

## Editorial

## Mood instability: significance, definition and measurement

M. R. Broome, K. E. A. Saunders, P. J. Harrison and S. Marwaha

**Summary**

Mood instability is common, and an important feature of several psychiatric disorders. We discuss the definition and measurement of mood instability, and review its prevalence, characteristics, neurobiological correlates and clinical implications. We suggest that mood instability has underappreciated transdiagnostic potential as an investigational and therapeutic target.

**Declaration of interest**

P.J.H. has sat on advisory boards for Sunovion and Roche,

and has been an expert witness in pharmaceutical patent litigation cases. S.M. has received sponsorship from Otsuka and Lundbeck to attend an academic congress and owns shares in GSK and AstraZeneca.

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Mood instability is a common experience. In the Adult Psychiatric Morbidity Survey (APMS) 2007 ( $n = 7403$ ),<sup>1</sup> a population rate of 13.9% was found. It was more common in women than men, peak prevalence was in those aged 16–24, and it gradually declined with age with 7% of 65- to 74-year-olds reporting unstable mood.<sup>1</sup> Mood instability is reported in 40–60% of those with depression, anxiety disorder, post-traumatic stress disorder and obsessive-compulsive disorder, and is associated with increased health service use and suicidal ideation, independent of neurotic symptoms, alcohol misuse, borderline personality disorder and other confounders.<sup>2</sup> Complementing these data in the general population, mood instability has clinical significance beyond simply being a feature of several psychiatric disorders: it is involved in their origins and affects prognosis. Mood instability is part of the prodrome of bipolar disorder,<sup>3</sup> and can occur in the earliest phases of attention-deficit hyperactivity disorder and depressive disorder. It is not only a mediating factor in the pathway from trauma to emerging borderline personality disorder but also in the genesis of hallucinations, paranoia and psychotic disorders.<sup>4</sup> Mood instability independently predicts worse long-term outcome in euthymic patients with bipolar disorder.<sup>5</sup>

**Defining and measuring mood instability**

These findings together indicate that mood instability is an important aspect of psychopathology, and suggest that better

understanding of its nature, origins, correlates and implications would be valuable. However, attempts to make progress must first address the lack of consensus as to the definition of mood instability. For example, the APMS studies relied upon a single question to assess mood instability ('Do you have a lot of sudden mood changes' with the timescale being 'suffered this symptom over the last several years'), taken from the structured interview for the DSM-IV diagnosis of borderline personality disorder,<sup>6</sup> whereas assessments of mood instability in clinical samples typically use one of several rating scales. Clearly, these will result in very different estimates of prevalence and, potentially, in the concept being measured.

The nomenclature surrounding affect or mood includes valence, intensity, frequency of shift, rapidity of rise-times and return to baseline, reactivity to psychosocial cues and the extent to which there is overdramatic expression. The literature spans psychiatry, psychology and neuroscience, and multiple terms are used to describe the same, or related phenomena, including affective instability, emotional dysregulation, mood swings, emotional impulsiveness and affective lability. Collating the main overlapping dimensions, definitions, and their measurement scales, a recent systematic review proposed that mood instability is 'rapid oscillations of intense affect, with a difficulty in regulating these oscillations or their behavioural consequences'.<sup>7</sup> The presence of these various elements mandates a multidimensional approach to assessment of mood instability. The current uncertainties may contribute to the fact that patients experiencing unstable mood are not consistently given an explanation by their clinician, even though they value one.<sup>8</sup>

Progress in defining and measuring mood instability can be facilitated by taking advantage of two recent developments. First, the mood instability literature to date is almost entirely derived from the use of retrospective questionnaires. Clearly, this has been and remains a valuable approach. However, responses to retrospective questionnaires are known to suffer from limitations including recall bias, and may be a particular problem for studies of mood instability given its dynamic nature;<sup>9</sup> both variation and intensity need to be recalled in addition to the mood state *per se*. Momentary assessment and remote monitoring methodologies can largely overcome these problems, and give greater insight and a more detailed quantitative characterisation of the nature of mood instability in daily life. For example, high-frequency prospective automated mood monitoring such as that used in

the True Colours system ([www.truecolours.nhs.uk](http://www.truecolours.nhs.uk)) reveals a complex picture in bipolar disorder in which chronic mood instability is more common than discrete episodes.<sup>10</sup> Second, it is increasingly possible to use remote sensors and other devices (such as via smartphones, smartwatches or patches) to capture the behavioural, physiological and environmental correlates of mood instability, and in this way provide a much richer and deeper understanding.<sup>11</sup>

### Investigations and implications of mood instability

Despite the complexities, mood instability merits greater clinical and research attention than simply being an acknowledged but often neglected component of psychopathology.

#### What is its origin?

Mood instability presumably shares some of the same genetic and environmental risk factors as the disorders in which it is a feature but may also have its own causal factors. Longer-term epidemiological studies of mood instability, examining persistence from childhood, will enable a greater understanding of how far it is a precursor to, or a risk factor for, a particular disorder or for multiple outcomes. In addition discovery of causes, trajectories and insights into the nature of mood instability in different disorders would shed light on its shared elements or transdiagnostic aspects. In this regard, mood instability fits well as a construct of the kind envisaged in the Research Domain Criteria (RDoC):<sup>12</sup> it is likely to reflect problems in a core behavioural function of the brain, seems likely to be related to a dysfunction in neural circuits, and is dimensional.<sup>13</sup>

#### What are its cognitive and neural correlates?

Cognitive function is impaired in diagnostic groups where mood instability is prominent<sup>14</sup> and the relationship between mood instability and fluctuations in attention, cognition, and the underlying brain processes will be of interest. The amygdala and its functional connectivity may be altered,<sup>15</sup> but the circuits underlying mood stability, and how these are impaired in those with unstable mood remain to be identified. For example, there may (or may not) be a relationship between neural stability (for example in oscillatory activity) and stability as manifested at the cognitive or emotional level. These questions can be investigated by multimodal study of participants with differing degrees of mood instability, including brain imaging methods such as magnetoencephalography.

#### What are the implications for treatment?

We can see two facets to this important issue. First, stabilisation of mood could be an early marker or predictor of the subsequent efficacy of interventions to treat clinical mood episodes. This would be analogous to the discovery that the clinical efficacy of antidepressants can be predicted by their acute effects on emotional processing.<sup>15</sup> If so, it would provide an experimental medicine model for bipolar disorder, as well as for borderline personality disorder and other disorders and prodromal states in which mood instability has a key role, and would facilitate more rapid and cost-effective testing of novel interventions and thereby encourage more innovation and investment in these neglected areas. This approach can in principle apply to psychological as well as pharmacological treatments. Second, stabilisation of mood may be therapeutically valuable beyond the usual sense of

preventing episodic relapses in bipolar disorder, given the evidence that unstable mood during euthymia, and in the prodrome of illness, predicts worse functioning and outcome. As such, mood instability may be an important target for early intervention in a variety of conditions. Clearly, it would be necessary to demonstrate the efficacy, safety and acceptability of any such interventions before they could be advocated in clinical practice.

All these investigations of mood instability will be facilitated by the rapid developments mentioned earlier in methods for the more fine-grained and remote assessment of mood and its integration with environmental and physiological data. One result may be the delineation of subgroups based on their mood instability and associated characteristics, which cut across existing syndromal boundaries and which can be tested for their prognostic and therapeutic correlates. A second result may be the identification of mood instability signatures in individual patients that predict an imminent event (such as a manic episode) and which could be rapidly relayed back (for example, via a text to their smartphone), allowing the patient to implement appropriate behavioural changes, or to take additional medication. The feasibility and clinical utility of this approach and technology will need to be carefully tested.

In summary, mood instability is a common, clinically important phenomenon, with functional consequences. More precision in its definition and measurement, in combination with contemporaneous assessment of physiology, behaviour and environment, will facilitate study of its characteristics, correlates and implications. The latter include the possibility that mood instability has a broader potential as a therapeutic target than is currently the case.

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First received 15 Jan 2015, accepted 20 Apr 2015

### Funding

P.J.H. and K.E.A.S. are supported by a Wellcome Trust Strategic Award 'Collaborative Oxford Network for Bipolar Research to Improve Outcomes (CONBRIO)'.

### References

- 1 Marwaha S, Parsons N, Flanagan S, Broome M. The prevalence and clinical associations of mood instability in adults living in England: results from the Adult Psychiatric Morbidity Survey 2007. *Psychiatry Res* 2013; **205**: 262–8.
- 2 Marwaha S, Parsons N, Broome M. Mood instability, mental illness and suicidal ideas: results from a household survey. *Soc Psychiatry Psychiatr Epidemiol* 2013; **48**: 1431–7.
- 3 Howes O, Lim S, Theologos G, Yung AR, Goodwin GM, McGuire P. A comprehensive review and model of putative prodromal features of bipolar affective disorder. *Psychol Med* 2011; **41**: 1567–77.
- 4 Marwaha S, Broome MR, Bebbington P, Kuipers E, Freeman D. Mood instability and psychosis: analyses of British national survey data. *Schizophr Bull* 2014; **40**: 269–77.
- 5 Streljevic SA, Martino DJ, Murru A, Teitelbaum J, Fassi G, Marengo E, et al. Mood instability and functional recovery in bipolar disorders. *Acta Psychiatr Scand* 2013; **128**: 194–202.
- 6 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (4th edn) (DSM-IV)*. APA, 1994.
- 7 Marwaha S, He Z, Broome MR, Singh SP, Scott J, Eyden J, et al. How is affective instability defined and measured? A systematic review. *Psychol Med* 2014; **44**: 1793–808.

- 8 Bilderbeck AC, Saunders KEA, Price J, Goodwin GM. Psychiatric assessment of mood instability: qualitative study of patient experience. *Br J Psychiatry* 2014; **204**: 234–9.
- 9 Solhan MB, Trull TJ, Jahng S, Wood PK. Clinical assessment of affective instability: comparing EMA indices, questionnaire reports, and retrospective recall. *Psychol Assess* 2009; **21**: 425–36.
- 10 Bonsall MB, Wallace-Hadrill SMA, Geddes JR, Goodwin GM, Holmes EA. Nonlinear time-series approaches in characterizing mood stability and mood instability in bipolar disorder. *Proc Biol Sci* 2012; **279**: 916–24.
- 11 Glenn T, Monteith S. New measures of mental state and behavior based on data collected from sensors, smartphones, and the internet. *Curr Psychiatry Rep* 2014; **16**: 523.
- 12 Insel T, Cuthbert B, Garvey M, Heinssen R, Pine DS, Quinn K, et al. Research Domain Criteria (RDoC): toward a new classification framework for research on mental disorders. *Am J Psychiatry* 2010; **167**: 748–51.
- 13 Broome MR, He Z, Iftikhar M, Eyden J, Marwaha S. Neurobiological and behavioural studies of affective instability in clinical populations: a systematic review. *Neurosci Biobehav Rev* 2015; **51**: 243–54.
- 14 Bourne C, Aydemir Ö, Balanzá-Martínez V, Bora E, Brissos S, Cavanagh JTO, et al. Neuropsychological testing of cognitive impairment in euthymic bipolar disorder: an individual patient data meta-analysis. *Acta Psychiatr Scand* 2013; **128**: 149–62.
- 15 Harmer CJ, Goodwin GM, Cowen PJ. Why do antidepressants take so long to work? A cognitive neuropsychological model of antidepressant drug action. *Br J Psychiatry* 2009; **195**: 102–8.



## psychiatry in pictures

### The famous case of Alice Cooper

Mark Silvert

Alice Cooper, the infamous theatrical rock star, real name Vincent Furnier, was suffering with depression and life-threatening alcohol addiction at the height of his success, when he was drinking well over a bottle of whiskey a day. This comic depicting Alice being committed to hospital was published in 1979 by Marvel Comics to coincide with Alice's album 'From the Inside'. It was co-written with Elton John's well-known lyricist Bernie Taupin. It describes when Alice Cooper voluntarily incarcerated himself into Cornell Medical Centre in White Plains, New York.

He was there for 3 months and in the comic he depicts the patients, doctors and nurses he met during his admission. Alice has often commented in interviews that treatment in hospital and recovering from his substance misuse saved his life, when many similar artists at that time, such as Jim Morrison and Janis Joplin, were not as fortunate, succumbing to their addictions.

The lead single from the album was 'How You Gonna See Me Now', a song describing the anxiety the singer felt coming back home to his wife after his stay in hospital and facing the stigma of being treated for his mental illness. It went on to become a well-known successful ballad.

The comic can still be found in comic shops or through online auction sites.

Alice is now a supporter of substance misuse and rehabilitation charities in the USA. He has continued recording and touring since his time in Cornell and is still doing so all these years later. Image © Marvel Comics and Alice Cooper. Reproduced with permission.

