

# Mental Imagery in Psychological Disorders

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## Abstract

Mental imagery involves having an experience like perception but in the absence of a percept. We frequently have mental images such as when we remember an event or imagine the future. In psychological disorders, emotional mental images can flash to mind and be highly distressing, including traumatic memories or simulations of feared future events. However, emotional images have been neglected in research and therapy. This entry combines perspectives from cognitive science (mental imagery) and clinical psychology (psychological disorders). Cognitive science suggests that compared to verbal thoughts, mental imagery has a more powerful impact on emotion. Therefore, it is useful to ask about imagery in clinical assessment of emotional disorders. However, this approach has been largely restricted to PTSD (posttraumatic stress disorder). First, we illustrate that emotional mental imagery occurs across a wide variety of disorders. Second, by mapping the nature of imagery in disorders where it has been neglected (e.g., bipolar disorder), we may be able to import existing imagery therapy techniques (e.g., from PTSD) to improve treatment. Third, by drawing on cognitive science, we can capitalize on the properties inherent to mental imagery to suggest novel techniques. For example, maladaptive imagery may be reduced by cognitive tasks, which interfere with holding an image in mind. Also, adaptive imagery may be boosted by computerized training in generating positive imagery. Intriguingly, this opens the possibility of cognitively informed and computerized psychological treatments that may look rather different from traditional talking therapies.

## INTRODUCTION

Imagine you are reading this and, without warning, you see in your mind's eye the worst moment of the most frightening film you have watched. You see a flash of the movie scene and hear the sounds. You are likely to feel surprised, anxious, and on edge. Now pull away from this mental image and continue reading. Vivid images capture our imagination and seem to "haunt" us when they spring to mind. In their most extreme form, emotional mental images cause great distress. Patients with posttraumatic stress disorder

(PTSD) describe recurrent, involuntary image-based memories from a traumatic experience, which bring back strong emotions. Furthermore, we are discovering that emotional images occur in many other psychological disorders, such as bipolar disorder and depression. While striking to patients, emotional mental imagery has been relatively neglected in talking therapies and research alike.

This entry combines perspectives from cognitive science (mental imagery) and clinical psychology (psychological disorders and their treatment). Experimental psychology studies reveal that compared to verbal thoughts, mental imagery has a more powerful impact on our emotions (e.g., Holmes, Mathews, Mackintosh, & Dalgleish, 2008). Given that imagery can amplify emotions, we suggest it is useful to ask about imagery in the clinical assessment of emotional disorders. We will illustrate that emotional mental imagery occurs across a wide variety of disorders, so is relevant to the broad field of mental health (Di Simplicio, McInerney, Goodwin, Attenburrow, & Holmes, 2012). By bridging to cognitive science, we can better understand mechanisms and may discover novel techniques to work with problematic imagery. Intriguingly, this experimental psychopathology approach opens the possibility of treatments that look rather different from traditional talking therapies.

## BACKGROUND RESEARCH: FROM CLINICAL PSYCHOLOGY TO COGNITIVE SCIENCE

### WHAT IS MENTAL IMAGERY?

When we recall past events or imagine something happening in the future, we recruit mental imagery. Mental imagery has been described as like having a sensory experience in the absence of a physical sensory stimulus—“seeing with the mind’s eye,’ ‘hearing with the mind’s ear’ and so on” (Kosslyn, Ganis, & Thompson, 2001). Although mental imagery is frequently visual, any of the five senses can be involved. For example, imagine that you are cutting a lemon—can you feel the skin, smell the zest, see the juice? In contrast, when we think in verbal thoughts we use words similar to spoken language, for example, “A squeezed lemon exudes juice”. As we shall see, such thoughts do not pack the same sort of emotional punch as mental imagery.

### CLINICAL PSYCHOLOGY: EMOTIONAL MENTAL IMAGES OCCUR ACROSS PSYCHOLOGICAL DISORDERS

In psychological disorders, mental imagery tends to occur involuntarily and be distressing, with content tied to the theme of the respective disorder. The

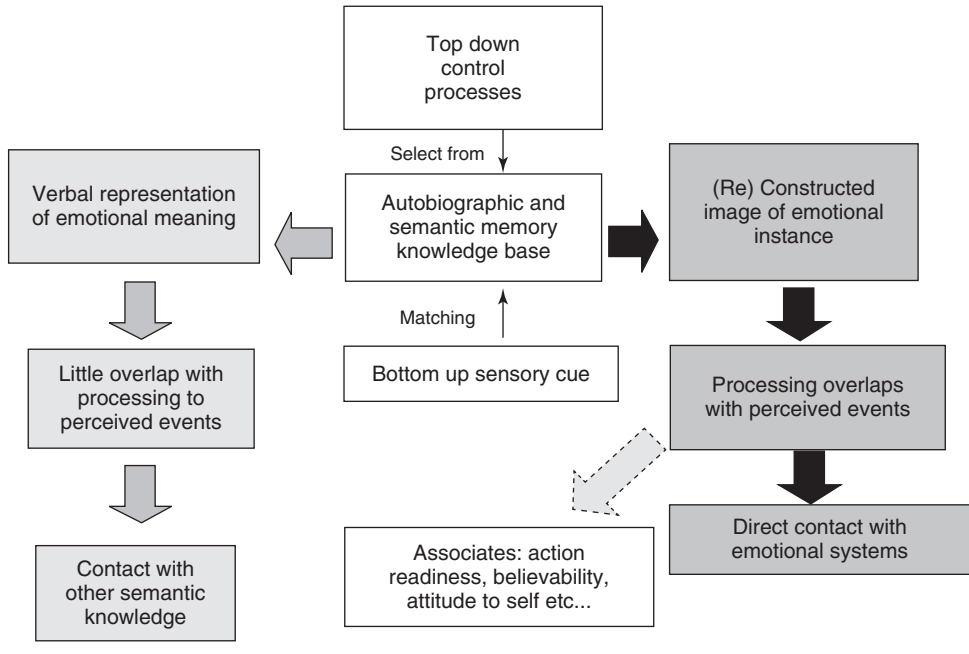
hallmark of PTSD is recurrent and intrusive distressing memories of a traumatic event in the form of emotional images (American Psychiatric Association, 2000). These can be brief images or (rarely) full-blown flashbacks, which are so intense the patient feels they are “reliving” the event. For example, a victim of a car accident may have vivid images of car headlights approaching. In social anxiety disorder—an excessive fear of social situations (American Psychiatric Association, 2000)—the person may fear acting in an embarrassing way. This belief is maintained by distorted images of how the person sees himself or herself appearing to others (Hackmann, Clark, & McManus, 2000), for example, imagining their face as bright red.

We are learning that emotional mental imagery plays a role in a wide range of disorders (special issues to date: Hackmann & Holmes, 2004, 2012; Holmes, Arntz, & Smucker, 2007; Krans, 2011; Stopa, 2011). Examples include snake phobia, suicidality, cravings, health anxiety, obsessive compulsive disorder, chronic pelvic pain, bipolar disorder, psychosis, body image disorder, and so on (for reviews, see Brewin, Gregory, Lipton, & Burgess, 2010; Holmes & Mathews, 2010).

#### COGNITIVE SCIENCE: A SPECIAL RELATIONSHIP BETWEEN MENTAL IMAGERY AND EMOTION

It has long been suggested that mental imagery can influence our emotions. Lang’s (1979) bio-informational theory proposed that mental images controlled patterns of emotional and behavioral responding. However, only recently has research directly tested the relative emotional impact of mental images versus verbal thoughts. In one experiment (Holmes & Mathews, 2005), participants listened to a series of negative scenarios and were either asked to imagine them, or to think about the words and meanings. The imagery condition led to a greater increase in anxiety than the verbal condition. This suggests that mental imagery has a more powerful impact on emotion than verbal thought. Consistent with this, those memories that are more emotional tend to be more image-based (Arntz, de Groot, & Kindt, 2005).

Why might imagery have a more powerful impact on emotion than words? Mental imagery may rely on the same neural systems as actual perception (Kosslyn *et al.*, 2001). Furthermore, images induce arousal, similar to that induced by the actual event. Interestingly, mental images may be more likely to be confused with real events than verbal descriptions (Mathews, Ridgeway, & Holmes, 2013). Thus, mental imagery may have a similar impact to directly experiencing something, and in turn make more direct contact with emotional systems than do words, as illustrated by Holmes and Mathews (2010); see Figure 1.



**Figure 1** The construction of imagery versus verbal representations and their relative impact on emotion. *Source:* Taken from Holmes & Mathews, 2010.

## CUTTING-EDGE RESEARCH: HOW CAN WE TREAT EMOTIONAL MENTAL IMAGERY?

### CLINICAL PSYCHOLOGY: TECHNIQUES TO TREAT EMOTIONAL MENTAL IMAGERY

Mental imagery has been used in psychological therapies since ancient Egyptian times (Edwards, 2007). Currently, a leading evidence-based form of talking therapy is cognitive behavior therapy (CBT). In CBT, the predominant focus has been patients' negative *verbal* thoughts. Imagery has become a "hot topic" in the last decade. Imagery techniques, such as those termed *exposure* and *restructuring*, are pivotal in CBT for PTSD (Ehlers & Clark, 2000; Foa, Hembree, & Rothbaum, 2007). CBT for social anxiety disorder has also been highly successful. The latter tackles social anxiety images using techniques including comparing images with reality via video feedback (Clark *et al.*, 2006) and "imagery rescripting" in which the problematic imagery is transformed—akin to reediting a piece of film footage.

The technique of imagery rescripting is now receiving attention for other disorders (Arntz, 2012). As well as transforming a problematic image, imagery rescripting can be used to construct new helpful images linked with more favorable emotions, for example, feeling cared for. Imagery rescripting is integral to schema therapy—one of the few approaches with an evidence

base for borderline personality disorder (Arntz & Jacob, 2013). It is also being applied to other areas such as complex PTSD involving guilt and anger, to depression (Wheatley *et al.*, 2007), and for feelings of contamination after childhood sexual abuse (Jung & Steil, 2013).

#### COGNITIVE SCIENCE: EMERGING TECHNIQUES TO TREAT EMOTIONAL MENTAL IMAGERY

Given the worldwide scale of mental health problems and the limited availability of trained therapists, new treatments that are computerized, simple to deliver, and readily disseminated may be useful. Therefore, alongside the development of imagery interventions in talking therapies, recent research has drawn on cognitive science to propose novel techniques targeting mental imagery. By bringing in perspectives from cognitive science, we can capitalize on the properties inherent in mental imagery.

For example, from experimental psychology we know that we have limited cognitive resources. If we experience a visual mental image and simultaneously perform a cognitive task requiring visual imagination, the latter reduces the vividness of the former (Baddeley & Andrade, 2000). This holds potential for novel techniques to reduce negative emotional mental imagery. Alternatively, mood-enhancing imagery may be boosted by computerized training in generating positive imagery. In the next section, we will discuss two such examples.

#### FUTURE RESEARCH ON EMOTIONAL MENTAL IMAGERY

There are untapped opportunities to explore emotional mental imagery, encompassing the fields of both clinical psychology and cognitive psychology. We draw on ideas from our research groups, though clearly many more are possible and need investigation!

#### CLINICAL PSYCHOLOGY: MAPPING AND EXTENDING THERAPY TECHNIQUES

*Mapping Emotional Imagery in New Domains.* We have a grasp of imagery psychopathology in remarkably few areas, though promising work is emerging across a variety of disorders (Brewin *et al.*, 2010; Holmes & Mathews, 2010). Extension studies in all aforementioned disorders are warranted; other areas remain completely unmapped. One direction is the identification of mental images of imagined events in the future (rather than the past)—termed *flash-forwards* (Engelhard, van den Hout, Janssen, & van der Beek, 2010; Holmes, Crane, Fennell, & Williams, 2007), or deficits in future imagery such as complicated grief (Robinaugh & McNally, 2013). In many more areas including

health issues (e.g., pain, cancer), behavioral problems (e.g., smoking, violence), or social concerns (e.g., stigma, prejudice), imagery may play a role. Research might investigate the phenomenology of any associated imagery and its role in maintaining the problem.

*Not Only Negative, But Problematic “Positive” Imagery.* Overly negative mental imagery is related to pathologically negative emotions. However, overly positive or appetitive imagery can also be problematic, for example, in bipolar disorder. Bipolar disorder (formerly known as *manic depression*) is a chronic, recurrent condition characterized by periods of depression interspersed with periods of mania (elevated mood). Medication only benefits a modest proportion of patients, and psychological treatments (e.g., CBT) are not yet adequate. How might an imagery perspective help? Mental imagery has been proposed to act as an “emotional amplifier,” heightening the experience of mania, depression and anxiety, and destabilizing mood (Holmes, Geddes, Colom, & Goodwin, 2008). In mania, people strive for goals they may later regret (Gruber & Johnson, 2009) and take risks (e.g., reckless driving). Consistent with an imagery hypothesis, people with bipolar disorder report a high general use of mental imagery (Holmes *et al.*, 2011), which may relate to risk for mania. Future development of more imagery-focused therapy may play to the strengths of this group, as well as address emotional phenomena not yet targeted (e.g., overly “positive” flashforwards of future goals).

*Imagery Rescripting Techniques: Importing to New Areas and Better Understanding the Mechanisms.* By mapping imagery abnormalities in new domains, we can import existing imagery techniques (e.g., imagery rescripting) to improve treatments. Imagery rescripting has the potential to reduce a variety of negative emotions including anxiety, shame, and anger in different disorders (Arntz, 2012). Strikingly, in many clinical areas, imagery techniques have not yet been tried or have been piloted but not systemically tested. Furthermore, research on underlying mechanisms is only just starting, and is needed to develop a scientific understanding of how imagery techniques work.

#### COGNITIVE SCIENCE: PIONEERING NOVEL AND COMPUTERIZED TECHNIQUES TO TREAT EMOTIONAL MENTAL IMAGERY

*An Example of Translating Experimental Psychology into the Clinic: Preventing the Build-Up of Flashbacks after Trauma* We have good treatments for full-blown PTSD but lack interventions in the early aftermath of trauma (Roberts, Kitchiner, Kenardy, & Bisson, 2009). “Flashbacks” (emotional image-based memories of a traumatic event) are common in the first days and weeks

posttrauma, although we can only diagnose PTSD at 1 month. Early flashbacks are intrinsically distressing but also predict later PTSD (Creamer, O'Donnell, & Pattison, 2004). Cognitive science studies have raised the possibility of reducing the build-up of involuntary negative imagery (i.e., flashbacks) by engaging in cognitive tasks soon after traumatic stimuli. In a series of experiments (Holmes, James, Coode-Bate, & Deeprose, 2009; Holmes, James, Kilford, & Deeprose, 2010), volunteers watched a film with traumatic content, and after a break performed either a cognitive task—a film reminder plus playing the computer game Tetris—or no task as a control condition. People who played Tetris had fewer flashbacks of the film over the following week. This has implications for reducing early distress and preventing PTSD symptoms after trauma. Flashbacks were not reduced when playing a more verbal computer game—Pub Quiz (Holmes *et al.*, 2010). Why might playing Tetris reduce flashbacks whereas Pub Quiz did not? We suggest the following possibility. Tetris is a visuospatial cognitive task. Concurrent visuospatial tasks reduce the vividness and emotionality of visual images, for example, trauma film memories (Kavanagh, Freese, Andrade, & May, 2001; van den Hout, Muris, Salemink, & Kindt, 2001). There is a time window of a few hours after an event during which memories are still malleable (Walker, Brakefield, Hobson, & Stickgold, 2003). Playing Tetris during this window may hinder the consolidation of imagery-based memories. A more verbal task would not be predicted to have this effect. Future research needs to consider translation to a clinical setting.

*An Example of Boosting Adaptive Imagery: Positive Imagery Training for Depression.* We often focus on the negative thoughts and feelings associated with depression. However, another important yet neglected angle is the lack of positive mood and positive imagery. In a depressed mood, it can be hard to imagine positively either the past (Werner-Seidler & Moulds, 2011) or future (Morina, Deeprose, Pusowski, Schmid, & Holmes, 2011). Being able to imagine a positive future has been associated with optimism (Blackwell *et al.*, 2013). Drawing on the experimental studies showing a stronger impact of mental imagery on emotion than verbal processing (Holmes, Mathews, *et al.*, 2008), we have developed ways to train people to use positive imagery. First studies indicate that computerized training in imaging scenarios that resolve positively is beneficial for patients with depression (Lang, Blackwell, Harmer, Davison, & Holmes, 2012). However, larger clinical trials are still needed. This work could be adjusted for other areas where more adaptive positive and future imagery is needed.

*Understanding Basic Mechanisms Concerning Emotional Imagery to Fuel Future Treatments.* Mental imagery experiences are on a continuum from our everyday experiences to clinical disorder. A continuum approach invites insights about mental imagery from experimental psychology and cognitive neuroscience to clinical psychology, and vice versa. Examples include understanding imagery treatments through the lens of more fundamental mechanisms such as conditioning (Lewis, O-Reilly, Khuu, & Pearson, 2013), or understanding why some images are intrusive and occur involuntarily (e.g., Verwoerd, Wessel, & de Jong, 2012). The child development perspective warrants consideration (Burnett Heyes, Lau, & Holmes, 2013), as in turn will an aging perspective. Brain imaging techniques may add to our understanding of processes during the encoding (Bourne, Mackay, & Holmes, 2013), construction (Addis, Pan, Vu, Laiser, & Schacter, 2009), perspective (Eich, Nelson, Leghari, & Handy, 2009), or therapeutic change of emotional imagery. Moreover, we need to develop better experimental measures of emotional imagery (Pearson, Deeprose, Wallace-Hadrill, Burnett Heyes, & Holmes, 2013).

#### THE FUTURE: COMBINING COGNITIVE SCIENCE AND CLINICAL PSYCHOLOGY

We have raced our way through an imaginary emotional world of flashbacks and flashforwards, negative and positive imagery, and hope we have conveyed our fascination with the field. Opportunities to explore emotional mental imagery reach far beyond those mentioned earlier. Evidence-based treatment innovations are desperately needed in mental health, and so this is a “call to arms” for cross-discipline research contributions to this field. We need to more strongly combine research from clinical psychology and cognitive science perspectives. We need to understand why emotional imagery has its effects and how to modify it. Approaches pioneered in one area may be harnessed and applied to new domains. This approach may hold relevance well beyond clinical psychology to health psychology, sports psychology, and social psychology to name a few, connected on a vivid common thread—the core process of emotional mental imagery.

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## FURTHER READING

### Short texts for those in a hurry

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### **First special issue on mental imagery in emotional disorders**

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