converges with longer mood questionnaires including the Beck Depression Inventory (Beck et al. 1996; Davies et al. 1975; Folstein and Luria 1973) and they have been found to show good test–retest reliability over the space of 1 h ( $r = .85$ ; Ahearn and Carroll 1996). Furthermore, previous studies have found that they are an effective method for capturing mood fluctuations which occur in response to experimental mood inductions (Goldstein and Willner 2002; Johnson et al. 2008; Liverant et al. 2008).

Supporting their concurrent validity, VAS happiness and hope scores at baseline were found to correlate negatively with both depression measured with the BDI-II, ( $r = -.40$ ,  $p < .01$  and  $r = -.36$   $p < .05$ , respectively) and suicidality measured with the SBQ-R ( $r = -.34$ ,  $p < .05$  and  $r = -.31$ ,  $p < 0.05$ , respectively).

## Procedure

Participants provided written consent to take part in the research. The session then began with the completion of the BDI-II, the SBQ-R and the VASs, after which participants were randomly allocated to either the BMAC condition or the control condition. Following this, participants completed the VASs a second time. Thus the second assessment took place immediately after completion of the BMAC or control task. Participants were not asked to complete the SBQ-R and the BDI-II a second time, following the mood induction. This was because the SBQ-R measures lifetime prevalence of suicidality and the BDI-II measures depression over the previous 2 weeks, and so these were not expected to change during the time-span of the study. There were two purposes of using the BDI-II and the SBQ-R at baseline. The first of these was to provide a method for validating the VAS measures of happiness and hope by demonstrating an inverse correlation between these VAS measures and clinical measures of negative mood and suicidality. The second was to provide a description of the study sample in order to demonstrate the extent to which the present findings may generalise to other clinical populations. Prior to taking part in the BMAC, the procedure and its purpose were explained to the participant.

**Table 1** The five phases of the broad-minded affective coping (BMAC) procedure and example prompts

Stage	Aim	Example prompts
Preparation stage	To relax and facilitate the experience of positive emotions and associate a relaxed physical state with positive memories	“Ensure that your body is resting comfortably” “Focus on your breathing. Every time you breath out let your body relax a bit more”
Guided imagery of positive memories	To create a vivid mental image	“Look all around the room” “What can you see?”
Engaging the senses	To recall all sensory aspects of the memory	“What can you smell?” “What sounds can you hear, what’s the background noise?” “Take a sip of your drink”
Exploring emotions	Re-experiencing the emotions related to the memory	“Which emotions were you experiencing? Re-create those emotions” “How did you feel at that moment?”
Interrogating the memory	To develop explicit positive appraisals associated with the memory and to strengthen the association between these, the memory, and the positive emotions	“What was it about that moment that made you feel that way?” “What was it about that day that was important?”

Prompts are used to enable visualisation of the memory

The BMAC itself then consisted of roughly five stages, which are outlined in Table 1.

Once the BMAC had been practiced once, participants discussed their experience of the procedure and any difficulties they had with the researcher before repeating it a second time. Altogether, this took around 20 min. A detailed description of the BMAC procedure is provided in Tarrier (2010).

#### Control Task

The control task consisted of relaxing and listening to 20 min of classical music without lyrics. At the beginning of the task, participants were instructed to make themselves comfortable, relax and enjoy the music.

#### Analysis Strategy

In order to investigate whether the BMAC boosted hope more effectively than the control task, an ANCOVA was conducted to investigate whether condition could predict post-induction hope whilst covarying for baseline hope. This ANCOVA was then repeated to investigate whether the BMAC also boosted happiness.

## Results

#### Participant Characteristics

A total of 51 participants were recruited into the study. One of these subsequently withdrew prior to data collection due to self-reported concentration difficulties. Of the final

sample of 50 (12 female;  $M_{age} = 43.1$  years,  $SD = 11.9$ ), 25 were randomly allocated to the BMAC condition (5 female;  $M_{age} = 44$  years,  $SD = 12.5$ ) and 25 were allocated to the control condition (7 female;  $M_{age} = 42.2$  years,  $SD = 11.5$ ). The majority of participants were white ( $n = 44$ , 88 %), then Mixed British ( $n = 2$ , 4 %), Asian ( $n = 1$ , 2 %), and African ( $n = 1$ , 2 %), with ethnicity data missing for two participants. The majority of participants had a diagnosis of schizophrenia ( $n = 45$ , 90 %) then schizoaffective disorder ( $n = 4$ , 8 %) and atypical psychosis ( $n = 1$ , 2 %). Descriptive data for the sample regarding depression measured by the BDI-II, suicidality measured by the SBQ-R, age of onset, duration of untreated psychosis and time since last relapse are presented in Table 2.

Depression measured with the BDI-II (see Table 2) was not significantly lower than that found amongst other samples with a diagnosis of schizophrenia ( $d = 0.29$ ; Waters et al. 2003) and higher than that reported amongst non-clinical samples ( $d = 0.51$ ; MacDonald et al. 1997). Suicidality measured by the SBQ-R (see Table 2) was substantially higher than that found amongst non-clinical participants ( $d = 0.92$ ; Johnson et al. 2010). These findings suggest that the results from the present study may be generalisable to other clinical populations of individuals with psychosis-spectrum disorders who are experiencing depression and suicidality.

#### Group Characteristics

BDI-II scores, SBQ-R scores, and descriptive statistics for age of onset of psychosis, duration of untreated psychosis and time since last relapse are displayed for the overall

**Table 2** Means and standard deviations<sup>a</sup> for depression, suicidality, age of onset of psychosis, duration of untreated psychosis and time since last relapse across the sample and in each condition<sup>b</sup>

	Total Sample	BMAC condition	Control condition
Depression, (BDI-II), $n = 50$	9.68	10.36	9.00
	<i>9.45</i>	<i>9.16</i>	<i>9.88</i>
Suicidality (SBQ-R), $n = 50$	8.78	8.68	8.88
	<i>3.65</i>	<i>3.83</i>	<i>3.55</i>
Age at onset (years), $n = 42$	23.43	23.67	23.19
	<i>10.06</i>	<i>11.78</i>	<i>8.29</i>
Duration of untreated psychosis (weeks), $n = 41$	133.51	152.81	113.25
	<i>221.82</i>	<i>282.56</i>	<i>136.75</i>
Time since last admission (weeks), $n = 43$	244.95	220.70	272.85
	<i>377.79</i>	<i>455.01</i>	<i>272.49</i>

*BDI-II* beck depression inventory-II (Beck et al. 1996). *SBQ-r* suicidal behaviours questionnaire-revised, Osman et al. 2001)

<sup>a</sup> Standard deviations appear in italics below the means

<sup>b</sup> The number of participants for whom this data were available for each variable is indicated within the first column of the table

**Table 3** Means and standard deviations<sup>a</sup> for happiness and hope in each condition

Condition	Happiness			Hope		
	Baseline	Post-induction	Effect size ( $d$ )	Baseline	Post-induction	Effect size ( $d$ )
BMAC	6.69	8.07	0.63	6.29	7.56	0.44
	<i>2.53</i>	<i>1.75</i>		<i>2.91</i>	<i>2.90</i>	
Control	5.99	6.62	0.26	6.54	6.40	0.06
	<i>2.63</i>	<i>2.29</i>		<i>2.18</i>	<i>2.18</i>	

<sup>a</sup> Standard deviations appear in italics below the means

sample also split by group in Table 2. Independent  $t$  tests were conducted to investigate whether there were any significant differences between groups for these variables. Results suggested there were no significant differences (all  $ps > 0.1$ ).

#### Assessing the Impact of the BMAC

##### Hope

As can be seen in Table 3, baseline hope appeared to be roughly equivalent in each condition at baseline, but higher amongst individuals in the BMAC condition post-induction. In order to assess this post-induction difference, an ANCOVA was conducted. This found a significant impact of condition upon post-task hope whilst covarying for baseline hope,  $F(1, 47) = 6.37$ ,  $p < .05$ . Hope scores (and confidence intervals) for each condition are displayed in Fig. 1a.

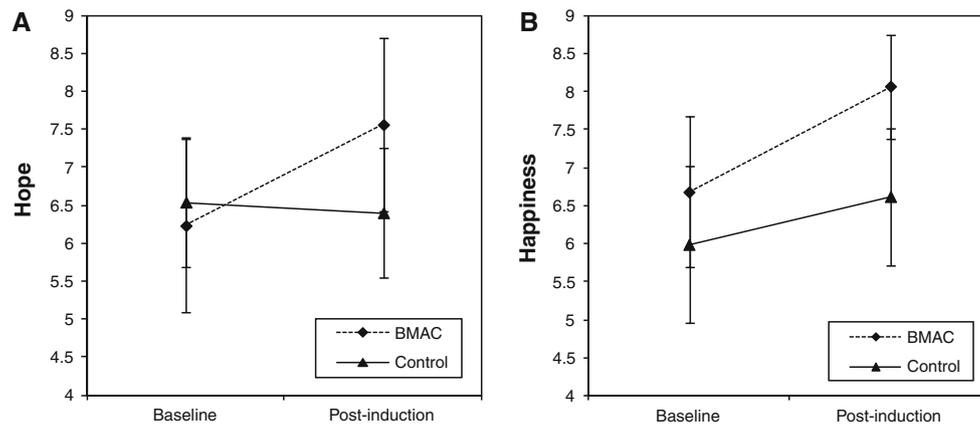
##### Happiness

Happiness scores appeared to be slightly higher amongst individuals in the BMAC condition at baseline (see

Table 3). Happiness scores appeared to increase in both conditions at post-induction, but this increase was greater amongst individuals in the BMAC condition. In order to assess this post-induction change whilst controlling for the difference in baseline scores, an ANCOVA was conducted. This found a significant impact of condition upon post-task happiness whilst covarying for baseline happiness,  $F(1, 47) = 5.89$ ,  $p < .05$ . Happiness (and confidence intervals) for each condition have been plotted in Fig. 1b.

#### Discussion

The current study investigated the broad-minded affective coping (BMAC) procedure, which is designed to be used in conjunction with psychological therapies as a brief technique to boost positive emotions in clinical settings. Accordingly, the main aim of the study was to investigate whether BMAC was more effective than a control task for boosting feelings of happiness and hope in a sample of individuals with psychosis. Supporting our prediction, the results demonstrated significantly greater increases in



**Fig. 1** Self-reported hope (a) and happiness (b) at baseline and post-induction, including confidence intervals, in the Control condition and the BMAC condition

self-reported happiness and hopefulness amongst individuals who took part in the BMAC than those in the control condition who listened to music. These results support previous narrative evidence from a case-series report which found the BMAC to be an effective mood-boosting procedure used as an adjunct to psychological therapy amongst individuals with PTSD and depression (Tarrier 2010), and expand on this in three main ways.

First, the current results are the first empirical findings supporting a mood-boosting impact of the BMAC procedure. Although narrative support for the BMAC has been provided (Tarrier 2010), the current study adds to this by demonstrating that the BMAC was more effective for boosting self-reported mood than a control task. Further supporting the effectiveness of the BMAC was the finding that the participants also found that the control task, which involved listening to classical music, increased their subjective happiness. Indeed, the potential for music to boost mood has previously been noted, and it has been suggested that it may have therapeutic value (Smith and Noon 1998). However, the current results suggest that BMAC boosted mood more effectively than music, and could be a particularly useful tool in this respect.

The importance of boosting mood has been highlighted by the broaden-and-build theory of positive emotions and the body of research that this has inspired. Broaden-and-build theory suggests that positive emotions widen cognitions and the scope of behaviours an individual engages in, which serves to help the individual build resources and resilience (Fredrickson 2001). These suggestions have been supported by evidence suggesting that self-reported happiness and positive mood can predict a range of outcomes longitudinally, including marital well-being (Ruvolo 1998), job satisfaction (Diener et al. 2002) and income level (Diener et al. 2002). A recent study found that even

transient, in-the-moment experiences of positive emotions can predict higher levels of trait resilience and self-reported life satisfaction one month later (Cohn et al. 2009). The current findings suggest that taking part in the BMAC can help to provide these in-the-moment boosts in emotion, and could be an important adjunct to psychological interventions seeking to build resilience and lead to recovery. Indeed, although the BMAC may have positive effects in its own right, it is best construed as a springboard to other clinical strategies facilitated by an improvement in mood, albeit brief. For example, the BMAC could be used to promote and facilitate engagement in positive behaviour or behaviour change, or to enhance positive appraisals and interpretative judgements.

Second, the current results suggest that the BMAC is not only useful for boosting positive affect or ‘happiness’ in general, but may also be an effective tool for boosting feelings of hope, specifically. This is particularly interesting, as research suggests that low levels of hope increase risk for developing subsequent depressive symptoms (Alford et al. 1995) and suicidality (Beck et al. 1985; Lester 2006; O’Connor et al. 2000). Potentially, the impact of the BMAC procedure on hope may be due to its activation of autobiographical memory. The ability to access this type of specific, episodic memory has been associated with the ability to generate positive future expectancies and hope (D’Argembeau et al. 2008; Evans et al. 1992; Williams et al. 1996). Furthermore, this process is known to be affected by mood, with low mood having a deleterious impact (Dalgleish et al. 2001; Johnson et al. 2008). By acting to boost mood and access autobiographical memory in tandem, the BMAC may be a particularly efficient method for retrieving specific episodic information and thus increasing the ability to generate future expectancies and hope.

Third, the current study is the first to investigate the BMAC amongst individuals with psychosis. Previously, evidence in favour of the BMAC has come from narrative case studies of individuals with PTSD and depression (Tarrier 2010), but the current results provide empirical evidence supporting its utility amongst individuals with schizophrenia-spectrum disorders. Investigating methods of boosting happiness and hope in this population is particularly important, as they tend to report higher levels of depression (MacDonald et al. 1997; Salkovskis et al. 2000; Waters et al. 2003), hopelessness (Aguilar et al. 1997) and Anhedonia (Blanchard et al. 1998; Harvey et al. 2009) than non-clinical samples. Indeed, the evidence that this group tends to demonstrate higher levels of negative affect (Blanchard et al. 1998; Salkovskis et al. 2000) in addition to deficits in autobiographical memory (Corcoran and Frith 2003; Neumann et al. 2007) and attention span (Addington and Addington 1997; Holmén et al. 2010), and higher rates of previously experienced negative events (Bebbington et al. 1993) might have been expected to affect the practicality or effectiveness of the BMAC. However, the current results suggest that the BMAC is not only a procedure which individuals with psychosis are able to engage in, but also one that boosts both subjective happiness and hope.

Furthermore, the results of the study may also have implications for the treatment of Anhedonia, which is often experienced by individuals with psychosis and predicts a more chronic course of the disorder (Earnst and Kring 1997; Herbener et al. 2005). It has been suggested that Anhedonia is a reduction in anticipatory pleasure (Kring and Moran 2008) which may be associated with a deficit in sustained processing of emotion (Horan et al. 2010). By encouraging participants to initiate a positive experience (the recall of the positive memory) and reflect upon the emotional impact of this, the use of the BMAC procedure may enable individuals to understand the links between positive experience and positive emotion and thereby increase anticipated positive emotion for future events. Furthermore, the BMAC procedure is 20 min long, and practicing this regularly may have the potential to improve sustained emotional processing. Although these possibilities were not tested by the current study, these areas may be interesting avenues for future research.

There were three main limitations of the research. First was the use of Visual Analogue Scales (VASs) to measure mood. These are single-item scales, and as such, may not have captured the full concepts of 'hope' and 'happiness'. However, the use of these scales was deemed appropriate in the current study, as previous research suggests they are responsive to the mood fluctuations which occur in response to experimental mood inductions (Goldstein and Willner 2002; Johnson et al. 2008; Liverant et al. 2008). Furthermore, scores on these measures are known to

converge with longer measures of mood such as the Beck Depression Inventory (Davies et al. 1975; Folstein and Luria 1973), which was also found in the present study. The second limitation related to the investigation of an isolated and brief experience of the BMAC. This procedure is designed to be used in a more consistent, repeated manner as part of longer-term interventions. Repeated practice is thought to improve concentration and engagement with the memory (Tarrier 2010), and as such, the current study may not reflect the full impact which the BMAC may have when it is used in context. For this reason, the current study should be regarded as a preliminary investigation on the short term effects of the BMAC compared to another potentially mood enhancing method, and further research investigating the long-term impact of the BMAC is necessary. The third limitation was the sample size which at 50, was five below that which was estimated by the power analysis. However, this was only a slight reduction on the estimated sample size, and could have been expected to cause Type II error, rather than Type I error. As the impact of the BMAC on mood was significant despite this, the sample size used in the study does not appear to have been a significant limitation.

## Conclusions

In summary, the current study sought to investigate whether the BMAC procedure could boost self-reported happiness and hopefulness amongst individuals with psychosis. Results suggested that the BMAC was both a practical and useful tool for boosting mood amongst this population, and may be useful to incorporate into psychological interventions.

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