Measuring mood – relative sensitivity of numerical rating and Likert scales in the context of teaching electroacupuncture. Initial findings and the influence of response style on results.
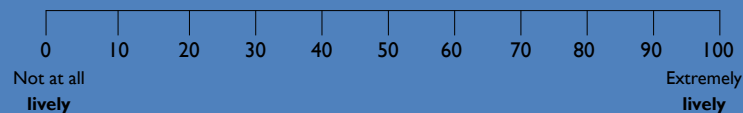
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Background

Mood and its changes are important but often overlooked in acupuncture research (a PubMed search revealed only eight studies with both 'acupuncture' and 'mood' in the title). A number of mood questionnaires exist, all using Likert scales, such as the proprietary 65-item Profile of Mood States (POMS). An anglicised and shorter version of POMS is the validated, open-access 24-item Brunel Mood Scale (BRUMS$_{24}$). Like POMS it comprises six subscales – five of negative valence (ANGer, CONFusion, DEPRession, FATigue, TENSion), one positive (VIGour), with a derived Total Mood Disturbance (TMD).

Our own acupuncture research called for a quick and easy method of assessing mood and its changes before, during and after stimulation. Most existing measures were overly complicated or for other reasons did not meet our requirements.

Following several pilot studies, we therefore developed a multiple numerical rating scale for mood (NRS-M) with four negative subscales (Anxious, Confused, Fatigued, Gloomy) corresponding to those in BRUMS$_{24}$ and four positive subjective states (Comfortable, Lively, Relaxed and overall 'Good mood') that we considered would be useful in our research, rather than focusing solely on the pathological states emphasised by POMS and BRUMS$_{24}$. Using fewer words, we hoped this would be easier to understand for non-native English speakers and those with learning difficulties, as well as quicker to complete even than BRUMS$_{24}$. Here we analyse its use in a teaching situation.

Main objectives

1. To assess validity and reliability of the NRS-M.

2. To determine whether NRS-M is more sensitive to mood and its changes than BRUMS$_{24}$, using a variety of methods.

3. To conduct factor and cluster analyses for NRS-M and BRUMS$_{24}$.

4. To investigate common response styles for both scales.

Methods

- Ethics approval was obtained, and 158 respondents recruited from attendees at nine UK electroacupuncture (EA) training seminars.
- The two measures were administered in paper form in quick succession twice in each teaching session – once early on (NRS-Pre; BRUMS-Pre), and once towards the end of the session (NRS-Post; BRUMS-Post), after most participants had received a brief, individualised EA treatment from a fellow attendee.
- NRS-M subscales were printed in such a way that it was unlikely that they would appear in the same order in both NRS-Pre and NRS-Post for a particular respondent.
- Statistical analysis (non-parametric) was conducted in Excel and SPSS.

Example Likert and NRS subscales

BRUMS$_{24}$ – Circle one of the numbers to describe **how you feel right now**.

Word	Not at all	A little	Moderately	Quite a bit	Extremely
2. Lively	0	1	2	3	4

NRS-M – Place a cross on each line to represent **how you feel right now**.

0   10   20   30   40   50   60   70   80   90   100

Not at all **lively**   Extremely **lively**

Results 2. Is NRS-M more sensitive than BRUMS$_{24}$?

(a) Test discrimination $delta_G$ (ability to discriminate between individuals *without* reference to an external criterion) was consistently greater for NRS-M than for BRUMS$_{24}$, both Pre and Post and for Pre-Post differences – suggesting that NRS-M has greater sensitivity.

(b) Skewness ÷ SE was consistently positive and almost always numerically greater for BRUMS$_{24}$, indicating that results are probably less dependable than those for NRS-M (Pre and Post). For the Pre-Post difference, Skewness ÷ SE was again more acceptable for NRS-M, if only marginally.

(c) Counts of 'low scores' per individual indicate that NRS-M is significantly more sensitive to all moods than BRUMS$_{24}$, Pre and Post, as well as for Pre-Post changes (12% vs 32% Pre; 18% vs 43% Post; 27% vs 45% Pre-Post difference).

(d) Numbers of 'no change' Pre-Post differences were significantly more for BRUMS$_{24}$ (200 vs 161; p=0.045).

(e) Comparing subscale median values Pre and Post, BRUMS$_{24}$ appears **more** sensitive to changes in mood than NRS-M (except for 'Confused'/CONF and 'Lively'/VIG).

(f) Significance levels of Wilcoxon tests for Pre-Post differences in corresponding subscales in NRS-M and BRUMS$_{24}$ are very similar, but effect sizes are all small (<0.5).

SE = standard error

Where next?

Data is currently being collected to assess external (criterion) validity of some NRS-M subscales in relation to measures such as heart rate variability (HRV), and of its stability (test-retest) reliability when administered repeatedly at intervals of a week or more.

Conclusions

NRS-M is a reasonably robust, responsive and partially validated measure of mood to use in the context of acupuncture practice. It has advantages over longer Likert scales such as BRUMS$_{24}$.

Results 1. Validity & reliability of NRS-M

(a) Concurrent validity

- Correlations of NRS-Pre and NRS-Post subscales with the corresponding BRUMS$_{24}$ subscales are good (>0.6 or above).

(b) Convergent and discriminant validity

- Nonparametric correlation confirms convergence between 'Comfortable' and 'Relaxed'.

- BRUMS$_{24}$ shows greater mean correlation between subscales than NRS-M, suggesting greater discriminant validity for NRS-M than BRUMS$_{24}$.

(c) Internal consistency and test-retest reliability

- Cronbach's *alpha* was consistently low for both NRS-Pre and NRS-Post, greatest when calculated for positive subscales only, and predictably higher for BRUMS$_{24}$.

- In this context, NRS-M test-retest reliability was low (except for 'Comfortable'), possibly indicating greater sensitivity than BRUMS$_{24}$ to changes in some moods.

Results 3. Factor & cluster analyses

For both methods:

- The association between 'Comfortable' and 'Relaxed' is consistent.

- 'Comfortable', 'Relaxed' and 'Lively' are associated for NRS-Pre.

- 'Comfortable' and 'Relaxed' are associated for NRS-Post, as are 'Anxious', 'Confused' and 'Gloomy'.

- Best agreement between the methods is for NRS Pre-Post, with (1) 'Comfortable', 'Relaxed' and 'Lively', and (2) 'Anxious', 'Fatigued' and 'Gloomy' as the main two factors/clusters, but lack of agreement about 'Confused'.

Results 4. Response style (RS)

- Most NRS-M respondents exhibited a 'mild response style' (or non-extreme RS, NERS).

- Numbers of those who exhibited another RS *consistently* Pre and Post were small (<9% for NRS-M; <8% for BRUMS$_{24}$; 0.8% for both).

- Thus RS is unlikely to threaten the validity of conclusions drawn from responses to the two scales.

- However, ERS respondents to NRS-M are likely to emphasise positive moods and to de-emphasise negative moods (p<0.001).

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More details are available at www.qeeg.co.uk/electroacupuncture/EAmood, also accessible through the QR code at the head of this poster.