

**Mental imagery and emotion in treatment across disorders:
Using the example of depression**

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Invited Article: Special Issue of Cognitive Behaviour Therapy: What Makes Therapy Work?

Mental imagery and emotion in treatment across disorders: Using the example of depression

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Abstract

Abnormalities in mental imagery have been implicated in a range of mental health conditions. Imagery has a particularly powerful effect on emotion and as such plays a particularly important role in emotional disorders. In depression, not only is the occurrence of intrusive negative imagery problematic, but the lack of positive (in particular, future-directed) imagery is important. We also suggest in depression that imagery can exacerbate the effects of interpretation bias. This paper outlines an experimental psychopathology subcomponents model of depression, which focuses specifically on the role that imagery and interpretation bias play in the maintenance of the disorder. We propose that negative intrusive imagery, a lack of positive imagery and negative interpretation bias serve both independently and interactively to maintain depressed mood. Finally, we consider the implications of this imagery-based approach for the development of new cognitive treatments in this area.

Key words: Mental imagery; interpretation bias; depression; intrusive memories; emotion

Mental imagery and emotion in treatment across disorders: Using an example of depression

Why consider mental imagery and emotion in treatment across disorders?

Abnormalities in mental imagery are problematic across a range of different psychological disorders. Mental imagery has been described as the experience of ‘seeing with the mind’s eye’; ‘hearing with the mind’s ear’ and so on (Kosslyn, Ganis, & Thompson, 2001). Such mental imagery can be of the past or future, and can be either voluntary (deliberately generated) or involuntary (coming to mind spontaneously and ‘unbidden’).

In cognitive behaviour therapy (CBT), cognitions are assumed to take the form of either verbal thoughts or mental images. The dominant focus has traditionally been on verbal thoughts, although since its inception, cognitive therapy has also emphasised the role of mental imagery (Beck, 1976). Figure 1 illustrates how CBT “does exactly what it says on the tin”. That is, it tackles the two types of cognitive ‘ingredients’ that need to be modified – verbal thoughts and mental images. For the best treatment results, clearly we need to target the most toxic cognitions. We have previously argued that mental imagery has a particularly strong impact on emotion, and therefore provides a particularly important treatment target (Holmes & Mathews, 2005).

In what psychological disorders does negative emotional imagery occur?

Intrusive, affect-laden images constitute a hallmark symptom of post-traumatic stress disorder (PTSD). For example, following an assault a patient may ‘re-experience’ the event through sensory and affective flashbacks such as “feeling like I am being stabbed in the chest” (Holmes, Grey, & Young, 2005, p.8). However, intrusive images cause distress across a range of psychological disorders (Hirsch & Holmes, 2007), with well known examples including social phobia and depression,

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3 but additionally agoraphobia, obsessive compulsive disorder, spider phobia, bulimia,
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5 substance misuse, and suicidality. Interestingly, it is the *absence* (or ‘pushing away’)
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7 of imagery that characterises some other disorders such as generalised anxiety
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9 disorder (Hirsch & Holmes, 2007).
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12 *Why might imagery be important in making therapy work across psychological*
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14 *disorders?*
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17 Importantly for our distinction between verbal and imagery based cognitions,
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19 evidence shows that imagery has a more powerful impact on emotion than its verbal
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21 counterpart (Holmes & Mathews, 2005; Holmes, Mathews, Dalgleish, & Mackintosh,
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23 2006; Holmes, Mathews, Mackintosh, & Dalgleish, 2008). Holmes and Mathews
24
25 (2005) suggest there are several reasons why imagery may have such a powerful
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27 impact on emotion. Imagery has perceptual correspondence to sensory experience,
28
29 “as if” it were really happening. That is, it is possible for imagery to directly provoke
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31 emotion in a similar manner as a real percept. For example, the neural representation
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33 of visual imagery is similar to that produced by actual visual performance (Sirigu &
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35 Duhamel, 2001). Relatedly, imagery can be used to access autobiographical
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37 memories and their associated emotions. Imagery can ‘hijack’ attention through its
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39 highly absorbing nature and sense of ‘now-ness’ and ‘real-ness’, for example, as
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41 experienced in flashbacks to a traumatic event in PTSD. Importantly, prospective
42
43 imagery has been shown to be causal in determining future behaviour; imagining
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45 oneself completing a future event leads to significantly greater likelihood of this event
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47 being completed in real-life (Libby, Shaeffer, Eibach, & Slemmer, 2007).
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53 *What is the evidence that imagery has a special relationship with emotion?*
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57 While intrusive imagery has been reported anecdotally as being particularly
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59 striking in psychopathology by clinicians, until recently, little experimental research
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had addressed basic assumptions about mental imagery. The special relationship

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3 between mental imagery and emotion that had been observed clinically has now been
4 confirmed in the laboratory using a variety of paradigms (Holmes, Lang, & Shah,
5 2009; Holmes & Mathews, 2005; Holmes et al., 2006; Holmes, Mathews et al., 2008).
6
7 One such paradigm comes from the cognitive bias modification (CBM) literature
8 which involves training individuals to adopt a particular habit of thought. One version
9 of CBM involving the training of interpretative bias uses repeated exposure to
10 ambiguous scenarios, which are continually resolved either negatively or positively
11 depending on experimental condition. Holmes and Mathews (2005) compared
12 imagery and verbal processing instructions during negative CBM for interpretation
13 bias and found that imagery processing produced greater increases in negative
14 emotions compared to verbal processing. Holmes et al. (2006) and Holmes et al.
15 (2009) compared imagery versus verbal processing instructions for positive
16 interpretation CBM and found a greater increase in positive mood associated with
17 imagery processing. An evaluative learning style paradigm has provided convergent
18 evidence for these findings (Holmes, Mathews et al., 2008). Imagery has thus been
19 shown to have a more powerful effect on increasing both *negative* and *positive*
20 emotion, and can be considered an “emotional amplifier” in psychopathology
21 (Holmes, Geddes, Colom, & Goodwin, 2008).
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46 *If imagery acts an emotional amplifier, what are the overarching implications for*
47 *‘making therapy work’?*
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51 Key implications for CBT are that in addition to considering patients’ verbal
52 cognitions, therapists should be aware of:
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55 (1) the importance of *assessing negative imagery* during assessment across
56 disorders;
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58 (2) the benefits of *promoting more positive imagery* in treatment;
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60 (3) the potential to develop new, *imagery-focussed therapy innovations*.

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3 We hope that investigating mental imagery in the laboratory will inform
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6 developments in cognitive theory, which in turn will inform developments in
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9 treatment innovation in the clinic which should be related back to basic science, thus
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11 promoting a continued interweave between experimental psychopathology and
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13 clinical application.

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15 *What techniques are there across disorders for treating problematic imagery?*

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17 A range of successful cognitive therapy interventions address problematic
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19 imagery and its treatment at their core, notably in PTSD (Ehlers & Clark, 2000) and
20
21 in social phobia (Clark et al., 2006). Imagery offers new treatment possibilities to the
22
23 traditional approaches of working with verbal negative thoughts, one example being
24
25 “imagery rescripting” which may be applied across disorders (Holmes, Arntz, &
26
27 Smucker, 2007). The presence of problematic imagery however, is not a prerequisite
28
29 for using imagery techniques – it can also be important to build up more positive and
30
31 adaptive imagery. The promotion of more positive/adaptive imagery may also be
32
33 achieved by translating research on cognitive bias modification (CBM) paradigms
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35 discussed earlier – that is, via computerised programmes aimed to modify biases such
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37 as of interpretation and promote positive imagery (e.g., Holmes, Coughtrey, &
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39 Connor, 2008; Holmes et al., 2009).

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42 *Further thoughts about an imagery approach using the example of depression*

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45 Depression is a mood disorder with a range of symptoms. Emotional effects
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47 include feelings of extreme sadness and hopelessness. Cognitive effects typically
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49 include low self-esteem, guilt and concentration difficulties. Behavioural effects
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51 include agitation and changes in bodily functioning include sleep, eating and sexual
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53 problems (American Psychiatric Association, 2000). Rather than consider the whole
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55 disorder as described above, in this paper we focus on a subset of specific cognitive
56
57 psychopathological processes: negative interpretation bias, a preponderance of
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3 negative imagery and a lack of positive imagery. These experimental
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5 psychopathology subcomponent processes are illustrated in Figure 2a and discussed
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7 in further detail below.
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10 *Interpretation Bias and Depression*

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Everyday we encounter information that is ambiguous in nature, in other words, information that can be interpreted in more than one way. It has long been held that individuals with depression tend to interpret ambiguous information negatively and this idea is central to traditional cognitive behavioural theories of depression (Beck, 1976). As shown in Figure 2a, when presented with an ambiguous event such as, 'a friend fails to return your phone call', non-depressed individuals are more likely to display a positive bias and make a benign interpretation, for example, believing their friend was simply preoccupied. In contrast, individuals with depression are more likely to have a negative bias and make a negative interpretation for example, suspect their friend is deliberately ignoring them. Greater negative bias has been shown to be predictive of future depressive symptoms (Rude, Valdez, Odom, & Ebrahimi, 2003).

One way in which to resolve ambiguity inherent in all sorts of daily situations is to imagine the outcome which allows us to mentally simulate the resolution to the situation. Given the powerful effect imagery has on emotion, this strategy will be particularly toxic when accompanied by a negative interpretation (Holmes & Mathews, 2005). That is, we suggest that when imagining a negative outcome and subsequently mentally simulating it (e.g. after a friend not returning the phone call, seeing an image of oneself as being abandoned, lonely and rejected), this is likely to exacerbate depressed mood to a greater extent than verbally thinking about the same event.

Can even positive information seem negative?

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3 The confrontation with ambiguous information can reveal a negative
4
5 interpretation bias. However, even in the face of overtly positive information a
6
7 negative bias can emerge. Holmes et al. (2006) found that when given overtly positive
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9 material, verbal compared to imagery based processing produced not only less
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11 positive mood, but an increase in negative mood and bias. Holmes et al. (2009)
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13 suggest that the presentation of overtly positive material may allow participants to
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15 make verbal comparisons between their current situation with their own “unachieved
16
17 standards”. Whilst it is also possible to make comparisons whilst imagery processing,
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19 this is less likely given the cognitive effort required to mentally switch between
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21 images. Experiment 2 in Holmes et al. (2009) concluded that when comparative
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23 processing highlights discrepancies between the ideal, ought and actual selves of
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25 participants, it may be partially responsible for the negative effects associated with
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27 verbally processing positive information. Current work is exploring this further.
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33 34 *Mental Imagery in Depression*

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36 Depression has traditionally been associated with verbal rather than imagery
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38 based thinking. A key focus has been on rumination, a predominantly verbal process
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40 (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002). However, another clinical
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42 feature of depression is the experience of involuntary negative image-based
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44 memories. Some studies indicate that up to 90 percent of depressed patients report
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46 experiencing distressing intrusive memories (Birrer, Michael, & Munsch, 2007). It
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48 has been proposed that overgeneral autobiographical memory in depression may
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50 develop as a protective mechanism adopted by individuals in an attempt to prevent
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52 such distressing intrusive memories from coming to mind (Williams et al., 2007).
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58 Negative, maladaptive appraisals of intrusive memories, (e.g., ‘*having this*
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60 *memory means that I am weak*’) have been proposed to maintain the occurrence of
intrusive memories, and in turn, depressive symptoms (Starr & Moulds, 2006).

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3 Maladaptive appraisals of intrusive memories have been shown to be significantly
4 associated with depressive symptoms. Over and above the severity of the memory
5 content and the frequency of the intrusion, maladaptive appraisals were found to be
6 the strongest predictor of depression in these studies.
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13 Not only is negative imagery of the past a problem in depression, a much
14 neglected area of research is imagining the future. Holmes, Crane, Fennel and
15 Williams (2007) proposed applying a PTSD perspective to suicidality asking whether
16 there is a prospective suicidal equivalent to “flashbacks.” Patients with suicidal
17 depression reported highly vivid negative, future-directed imagery of suicide, which
18 the authors termed “flash-forwards” to suicide. These suicidal images may be
19 particularly toxic given the powerful effect of imagery, with its ability to hijack
20 attention and promote action.
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31 *Lack of positive imagery*

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34 Positive mental imagery in the context of depressed mood has hitherto also
35 been relatively under-explored. Holmes, Lang, Moulds and Steele (2008) have shown
36 that people high in dysphoria have a poorer ability to imagine positive future events
37 compared to people low in dysphoria. As is shown in Figure 2a, we suggest that a
38 lack of positive imagery will also promote depressed mood.
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45 *An experimental psychopathology formulation of mental imagery in depression*

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48 We suggest an experimental psychopathology sub-components model of the
49 processes in depression, focussing on mental imagery and interpretation bias as
50 presented in Figure 2a. The term ‘sub-components’ is emphasised as clearly, the
51 model does not address all clinical features of depression. However, we believe a sub-
52 processes approach is important in identifying and testing specific hypotheses about
53 psychopathology in the laboratory.
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Figure 2 illustrates the key processes associated with the maintenance and exacerbation of depressed mood. First, *interpretation bias* (Figure 2, top left hand side): when faced with an event, such as the metaphorical “half filled glass”, if adopting a positive bias, a benign interpretation would follow, such as seeing the glass as “half full”. This is contrast to a negative bias which would lead to a negative mental interpretation such as perceiving the glass as “half empty”, thus promoting depressed mood. Importantly, if the outcome of the negative interpretation takes the form of a mental image (rather than a verbal thought), the powerful effect of imagery on emotion means that depressed mood is likely to be further exacerbated. In contrast, if the event is verbally processed, even in the face of positive information, comparative processing (which would create negative comparisons of the self compared to the positive information) may provoke depressed mood (Holmes et al., 2009).

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The second process key to this model (Figure 2, bottom left) is the preponderance of *negative intrusive imagery* of the past and future. Again, due to the powerful effect of imagery on emotion, this also further lowers depressed mood. For example, in suicidal depression times of despair can be associated with detailed mental images, for example, of making a future suicide attempt (Holmes, Crane et al., 2007). As illustrated in the model, (Figure 2, centre) the interpretation of negative intrusive imagery (e.g. “this means that I am crazy”, also further serves to maintain depressed mood (Starr & Moulds, 2006).

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Finally, a lack of positive imagery in depression (Figure 2, bottom right) contributes to the continuation of depressed mood and absence of healthy optimism that things can become better in the future.

The model therefore demonstrates how the key processes of negative intrusive imagery, lack of positive imagery and negative interpretation bias can function both

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3 independently and interactively to maintain depressed mood. This is in line with
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5 Hirsch, Clark and Mathews (2006) who propose a combined cognitive biases
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7 hypothesis which highlights the importance of examining cognitive biases in
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9 combination as opposed to in isolation.
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12 *Clinical Treatments: Future Directions*

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15 There are several implications of this imagery-based approach for the
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17 development of new cognitive treatments for depression. Figure 2b is an adaptation
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19 of Figure 2a, illustrating the suggested potential targets for cognitive therapy. We
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21 have highlighted the importance of promoting positive future oriented imagery in the
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23 treatment of depression (Holmes, Lang et al., 2008) (Figure 2b, bottom right). To do
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25 this, computerised CBM techniques hold promise for promoting the habit to create
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27 more positive mental imagery and interpretation biases as a routine part of everyday
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29 life (Holmes et al., 2009) . In terms of depressive intrusive memories, a computerised
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31 CBM task has been developed to specifically modify (or “re-train”) maladaptive
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33 appraisals (Lang, Moulds, & Holmes, 2009) . In a non-clinical sample this technique
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35 has been shown to produce increases in a positive appraisal bias and decrease the
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37 number of intrusions reported of an analogue negative event (a depressing film).
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44 Imagery rescripting (Figure 2b, bottom left) offers a cognitive therapy
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46 technique to address negative imagery. For example, suicidal imagery could be
47
48 directly targeted using imagery rescripting to produce an alternative future outcome,
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50 e.g. an image to overdose could be rescripted to an image of disposing of the tablets
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52 (Holmes, Crane et al., 2007).
53

54 *Conclusions*

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57 Our proposal of an experimental psychopathology subcomponents model of
58
59 processes in depression focuses on the role that imagery and interpretation bias play
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in the maintenance of the disorder. Specifically, this model proposes that negative

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3 intrusive imagery, a lack of positive imagery and negative interpretation bias serve
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5 both independently and interactively to maintain depressed mood. Providing a
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7 theoretical model by which to test core hypotheses using rigorous experimental
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9 techniques opens up new avenues of investigation in the drive for much needed
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11 potential therapeutic targets in this area. Further research is also required to
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13 investigate the role of imagery in a range of other psychopathological conditions such
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15 as schizophrenia and bipolar disorder.
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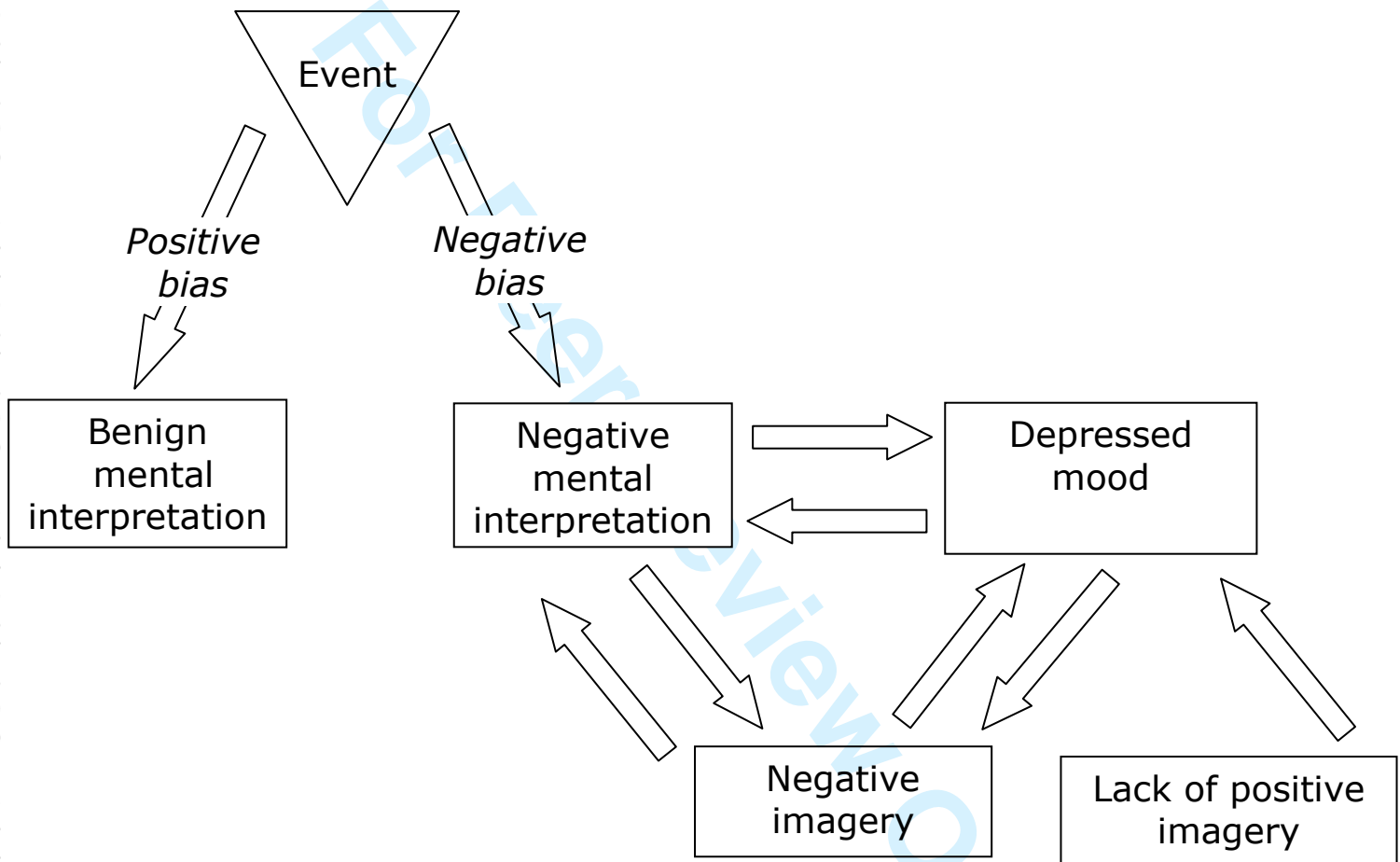
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Figure 1. Cognitive Behavioural Therapy “does exactly what it says on the tin”. The two cognitive “ingredients” are verbal thoughts and mental imagery.



Figure 2a. An experimental psychopathology subcomponents model of depression focussing on mental imagery and interpretation bias.



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Figure 2b. An experimental psychopathology subcomponents model of depression focussing on mental imagery and interpretation bias: Therapeutic Directions. (Narrow arrows indicate potential treatment targets.)

