



Mental imagery as an emotional amplifier: Application to bipolar disorder

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ABSTRACT

Cognitions in the form of mental images have a more powerful impact on emotion than their verbal counterparts. This review synthesizes the cognitive science of imagery and emotion with transdiagnostic clinical research, yielding novel predictions for the basis of emotional volatility in bipolar disorder. Anxiety is extremely common in patients with bipolar disorder and is associated with increased dysfunction and suicidality, yet it is poorly understood and rarely treated. Mental imagery is a neglected aspect of bipolar anxiety although in anxiety disorders such as posttraumatic stress disorder and social phobia focusing on imagery has been crucial for the development of cognitive behavior therapy (CBT). In this review we present a cognitive model of imagery and emotion applied to bipolar disorder. Within this model mental imagery amplifies emotion, drawing on Clark's cyclical panic model [(1986). A cognitive approach to panic. *Behaviour Research and Therapy*, 24, 461–470]. We (1) emphasise imagery's amplification of anxiety (cycle one); (2) suggest imagery amplifies the defining (hypo-) mania of bipolar disorder (cycle two), whereby the overly positive misinterpretation of triggers leads to mood elevation (escalated by imagery), increasing associated beliefs, goals, and action likelihood (all strengthened by imagery).

Imagery suggests a unifying explanation for key unexplained features of bipolar disorder: ubiquitous anxiety, mood instability and creativity. Introducing imagery has novel implications for bipolar treatment innovation - an area where CBT improvements are much-needed.

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Introduction

We propose that the presence of “affective, intrusive mental imagery” could prove to be much more prevalent and important than is currently appreciated in bipolar disorder. Our approach supposes a central role for involuntary, distressing mental images about the past or future that come to mind unbidden, typically with high levels of affect. Such images have already provided a distinct and critical Cognitive Behavior Therapy (CBT) treatment target in conditions where the salience of imagery is obvious [PTSD (Ehlers & Clark, 2000) and social phobia (Clark et al., 2006)]. However, to date, the potential roles of imagery have been neglected in other mental disorders with a high prevalence of comorbid anxiety. In particular, the emotional and behavioral disturbances in bipolar disorder seem to us singularly unexplored from this point of view.

Mental imagery has been described as that which occurs when perceptual information is accessed from memory, giving rise to the experience of “seeing with the mind's eye” or “hearing with the

mind's ear” (Kosslyn, Ganis, & Thompson, 2001). While perception occurs when information is directly registered from the senses, mental imagery also has neural correspondence with perceived visual stimuli. For example, the same selective neural activation pattern occurs when people simply imagine familiar faces as when they perceive them (O'Craven & Kanwisher, 2000). Thus, mental imagery differs from verbal thought by possessing sensory properties that are both consciously reported and whose representation can be demonstrated at a neural level. Moreover, while drawing on memory, imagination clearly allows us not only to relive events we have actually experienced (“re-experiencing”) but to create novel combinations of never-experienced images and to allow mental “time travel” forward to what might happen in the future. That is, we can “pre-experience” future events. The neural processes in autobiographical recall co-localize with those that support imagining the future (Schacter & Addis, 2007; Schacter, Addis, & Buckner, 2007; Schacter, Addis, & Buckner, 2008). Furthermore, we are more likely to act on those events we have simulated in imagination than those we have thought about verbally (Libby, Shaeffer, Eibach, & Slemmer, 2007; Markman, Gavanski, Sherman, & McMullen, 1993; Sanna, 2000).

As imagery has assumed increasing importance in cognition, it is also now appreciated to be a critical process in exacerbating states

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of normal and abnormal emotion. Holmes and Mathews (2005) proposed that emotional processing in the brain is particularly sensitive to imagery (rather than verbal thought) for several reasons. Basic emotions such as fear evolved relatively early in our evolutionary history, prior to language (Öhman & Mineka, 2001). Rapid response to imagery facilitates rapid responding to sensory events signaling danger or reward. Since processes involved in mental imagery overlap with those in perception (Kosslyn et al., 2001), imagined events may be responded to “as if” real. Episodic memories are image-based (Conway, 2001), and this is particularly so for emotional memories (Arntz, de Groot, & Kindt, 2005), thus imagery has enhanced access to previous emotional episodes. Interestingly, individuals prone to acquiring specific fears and phobias, compared to those who are not, have higher trait levels of imagery (Dadds, Hawes, Schaefer, & Vaka, 2004). Thus, imagery susceptibility (that is, the tendency to be a “visualizer” rather than “verbalizer”) may be a neglected risk factor for psychiatric disorder.

The goal of this review is to link the evidence that imagery has an amplifying effect on emotion with the still little-understood clinical phenomenology that bipolar is an emotionally volatile disorder. Thus, using anxiety as a starting point, imagery is predicted to serve as an emotional amplifier of a variety of mood states in bipolar disorder. We will review the potential contribution of imagery to key features of bipolarity: anxiety, depression/suicidality, mood elevation and creativity. We will illustrate some of our conclusions by reference to patient experience as reported to us in clinical consultation. We believe that, despite a dearth of direct experimentation in bipolar disorder, there is the beginning of an important message for future investigation of its psychopathology and for the development of potential adjunctive psychological treatments.

Anxiety in bipolar disorder

As many as 90% of bipolar patients have a comorbid anxiety disorder in their lifetime (Merikangas et al., 2007). This rate appears substantially higher than the prevalence of comorbid anxiety disorder in major depression (50%; Kessler et al., 2003) or non-affective psychosis (63%; Kessler et al., 2005). The comorbidity includes all anxiety diagnoses. Hence it is not surprising that anxiety has been suggested as a core dimension of bipolar disorder (Simon et al., 2004): how and why remains unexplained. Anxiety may have implications for understanding the etiology and expression of bipolar disorder. It certainly has potential implications for its treatment. A recent review (McIntyre et al., 2006) concluded that anxiety symptoms often precede and may hasten the onset of bipolar disorder, and are associated with increased dysfunction (see also Otto et al., 2006). Anxiety comorbidity is most likely in those with Bipolar II disorder (BPD-II), mixed or dysphoric episodes and rapid cycling is associated with poorer treatment response to pharmacological and psychotherapeutic treatments (Feske et al., 2000; McIntyre, Mancini, Parikh, & Kennedy, 2001; Simon et al., 2004). Importantly, anxiety in the context of bipolar disorder is also a risk factor for increased suicide attempts and suicide completion (Dilsaver & Chen, 2003; Simon, Hunkeler, Fireman, Lee, & Savarino, 2007). Given that bipolar disorder poses one of the greatest risks for suicide of all psychiatric disorders (Angst, Angst, Gerber-Werder, & Gamma, 2005; Hawton, Sutton, Haw, Sinclair, & Harriss, 2005), especially when comorbid with anxiety disorders (Simon et al., 2007), anxiety demands further investigation and the development of effective treatment strategies.

While bipolar disorder remains a disorder in which pharmacological treatments predominate, the use of medication to treat anxiety within this disorder is unproven and possibly contraindicated. There are several pharmacological treatments of primary (non-comorbid) anxiety disorders. For example, the SSRIs and related medicines such as venlafaxine have efficacy in anxiety/

depression, generalized anxiety disorder, panic, posttraumatic stress disorder and obsessive compulsive disorder (Baldwin et al., 2005). They have not been examined in the specific indication of comorbid anxiety in Bipolar I disorder (BPD-I; characterized by a history of depression and mania) or BPD-II disorder (characterized by a history of depression and hypomania). However, SSRIs and venlafaxine can induce switch to (hypo) mania if used in bipolar disorder (Post et al., 2006). The symptomatic use of benzodiazepines, gabapentin and alcohol appear to be common as anxiolytic strategies in bipolar disorder (Goodwin, 2003).

The absence of evidence on which to base the drug treatment of anxiety in bipolar disorder is matched by a corresponding absence of formal investigation of the effectiveness of psychological treatments targeting bipolar anxiety. CBT has been highly successful, for example for panic disorder (Barlow, 2002; National Institute for Health and Clinical Excellence, 2004). However, the efficacy of CBT in bipolar disorder remains uncertain. Whilst some cognitive programs focusing on education seem to succeed in preventing new episodes (Colom & Lam, 2005; Lam et al., 2003), there is little evidence to support a wider and routine use of generic CBT with bipolar patients (Scott & Colom, 2008). One major trial (Scott et al., 2006) was disappointingly negative (see also National Institute for Health and Clinical Excellence, 2006). However, CBT for bipolar disorder appears to have been rather pragmatic in its development so far. The underlying cognitive models of bipolar disorder have focused on depression and mania and as yet have failed to lead to adequately robust treatments. Moreover, cognitive aspects of anxiety, described below, do not appear to have been adequately explored in the conceptualizations of bipolar disorder. Other evidence-based psychosocial therapies for bipolar disorder such as family focused therapy (Miklowitz, George, Richards, Simoneau, & Suddath, 2003; Miklowitz et al., 2007), interpersonal social rhythm therapy (Frank et al., 2005; Frank, Swartz, & Kupfer, 2000) and psychoeducation (Colom et al., 2003) while not specifically targeting anxiety processes, share an objective of avoiding stressors.

The relationship between bipolar disorder and anxiety can be conceptualized in several different ways.

- 1) Anxiety may be an irrelevant comorbidity of bipolarity: it may be so common because bipolar disorder itself is severe and ‘pulls in’ other diagnoses in part by ascertainment bias (a further diagnosis is more likely to be detected), in part via shared risk factors or even as a secondary effect of the primary psychopathology. However, this seems unlikely because the comorbidity is present across samples of bipolar disorder, including those drawn from the community, where severity is often modest. Moreover, schizophrenia does not show the same level of comorbidity, despite its comparable and, on some indices, greater severity.
- 2) Anxiety may be a developmental accompaniment of bipolar disorder, preceding onset in the life history, but not having a direct role in bipolarity per se. This trajectory might or might not be unique to bipolar disorder, but is compatible with an independent expression and evolution of anxiety disorders on the one hand and bipolarity on the other.
- 3) Anxiety symptoms may be a precursor required for the development and full expression of bipolarity. On this view anxiety symptoms may mediate some of the characteristic phenomena of bipolar illness course such as increased mood reactivity and intrinsic mood instability. Childhood trauma, for example, appears to be associated both with a high incidence of PTSD and a more severe burden of bipolar episodes (Leverich & Post, 2006).

Currently there is little clinical, observational or experimental work to definitively distinguish these three possibilities. However, we are drawn to the third, quite simply because it could have such

important clinical implications, and because we see both the need and the potential for refuting it.

To support innovative treatment development in this challenging area, we require new perspectives and a better understanding of the full range of cognitive processes in bipolar disorder. Indeed, a way to develop more successful theoretically driven treatments is through research on cognitive processes that cross diagnostic boundaries (Fairburn, Cooper, & Shafran, 2003) and thus the type of processing associated with anxiety provides a useful starting point.

Mental imagery and anxiety psychopathology

The presence of distressing imagery has been established across a range of anxiety disorders. A feature of anxious mental imagery is that it can be “intrusive” - that is, comes to mind unbidden. The hallmark example is PTSD flashback experience (Ehlers & Clark, 2000). Flashbacks consist of vivid emotionally charged memories of the self in previous traumatic episodes, accompanied by a strong sense of current threat e.g. a road traffic accident survivor may experience flashbacks of the sight and sound of their car crashing (Grey & Holmes, in press; Holmes, Grey, & Young, 2005). In social phobia, patients experience images of seeing themselves looking anxious, e.g. seeing their face as red as a tomato (Clark et al., 2006; Hackmann, Clark, & McManus, 2000). A review of imagery in anxiety disorders (Hirsch & Holmes, 2007) indicates a link between image content and the core fears driving the disorder. In agoraphobia, patients describe imagery of being unable to cope with an impending mental or physical catastrophe, e.g. seeing themselves frozen and surrounded by an intimidating crowd (Day, Holmes, & Hackmann, 2004). Patients with obsessive compulsive disorder can experience both ego-dystonic obsessional images e.g. an aversive picture of killing someone: they may also report using compulsive images as a way to neutralize negative thoughts e.g. deliberately and repeatedly picturing comforting religious icons (Rachman, 2007; de Silva, 1986; Speckens, Hackmann, Ehlers, & Cuthbert, 2007). Health anxiety patients may visualize themselves being attacked by disease, feeling trapped in their body (Wells & Hackmann, 1993). Imagery occurs in specific phobias, such ‘seeing’ unfeasibly large and dangerous of spiders (with teeth!) in spider phobia (Pratt, Cooper, & Hackmann, 2004).

Imagery amplifies pathological emotion. For example, in social phobia (Clark et al., 2006; Clark & Wells, 1995; Hackmann et al., 2000) when the patient starts a conversation they begin to imagine how they will look to the other person, for example, picturing themselves “stammering and looking like an idiot”. The attention deployed to this distorted negative self-image disrupts concentration and ability to converse. After the conversation, this maintains the patient’s belief they must have appeared awful, which unfortunately encourages them to monitor yet more exhaustively how they look next time they start a conversation, thus reinforcing a vicious negative circle.

Paradoxically, unless patients are asked directly about imagery, even those with strong images typically fail to report them spontaneously. Several different inhibitions may be implicated. The non-specialist clinician may have a protective tendency to try to avoid eliciting such affect-laden images (e.g. to avoid evoking trauma flashbacks). This may be reinforced by the patient’s own conscious avoidance of provoking the experience. In addition to avoiding the subjective experience, its potency may also feed the patients’ beliefs that they will be assessed as “truly going mad” if they report seeing imaginary events.

Mental imagery in bipolar disorder

Over-general memory bias and traumatic imagery

One of the first studies that aimed to explore bipolar imagery presents data on deficits in memory specificity, rather than imagery

per se. Mansell and Lam (2004) used an adaptation of “the autobiographical memory test” (AMT; Williams et al., 2007) in which participants are presented with cue words and invited deliberately to recall a personal memory in response to the word. Patients with Major Depressive Disorder have an over-general memory bias: i.e. a tendency to respond by summarizing categories of events rather than describing a single autobiographical episode (Williams et al., 2007). Such a bias has also been demonstrated in euthymic bipolar disorder compared to healthy controls (Scott, Stanton, Garland, & Ferrier, 2000). Mansell and Lam (2004) found that remitted bipolar patients gave responses to the negative cue words in an even more over-general manner than a group of remitted unipolar depressed patients (see Mansell, in press for further discussion of this study). The content of negative memories was predominantly anxious even in euthymic patients. The results are relevant because over-general memories are thought to be less image-based (Williams, Healy, & Ellis, 1999) and indicative of suppressing intrusive images (Williams et al., 2007). However, memory responses to cue words do not provide the best test of imagery per se, because they do not capture spontaneous intrusive imagery of the kind we suppose to be particularly relevant (Holmes, Lang, Moulds, & Steele, 2008). It would be preferable to test intrusive imagery more directly.

Tzemou and Birchwood (2007) examined traumatic symptoms (e.g. intrusive trauma imagery) in addition to over-general memory bias in a prospective study comparing BPD-I disorder and unipolar depression versus non-clinical controls. Both clinical groups showed an over-general memory bias compared to controls, partially replicating Mansell and Lam (2004). Almost half of both unipolar and bipolar groups reported currently experiencing distressing traumatic memories (images): no such intrusive memories were reported by controls. Reduced over-general memory bias was associated with more traumatic intrusions. Differences were not observed in different phases of bipolar disorder, although severe mood abnormality is likely to have precluded testing. Following a similar rationale to that proposed for over-general memory within major depressive disorder (Williams et al., 2007), Tzemou and Birchwood (2007) proposed that over-general memory bias in bipolar disorder may serve to block traumatic memories. Cognitive avoidance of emotional memories was postulated to dysfunctionally maintain symptoms. The model presumes that functional emotional processing will be achieved by promoting awareness of distressing affect and promoting more specific deliberate recall. Thus, this preliminary study suggests a high level of traumatic intrusive imagery in bipolar disorder. However, additional non-trauma imagery was not explored (the experience of imagery was elicited using a PTSD-relevant instrument) and details of the level of other anxiety symptoms experienced by these patients were not described.

The prevalence of intrusive traumatic imagery in bipolar disorder requires replication and its pattern over time, and impact on mood and anxiety needs to be established. Further investigation is needed to examine whether bipolar patients experience forms of anxious imagery other than trauma imagery, given the high levels of social phobia and OCD comorbidity (McIntyre et al., 2006).

A novel hypothesis: imagery as an emotional amplifier in bipolar disorder

Anxiety is a prevalent feature of bipolar disorder, yet anxiety symptoms are often overlooked. Moreover, a key feature associated with anxiety – intrusive mental imagery – has been hitherto neglected in all but one study. Our clinical work indicates, in contrast, the prominence of anxiety symptoms in the patient experience. A conceptual framework is needed in order to derive hypothesis-driven research in this novel area.

We do not attempt to model the whole of bipolar disorder, but instead focus on two aspects – how imagery can contribute to the amplification of anxiety within the disorder, and the escalation of positive mood.

Hypothesis 1. Amplification of anxiety by imagery in bipolar disorder

We propose that mental imagery acts rapidly to amplify emotion in bipolar disorder. Indeed, it seems to us that the strength of this mechanism - in feedback terms, the gain of the system – may be a defining feature of bipolar disorder, and helps to explain a number of its key psychopathologies. In Fig. 1, the top half represents a simplified version of the cognitive model of panic (Clark, 1986). An internal trigger (e.g. increased heart rate) or external trigger (e.g. a loud noise) leads to the perception of threat. Anxious apprehension follows (with a concomitant physiological response) which in turn leads to an increased misinterpretation of actual threat (e.g. I'm going to die of a heart attack), fuelling a vicious cycle of increased anxiety. Although the original paper describing the model clearly highlighted imagery as a potential component, this cycle is often described in clinical teaching/practise purely in terms of verbal cognition – e.g. verbal thoughts about dying. Cognitive therapy more generally is similarly often targeted on challenging or interrupting such negative automatic (verbal) thoughts. However, beyond language-based experience, mental

imagery acts as an amplifier of emotional effects, and thus represents an important target in psychopathology.

In Fig. 1 we have indicated the amplifying role of imagery in anxiety (see the dashed line from “anxiety” to “increased threat belief” amplifying the inner circle via “imagery”). It is noted that the original figure for panic did not distinguish verbal and imaginal cognition, but this was inherent to the model since it was well established panic patients experience imagery (Clark, 1986). Experimental evidence for the greater impact of imagery over verbal cognition has been delivered subsequently. As discussed, experimental studies have shown (i) a greater initial anxiety response to provoking stimuli when imagery is enhanced relative to verbal processing e.g. seeing an image of one's self collapsing from a heart attack (Holmes & Mathews, 2005; Holmes, Mathews, Mackintosh, & Dalgleish, 2008). This can include heightening of the physiological response e.g. increased heart rate in similar circumstances (Vrana, Cuthbert, & Lang, 1986); (ii) strengthening of the interpretation that there is a real threat, at least at that moment, e.g. one is *really* about to die (Holmes & Mathews, 2005). Further, imagery has the power to hijack attention (most obviously by flashbacks) further away from the external world, making the internal cognitions more believable and associated emotion more powerful. Amplified anxiety states consequently effect behavior by avoidance of anxiety-related triggers (see top left parenthesis in Fig. 1), e.g. the avoidance of crowded places in agoraphobic anxiety.

Hypothesis 2. Amplification of mood elevation by imagery in bipolar disorder

We suggest that mental imagery in bipolar disorder may act, not only as an amplifier for anxiety, but for other mood states. If bipolar patients are imagery susceptible and this helps to account for the particularly strong association between bipolar and anxiety diagnoses, there is every reason to believe that similar cognitive mechanisms will be engaged by positive mood states. The process of mood elevation remains insufficiently explained in bipolar disorder at a cognitive level. Bipolar disorder is of course defined by the propensity to experience mood elevation and cognitive science has long suggested that people can experience intense positive as well as negative imagery (Conway, Meares, & Standart, 2004; Pillemer, 1988). The bottom half of Fig. 1 is speculative, but serves to illustrate how mood elevating imagery may fuel mania. Mirroring a similar vicious cycle to that described for anxiety, compared to verbal thoughts about the same topic, positive imagery (i) amplifies ‘positive’ emotion (Holmes, Coughtrey, & Connor, in press; Holmes, Lang, & Shah, in press; Holmes, Mathews, Dalgleish, & Mackintosh, 2006; Holmes, Mathews, et al., 2008) e.g. imagining buying a red sports car. This can again heighten the concomitant physiological response e.g. pulse racing in excitement. Importantly, (ii) it strengthens the interpretation that there is a real positive goal state to be achieved and acted on (Johnson, 2005b) e.g. purchase of a red Ferrari. Amplified mood elevation is predicted to influence behavior by approach towards such goals - see bottom left parenthesis in Fig. 1 - e.g. an impulsive visit to the nearest Ferrari dealer.

Given the lack of research in the bipolar area, convergent support for the notion of amplification of mood elevation by imagery in bipolar disorder is also drawn from other literatures. It is of interest that bipolar comorbidity includes both substance misuse and pathological gambling. Imagery of positive cravings in substance misuse contributes to seeking the desired goal (Kavanagh, Andrade, & May, 2005; May, Andrade, Panabokke, & Kavanagh, 2004). Imaginal simulation of prospective desires share neural aspects of memory function, as already discussed (Schacter et al., 2007) and such simulations can bring about rapid access to emotions associated with related memories. Johnson (2005b) has proposed mania is fuelled, in part, by over-involvement in desired

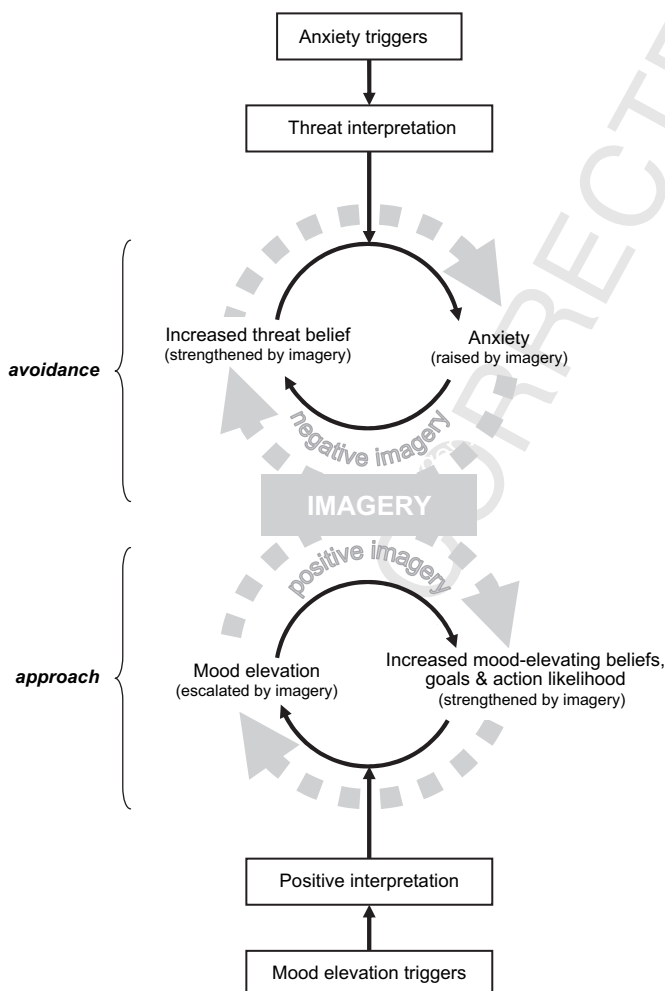


Fig. 1. A model of the role of mental imagery on emotion within bipolar disorder: imagery amplifies anxiety and mania.

goal pursuit. People with bipolar disorder have been found to set more extreme goals for themselves (Johnson & Carver, 2006) and be more motivated to achieve them (Johnson, 2005b). Indeed, pursuing approach goals (striving for a positive outcome) has been associated with risk for hypomania in the general population (Jones, Shams, & Liversidge, 2007). Further, a common prodromal symptom of mania is the presence of increased goal-directed behavior (Lam & Wong, 2005). From a cognitive science perspective, it is assumed that effective goals are simulated as mental images (Conway et al., 2004) and that imagining actions increase the likelihood of performing that action (Carroll, 1978; Gregory, Cialdini, & Carpenter, 1982; Libby et al., 2007). We suggest for bipolar disorder that if daily goals are simulated as mental images then this could fuel both rapid mood elevation and increase impulsivity. Rather than being engaged in the present (which can be quite mundane), there can be a thrill associated with “pre-experiencing” the future via imagining goals, and immersion in such imagery can amplify mood and associated actions. Anecdotally, a female patient in our clinic with BPD-I described that, when hypomanic, she began to experience “wonderful mental images of me, brightly coloured, I’m great, glowing ever so slightly”. This led her further “to portray myself in the appealing way I see myself in my image” by “dressing in vibrant colours and not having shoes on”.

We suggest that mood elevation may be due in part to positive imagery from the past. As an example, a patient in our clinic reported that when developing mania she tended to experience vivid images of an ecstatic memory in which she was elatedly holding her new-born child, surrounded by admiring others bringing her gifts. Mood elevation may be due in part to positive imagery of future events and goals (the “thrill of pre-experiencing”), as above (Sharot, Riccardi, Raio, & Phelps, 2007): another patient in our clinic described having such exciting positive future images of design projects that could be so vivid that they woke him up and kept him awake at night, trying to capture the goals and designs they represented by filling notebooks with the envisaged high-profile projects. He also said that while initially useful, productive and creative, once mania had taken over the intrusive images stopped being “useful” designs and became impractical, incoherent and unfeasible (although he may not realize this at the time).

In summary, we suggest that bipolar patients may be particularly imagery-prone. The catalytic effect of imagery mechanisms on emotion could contribute to both the extremes of mood intensity in bipolar disorder, as well as to rapid changes in mood. This imagery hypothesis has the particular appeal that it offers a unifying mechanism to explain emotional bipolarity, but an imagery focus also suggests there may be a powerful impact on pre-experiencing the future and on changing action likelihood. Furthermore, it makes a necessary link with the known and hitherto unaccountably widely co-occurring features of bipolar disorder such as anxiety (see also below). It may even link with the creativity associated with bipolarity. Consider one of the emblematic literary events of modern fiction – Marcel Proust’s vivid description of positive childhood images triggered by eating a madeleine (Mace, 2007).

Caveats to the hypotheses

We are not claiming that mental imagery is the *only* route to emotion – clearly language-based reasoning can also lead to affect. To claim that imagery has a more powerful impact on emotion is not to claim that verbal reasoning is completely non-emotional. In generalized anxiety disorder (GAD) the core pathological cognitive process is worry, which is conventionally understood to maintain anxiety levels, and GAD is an important comorbidity of bipolar disorder. However, GAD theory suggests that verbal worry may be

used in part as a distraction to keep even more emotional negative imagery at bay (Borkovec & Inz, 1990).

In pathological mood or anxiety states, it seems likely that emotion may arise *de novo*. Our conventional formulations of bipolar disorder place a primary emphasis on such a mechanism. Laboratory studies have indicated an imagery amplifying effect applies for anxiety, depressed mood and positive mood (Holmes, Lang, et al., in press; Holmes & Mathews, 2005; Holmes et al., 2006; Holmes, Mathews, et al., 2008), all of which appear relevant to bipolar disorder. Cognitive theories usually explain how symptoms may be maintained by biases in thinking. Imagery may have a similar effect, but its more automatic qualities also predict a role in the *de novo* production of emotion akin to that usually attributed to biological mechanisms. In any case, once established it is difficult to see how imagery would not contribute to the phenomenology of bipolar anxiety just as it does in other anxious patients.

Hypotheses for a wider role of imagery in bipolar disorder

Mood instability

While imagery might provide a link between life events and episodes of severe mood elevation, anxiety and depression, in classic episodic bipolar disorder, such episodes are relatively infrequent. The median time to re-admission after a first episode of mania is four years (Kessing, Andersen, Mortensen, & Bolwig, 1998). Accordingly, studying the onset of full-blown mood episodes is difficult. An alternative target could be another poorly understood characteristic of bipolar disorder, mood instability (Akiskal, 1994; Akiskal et al., 1995). If, as described above, imagery can act like an amplifier of the emotional intensity of a given thought, mental imagery could be expected to contribute significantly to the persistent mood instability. Imagery has the immediacy and completeness that verbal descriptions lack. It seems to have the necessary properties that will account for swift changes to positive or negative mood in patients who are formally inter-episode. For some patients, chronic mood instability is an important bad clinical outcome.

We are aware that predominant patient experience in bipolar disorder is of low mood (Judd et al., 2003, 2005). While negative images cause also distress in major depressive disorder (Kuyken & Brewin, 1994; Patel et al., 2007), unlike for the anxiety disorders, a key process maintaining depressed affect is rumination (Nolen-Hoeksema, 1991; Teasdale & Barnard, 1993). Rumination is a predominately verbal process (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002) involving recurrent thinking about negative feelings, and the causes, meanings and implications for self. In bipolar disorder such ruminative verbal appraisals appear from existing evidence to be comparable with unipolar depressed patients, though may differ in content (Mansell, Colom, & Scott, 2005). Thus, if mood instability is more striking in bipolar than unipolar patients we predict that the strength of any between mood instability and imagery will depend critically on the experience of mood elevation and/or anxiety (rather than just depressed affect). Interestingly, dysphoria has been associated with a deficit in imagining positive (but not negative) future outcomes (Holmes, Lang, et al., 2008). Prospective, positively affective images of the future may distinguish mania and depression.

Suicidal imagery

Risk for suicide is high in bipolar disorder (Dilsaver & Chen, 2003; Simon et al., 2007). Suicidal patients may not only verbally reflect on suicide but imaginatively simulate how to commit suicide (Holmes, Crane, Fennell, & Williams, 2007; Selby, Anestis, & Joiner, 2007). Vivid mental images of future suicidal acts have been termed

“flashforwards”, to mirror imagery “flashbacks” to past trauma (Holmes, Crane, et al., 2007). Given the causal link between imagery simulations and increased action likelihood (Libby et al., 2007), suicidal imagery is predicted to promote impulsive action. For example, a male patient with BPD-I reported persistent, intrusive vivid imagery of himself jumping from a certain cliff when suicidal. He had a history of escaping the inpatient ward to reach this particular cliff some distance from the hospital (Holmes, Crane, et al., 2007).

Creativity

Increased use of imagery is associated with increased creativity, and thus may confer creativity within bipolar disorder. People with history of manic symptoms are overrepresented in samples of highly accomplished creative individuals (Johnson, 2005b). Bipolar subjects score higher on creativity tests than normal controls and unipolar depressive subjects, in the same range as highly creative normal subjects (Santosa et al., 2007). From Blake and Byron to Van Gogh and Woolf, numerous artists, poets, writers and designers have experienced bipolar disorder, as discussed by Jamison (1993). We are unable to do justice to the scope of this association, beyond noticing the hackneyed expression that “a picture says a thousand words”; Imagery may have an advantage over more linear verbal thought in creating complex and novel combinations of ideas. Indeed, the ability to mentally simulate and thus experiment using imagery in the mind’s eye is fundamental to creativity. For example, Kekulé’s discovery of the ring structure of the benzene molecule was triggered by his mental image of seeing a snake bite its own tail (Boden, 2003). In describing the use of imagery in poetry, Ezra Pound said “The image is more than an idea. It is a vortex or cluster of fused ideas and is endowed with energy” (Pound, 2005). Whereas imagery may fuel affective pathology in bipolar disorder, the converse is that imagery susceptibility may also confer precisely the advantage seen in this disorder - creativity.

Summary of predictions

Several predictions emerge from our hypothesis that imagery acts as an emotional amplifier in bipolar disorder. We have predicted that bipolarity is associated with high imagery susceptibility. Experimental clinical studies are required to test the predictions that a) the emotional intensity of naturally occurring affect states in bipolar disorder is associated with the strength of imagery processing; and b) different affect states (e.g. anxiety, depression, mania) are associated with imagery of different content. Several other avenues for future research have been proposed in this article. We also note that existing measures of imagery may need to be tailored to best measure the aspects of imagery we have predicted to be most relevant for bipolar disorder e.g. to assess prospective and involuntary imagery. Imagery is a multifaceted domain. General measures of imagery and deliberate imagery generation will need to be contrasted with those involuntary, intrusive measures of imagery particularly relevant in psychopathology.

Implications for cognitive behavioral treatment innovation for bipolar disorder

A better understanding of cognitive processes in bipolar disorder will lead much-needed CBT treatment development. In anxiety disorders, CBT’s successes derive from rigorous formulation and testing of the underlying cognitive processes for a specific disorder. It pinpoints the precise ingredients that need to be targeted e.g. catastrophic images “I am about to die of a heart attack” in panic disorder (Clark, 1986), or PTSD imagery flashbacks which

evoke a sense of current threat (Ehlers & Clark, 2000). By formulating the range of cognitive ingredients in a model, and their contribution to symptom maintenance, the CBT therapist can intervene by breaking the maintenance cycle with targeted techniques. While novel for bipolar disorder, our proposal to focus on imagery is not new for CBT more broadly. As originally highlighted by Beck (1976), patients can also experience striking mental images which amplify a purely verbal description. For example, a depressed patient may report a negative verbal thought such as am “I am worthless” but when prompted also report an intrusive image of themselves shunned by others, cowering in a corner in miserable isolation. It follows that the frequently taught cognitive emphasis on verbal processing (e.g. with negative automatic thought records) may inadvertently neglect the more affectively ‘hot’ medium of imagery. Imagery techniques are being integrated in a range of new treatment developments e.g. the use of imagery rescripting (Holmes, Arntz, & Smucker, 2007) in treatment for borderline personality disorder (Giesen-Bloo et al., 2006) and for depression (Wheatley et al., 2007).

Where does this lead us for bipolar disorder? As we have argued, currently there is limited indication for routine use of CBT with bipolar patients (Scott & Colom, 2008). However, earlier models of bipolar disorder may be lacking – they have focused on depression and mania, while not targeting other affectively ‘hot cognitions’ such as anxious images. Further, CBT for bipolar disorder to date has been based on traditional verbal CBT methods rather than its imagery techniques. By better delineating how anxious (and other) images manifest in bipolar disorder we can improve our conceptual model of it. Consistent with the findings of Scott et al. (2006), we have informal experience of bipolar patients for whom CBT has proved unhelpful and from whom the feedback is that negative (verbal) thoughts do not drive their moods, so the focus of therapy felt wrong. In contrast, their ability to describe and report on their mental imagery, once a definition is provided, is striking. Our suggestion is also consistent with more recent cognitive approaches to bipolar disorder which address more specific elements of the disorder rather than the “whole package” at once (Johnson, 2005a; Johnson & Carver, 2006). Moreover, a focus on imagery delivers a fresh, adjunctive treatment target that could be incorporated into other evidence-based approaches such as family focused therapy (Miklowitz et al., 2003), interpersonal social rhythm therapy (Frank et al., 2005) and psychoeducation (Colom et al., 2003). Medication remains a critical treatment component for bipolar disorder. However, improving the cognitive theory of bipolar psychopathology may also drive a better understanding of the mechanisms of drug action as has happened for antidepressants (Harmer, Hill, Taylor, Cowen, & Goodwin, 2003).

Summary

Advances in the cognitive science of anxiety have highlighted that mental imagery is critical in exacerbating emotional states (Holmes & Mathews, 2005; Holmes, Mathews, et al., 2008). Understanding affective imagery in anxiety disorders like PTSD (Ehlers & Clark, 2000) and social phobia (Clark et al., 2006) has been crucial in the development of recent, highly successful CBT methods. Imagery provides a hub in the cognitive formulation of disease maintenance thus providing a target for alternative treatment techniques than simply verbal discussion. Despite the remarkable comorbidity between bipolar disorder and anxiety, research on emotional imagery in bipolar disorder is lacking. Imagery may offer a window not only on anxiety but other key features of bipolar disorder such as mood elevation and mood instability. We have formulated this as the specific hypothesis that bipolar patients may be unusually imagery susceptible, and that the presence of such imagery amplifies many aspects of their emotional

experience and may in part account for why it becomes problematic. Our clinical experience, while still anecdotal, supports this. We need to scope the potential for anxiety-related processes and imagery as future therapeutic targets. This paper presents a conceptual framework as a prerequisite to drive research questions in this novel area. Imagery is the language of emotion, and bipolar is an emotionally volatile disorder – the two need to converge.

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