Mood changes in response to electroacupuncture treatment in a classroom situation. Personality type, emotional intelligence and prior acupuncture experience, with an exploration of Shannon entropy, response style and graphology variables

© Tony Steffert[1] and David Mayor[2]
1. Music Computing Lab, Open University; 2. School of Health and Social Work, University of Hertfordshire

ABSTRACT

Background. We have used multiple rating scales to assess moods in our research since 2011. Here we present the results of using a multiple NRS for mood, the NRS-M, before and after electroacupuncture (EA) delivered by and to students in a classroom situation. With a variety of innovative secondary measures, we explore *how* the NRS-M was scored, and also whether personality type, emotional intelligence and the helpfulness of prior acupuncture impacted on NRS-M scores and changes. **Objectives. 1.** To pilot primary measures of personality type, emotional intelligence (EI) and the helpfulness of prior acupuncture in a teaching situation; **2.** To develop secondary measures to describe *how* the NRS-M and EI scales are completed; **3.** To provide descriptive statistics for these primary and secondary measures; **4.** To investigate interactions between the primary and secondary measures; **5.** To draw conclusions from the resulting findings. **Methods.** Respondents were recruited during six EA teaching sessions in the UK, attended as part of the requirement for a University degree qualification in acupuncture practice. The teaching sessions all followed a similar standard pattern, and respondents were not obliged to complete the scales. Ethics approval was granted under applications for related studies by the Health and Human Sciences Ethics Committee of the University of Hertfordshire, UK. Permission was also received from the course organisers and respondents themselves. Further information on the questionnaires and secondary measures used, together with their analysis, is provided online at http://www.qeeg.co.uk/electroacupuncture/. **Results.** Mood changes exhibited a 'regression to the median': 'Positive' moods tended to increase and 'negative' moods to decrease. Intuitive Jungian (Myers-Briggs) types outnumbered Sensing types, and Feeling types outnumbered Thinking types, supporting the view of acupuncturists as likely to be – or to consider themselves as – more 'touchy-feely' than thinking types. In support of this, emotional intelligence (EI) scores for these acupuncture students appeared significantly higher than the reference norms for the general population. There were also differences in response between Introverts and Extraverts, and several dimensions of EI that can be considered as markers of self-regulation were significantly more prominent for 'good responders' than 'poor responders'. In addition, those who initially felt more 'Gloomy' were slightly more likely to position their X below the line when scoring their moods using the NRS, whereas EI Optimism tended to be higher in those scoring above the line. **Conclusions.** Many statistical tests were conducted to assess differences and associations between the primary and secondary measures used in this study, so at least some of these findings are likely to be the result of chance. They should therefore be treated with caution rather than embraced uncritically. Nevertheless, our results may be helpful when entering the uncharted waters of the question 'Who responds well to acupuncture?', our next major project. Similarly, this first known attempt to use Shannon entropy to analyse questionnaire results was disappointing, but could pave the way to investigating whether variability (uncertainty) in responses to self-report instruments is in any way associated (positively) with more openness or awareness, or (negatively) with levels of stress or anxiety.

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Background

We have been using multiple rating scales to assess moods in our research since 2011, initially with visual analogue scales (VAS) (Mayor & Steffert 2013), and more recently numerical rating scales (NRS) (Mayor & Steffert 2016). Such measures are convenient for assessing changes in response to acupuncture treatment, and we have used them in our ongoing experimental research into the effects of electroacupuncture (EA) and transcutaneous electroacupuncture stimulation (TEAS), as well as with groups of students and practitioners attending seminars on these methods of treatment. Here we present the results of using a multiple NRS for mood, the NRS-M, before and after EA delivered in a classroom situation. With a variety of innovative secondary measures, we explore *how* the NRS-M was scored, and also investigate whether personality type, emotional intelligence and the helpfulness of prior acupuncture impact on NRS-M scores and changes.

Objectives

Our objectives were data-derived and exploratory, rather than fully defined beforehand:

1. To pilot primary measures of personality type, emotional intelligence (EI) and the helpfulness of prior acupuncture in a teaching situation, in addition to the NRS-M (used before).
2. To continue developing secondary measures that can be used to describe *how* the NRS-M and EI scales are completed.
3. To provide descriptive statistics for the primary and secondary measures used.
4. To investigate the interactions between these primary and secondary measures.
5. To attempt to draw some useful conclusions from the resulting thicket of findings.

Methods

Recruitment

Respondents were recruited during six pre-arranged EA teaching sessions in the UK, attended as part of the requirement for a University degree qualification in acupuncture practice. Respondents were not obliged to complete the scales. The teaching sessions all followed a similar standard pattern.

Ethics approval was granted under applications for related studies by the Health and Human Sciences Ethics Committee of the University of Hertfordshire, UK (Protocols HEPEC/07/11/93 and HSK/SF/UH/00124). Permission was also received from the course organisers and respondents themselves.

Measures

1. Primary measures

Primary measures in this study were:

- Mood (NRS-M)
- Emotional intelligence (TEIQue-SF)
- Helpfulness of prior acupuncture (AHQ)
- Personality type (JTT).

As in previous pilot studies (Mayor & Steffert 2013, 2016), numerical rating scales were used to assess eight moods or related states (NRS-M; see **Appendix A**). In addition, students were asked to complete the 30-item short form of the Trait Emotional Intelligence Questionnaire (TEIQue-SF) (Petrides 2009), to state whether they had received acupuncture previously and, if so, whether (and how) they had found this helpful (acupuncture helpfulness questions, AHQ; see **Appendix B**). They were also asked to complete the Jung Typology Test (JTT), an open-access online self-test (http://www.humanmetrics.com) which gives results similar to those of the proprietary Myers-Briggs (MB) type indicator (Pauline Esson, personal communication, 14 Oct 2016). The subscales, dimensions and types of the three main measures are shown in **Table 1**.

Table 1. NRS mood subscales, TEIQue-SF emotional intelligence traits and Jungian combination types.

NRS Moods	TEIQue-SF traits	Jungian (JTT) combination types
1. Anxious	1. Global trait emotional intelligence	1. Introverted, sensing, thinking, judging
2. Comfortable	2. Wellbeing	2. Introverted, sensing, feeling, judging
3. Relaxed	3. Self-control	3. Introverted, intuitive, feeling, judging
4. Lively	4. Emotionality	4. Introverted, intuitive, thinking, judging
5. Confused	5. Sociability	5. Introverted, sensing, thinking, perceiving
6. Fatigued	6. [Adaptability][a]	6. Introverted, sensing, feeling, perceiving
7. Gloomy	7. [Self-motivation][a]	7. Introverted, intuitive, feeling, perceiving
8. Overall, in a good mood	8. [Stress management][a]	8. Introverted, intuitive, thinking, perceiving
	9. [Trait empathy][a]	9. Extraverted, sensing, thinking, judging
	10. [Trait optimism][a]	10. Extraverted, sensing, feeling, judging
		11. Extraverted, intuitive, feeling, judging
		12. Extraverted, intuitive, thinking, judging
		13. Extraverted, sensing, thinking, perceiving
		14. Extraverted, sensing, feeling, perceiving
		15. Extraverted, intuitive, feeling, perceiving
		16. Extraverted, intuitive, thinking, perceiving

a. The bracketed dimensions of emotional intelligence are best assessed using the full version of the TEIQue (153 items, covering 15 facets), although the short form does give some indication of their relative importance.

2. Secondary measures

In addition to the measures themselves, the following styles of response were investigated as secondary measures:

2.1. Response Style (NRS and TEIQue-SF)

'Extreme response style' (i.e., tending to score at either end of the NRS or the TEIQue-SF) and 'Midpoint response style' (tending to score towards the middle of the NRS or TEIQue-SF) are convenient and recognised ways of assessing how respondents may complete questionnaires, irrespective of their content. Other response styles were not considered in this analysis. Response styles (RSs) were calculated as appropriate for our data using standard definitions (Baumgartner & Steenkamp 2001; Weijters et al. 2008; Cabooter 2010; Mayor & Steffert 2016) (**Table 2**).

Table 2. Definitions of NRS Extreme and Midpoint response styles, with thresholds for 'high' (and 'low') scores (from Mayor & Steffert 2016).

NRS	by subscale	Threshold (sum by respondent)
ERS	≤10 or ≥90	≥6
MRS	≥40 and ≤60	≥7

Table 2b. Definitions of TEIQue-SF Extreme and Midpoint response styles, with thresholds for 'high' (and 'low') scores.

TEIQue-SF	by subscale	Threshold (sum by respondent)
ERS	≤2 or ≥6	≥23
MRS	≥3 and ≤5	≥18

TEIQue-SF thresholds were calculated on the basis of expected scores in the ERS or MRS ranges, using the Binomial test.

2.2. Responsiveness

Two methods of assessment were used:

2.2.1. NRS responsiveness was considered to be good or large when absolute values of the Pre-Post differences in NRS subscale scores tended to be large (in the top decile), with at most one 'no difference' subscale score. It was considered to be poor or small when no scores were in the top decile, and there was no difference in at least one subscale score.

2.2.2. A confirmatory hierarchical cluster analysis was carried out (using Ward's method and squared Euclidean distances) to determine how closely results agreed with method 1.

2.3. Shannon Entropy (ShannEn)

Shannon entropy is a useful measure of the inherent uncertainty or randomness of information in a given string of data. Higher values indicate more uncertainty (Shannon & Weaver 1949). A related measure is metric entropy, defined as ShannEn divided by string length. Other measures of entropy or complexity are being used elsewhere in our research in the analysis of physiological time-series data (Bhavsar et al. 2014; Steffert & Mayor, 2014). ShannEn was introduced here as appropriate to the questionnaire data. It was calculated for both the NRS and TEIQue-SF using the open-access online calculator created by Lukasz Kozlowski (http://www.shannonentropy.netmark.pl/). The NRS scores were recoded as single letters, corresponding to the numbers 0, 5, 10, 15, … 100. A single space separated every letter (or number in the case of the TEIQue-SF), and subscales or items not scored were given a specific single-character 'non-scored' code.

2.4. Graphology variables

In the process of transferring paper questionnaire data to spreadsheets, various patterns became evident in how respondents scored the NRS:

2.4.1. 'Verticality' – whether they positioned their mark on the line (as requested), or mostly above or below it;

2.4.2. 'Shape' – whether their marks were a cross (X), as requested, a circle or oval (O), or something other (e.g. a cross in a circle);

2.4.3. 'Size' – whether their marks were unduly large (a X with *both* arms > 10 mm long, or a circle of diameter > 15 mm) or small (a X whose two arms were each < 5 mm long, or a circle of diameter < 6 mm);

2.4.4. 'Openness' – if their marks were generally circles, to what extent these were completely closed or partially left open.

2.4.5. 'Decade scoring' – whether respondents' marks were punctiliously positioned at the decade (or half-decade) markers along the NRS line, or to their right ('above') or left ('below').

Consistency of graphology response was also considered, for the reason that most people are likely, for example, to position a mark above or below a line some of the time, even if their intention is to place it on the line itself. A graphology variable response style was considered consistent if counts for the same score (e.g. -1 below, 0 on the line, +1 above the line) in NRS-Pre and NRS-Post taken together totalled 12 or more (out of 16 items); partially consistent if 8-11; inconsistent if <8 (however, a score of 8 could indicate consistency in one questionnaire, and the other not completed).

Administration

The measures were administered in paper form in in each teaching session – once early on (TEIQue-SF, AHQ, NRS-Pre), when it was judged that most of those who would be attending were present, and once towards the end of the session (NRS-Post), after most participants had received a brief treatment with EA and/or transcutaneous EA stimulation (TEAS) from a fellow attendee. Some attendees declined the treatment because of known contraindications (e.g. pregnancy or a heart condition), and occasionally because of an aversion to something 'non-traditional' like EA or TEAS, or to electricity itself. Some attendees arrived late or left sessions early, and thus were not present to complete both scales. Treatment was supervised but participants were free (within reason) to use their own choice of parameters (frequency, amplitude, mode, pulse and overall stimulation duration) and acupuncture points.

NRS-M (**Appendix A**) was printed with subscales positioned on the page in four different orders, so that it was unlikely that they would appear in the same order in both NRS-Pre and NRS-Post for a particular respondent. These two were also distributed and collected separately, so that they could not be seen at the same time. Thus the likelihood of respondents basing their replies to NRS-Post on their earlier replies to NRS-Pre was reduced.

Instructions were similar for both scales: 'Place a cross on each line to represent how you feel right now' for NRS-M, and 'put a circle around the number' for the TEIQue-SF (and, by implication, the AHQ). Respondents were asked to create and memorise a personal identification code, and entered this on all the scales they completed. In cases of uncertainty or omission, codes were double-checked against writing style and ink colour.

If students had not completed the online Jungian typology self-test (JTT) before the session (or had completed a different version), they were asked to do so during a break in the teaching.

Results

Respondents

88 acupuncture students attended electroacupuncture (EA) seminars as part of their training courses at three different institutions – the College of Integrated Chinese Medicine (CICM, Reading), London South Bank University (LSBU) and the Northern College of Acupuncture (NCA, York). Two seminars were held at each venue: CICM, March and September 2016; LSBU, November 2015 and October 2016); NCA, April and May 2016). Individual demographics such as age and gender were not recorded. **Table 3** shows the numbers of respondents in each group and the questionnaires they completed.

Table 3. Respondents and the questionnaires they completed.
AHQ-overall: 'overall' helpfulness of acupuncture; AHQ-other: helpfulness for particular problems.

Group	Group *N*	NRS-Pre	NRS-Post	TEIQue-SF	AHQ-overall	AHQ-other	JTT
CICM1	18	18	18	18	17	18	15
CICM2	19	14	12	15	14	15	15
LSBU1	13	13	12	13	n/a	n/a	n/a
LSBU2	12	10	10[a]	12	9	12	12
NCA1	15	11	12	15	14	9	14
NCA2	11	11	11	11	11	9	9
Totals	**88**	**77**	**75**	**84**	**65**[b]	**63**	**65**

a. Of these, one did not receive treatment, and another may not have done; b. Several respondents did not complete the AHQ, but only three (from NCA groups) stated that they had not received prior acupuncture.

Measures

3.1. NRS-M

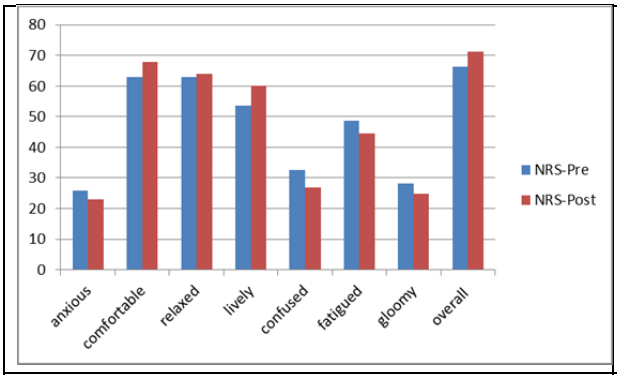
Using values rescored to the nearest multiple of five, modes (the *two* most frequently occurring scores), means, medians, standard deviations (SDs) and upper and lower quartiles for NRS-Pre, NRS-Post and the absolute values of the Pre-Post differences are shown in **Table 4**.

Table 4. Modes, means, medians, standard deviations (SDs) and upper and lower quartiles for NRS-Pre, NRS-Post and the absolute values of the Pre-Post differences.

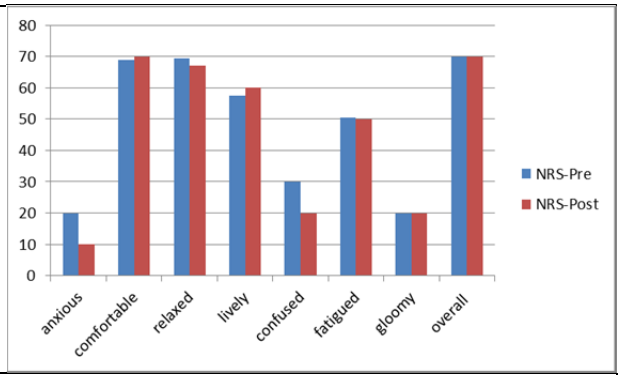
NRS	Statistic	anxious	comfortable	relaxed	lively	confused	fatigued	gloomy	overall
Pre	2 max counts (modes)	0 (17) 20 (8)	40 (10) 50 (7)	50 (9) 60, 90 (6)	70 (10) 60 (8)	0 (11) 30 (10)	0 (8) 60 (8)	0 (12) 10 (9)	70 (12) 60 (9)
	Mean (SD)/ Median	25.90 (24.92) 20.00	63.04 (24.46) 69	63.01 (23.91) 69.50	53.65 (25.21) 57.50	32.63 (27.41) 30.00	48.53 (28.97) 50.50	28.22 (27.10) 20.00	66.19 (21.62) 70.00
	quartiles	1; 49.50	40; 81	50; 80.25	30; 70	10; 51	27; 72	6; 41	50.75; 80
Post	2 max counts (modes)	0 (17) 10 (10)	70 (8) 60 (7)	80 (13) 50 (9)	50 (10) 60 (8)	0 (12) 50 (6)	10 (12); 50 (8)	0 (12) 20 (10)	60 (12) 70, 80 (11)
	Mean (SD)/ Median	22.95 (24.94) 10	67.81 (19.51) 70.00	63.99 (21.94) 67.00	60.05 (19.82) 60.00	26.77 (24.53) 20.00	44.43 (24.49) 50.00	24.71 (23.29) 20.00	71.11 (17.51) 70.00
	quartiles	1; 40	60; 80	50; 80	50; 75	2; 50	20; 66	3; 40	60; 82
Abs Pre-Post Diffs (re-scores)	2 max counts (modes)	0 (26) 10 (12)	10 (19) 20 (16)	10 (19) 0 (18)	10 (22) 20 (16)	0 (25) 10 (16)	20 (17) 10 (13)	0 (24) 10 (16)	10 (23) 0 (19)
	Mean (SD)/ Median	17.82 (19.83) 10.00	19.08 (15.80) 20.00	16.55 (15.85) 10.00	19.93 (16.36) 20.00	16.34 (20.05) 10.00	25.70 (22.27) 20.00	17.86 (21.64) 10.00	13.73 (15.83) 10.00
	quartiles	0; 30	10; 30	0; 30	10; 30	0; 20	10; 40	0; 30	0; 20

Respondents scored the Modes marginally more often in NRS-Post than NRS-Pre, but this difference was not significant.

NRS-Pre and NRS-Post means and medians are shown in **Figure 1** below.



NRS-Pre and NRS-Post: Mean values



NRS-Pre and NRS-Post: Median values

Figure 1. NRS-Pre and NRS-Post means and medians for the complete sample.

Four subscales ('Comfortable', 'Relaxed', 'Lively', 'Overall good mood') reflect what could be considered as 'positive' moods, and four ('Anxious', 'Confused', 'Fatigued', 'Gloomy') as 'negative

moods'. Comparing average values, 'positive' moods tended to increase, and 'negative' moods to decrease. Cell counts confirm this (**Table 7**).

3.1.1. Significant differences between College cohorts

All NRS-Post subscales except 'Gloomy' showed significant differences between the three training colleges. Median values of three 'negative' mood subscales were highest for CICM respondents (Kruskal-Wallis test result for 'Confused': Chi^2=10.10, p=0.006; and for 'Fatigued': Chi^2=7.68, p=0.022) and NCA respondents ('Anxious': Chi^2=8/65, p=0.013; 'Fatigued': Chi^2=7.68, p=0.022). Median values of the four 'positive' NRS-Post mood subscales were all highest for LSBU respondents (**Table 5**).

Table 5. 'Positive' NRS-Post moods: significant results of the Kruskal-Wallis test, showing greatest median values for the LSBU cohort.

Kruskal-Wallis test	p value	Chi^2	median
Comfortable	0.001	13.41	80.0
Relaxed	0.006	10.37	70.5
Lively	0.001	13.38	72.0
Overall good mood	0.006	10.10	80.0

3.1.2. Significant differences in NRS-Post – NRS-Pre subscale *values*

Using the Wilcoxon signed ranks test, the following Pre-Post differences were significant:

'Comfortable' (p=0.048; 24 decreases, 42 increases), 'Lively' (p=0.013; 22 decreases, 44 increases), 'Confused' (p=0.011; 40 decreases, 18 increases). The remaining subscales did not show significant Pre-Post differences.

3.1.3. Significant differences in NRS-Post – NRS-Pre subscale *counts*

Differences in counts, using the basic rescores, as in **Table 4** (to remove very small Pre-Post changes from analysis), are shown in **Table 6**.

Table 6. Significant differences in NRS-Post – NRS-Pre subscale counts.

Change	Anx	Comf[a]	Relax	Lively[b]	Confus[c]	Fatig	Gloomy	Overall
decrease	29	21	26	21	35	37	29	20
no change	26	12	18	11	23	11	24	19
increase	16	38	27	39	12	23	18	32
Totals	**71**	**71**	**71**	**71**	**70**	**71**	**71**	**71**

a. Binomial test (increase/decrease ratio) p=0.036; b. p=0.27; c. p=0.001

Most changes were found for 'Fatigued' and 'Lively'; differences between numbers of increases and decreases were significant only for 'Comfortable' and 'Lively' (more increases) and 'Confused' (more decreases). As for the mean values, counts show that 'positive' moods tended to increase, and 'negative' moods to decrease (Chi^2=33.99, df=2, p<0.001) (**Table 7**), a medium effect size.

Table 7. The Chi^2 test demonstrates an increase in 'positive' moods, and a decrease in 'negative' moods.

Change counts	Positive	Negative
decreases	88	130
no change	60	84
increases	136	69

3.1.4. Splitting the data by respondents' directions of change (NRS-Post – NRS-Pre subscales)

Although when taking the whole sample together, only three subscales showed significant score changes, If the sample is split into NRS Pre-Post 'decreasers', 'no-changers' and 'increasers' for the different subscales, many more changes in value become significant:40 in all for the 'decreasers', 10 for 'no-changers' and 33 for 'increasers' (**Table 8**).

Table 8. Significant subscale score changes

	-1,0,+1	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
Anx	decr	**	ns	*	*	**	*	*	**
	same	ns	ns	ns	ns	ns	ns	ns	ns
	incr	**	ns	**	ns	ns	ns	ns	ns
Comf	decr	ns	**	**	ns	ns	ns	ns	*
	same	ns	ns	ns	ns	ns	ns	ns	ns
	incr	*	**	**	**	**	**	ns	**
Relax	decr	*	ns	**	ns	ns	ns	ns	ns
	same	ns	ns	ns	ns	ns	ns	ns	ns
	incr	**	**	**	**	**	**	ns	**
Lively	decr	ns	*	**	**	ns	ns	ns	**
	same	ns	ns	ns	ns	ns	ns	ns	ns
	incr	ns	**	*	**	**	**	*	**
Confus	decr	ns	**	ns	**	**	**	*	*
	same	ns	ns	ns	ns	ns	ns	ns	ns
	incr	ns	ns	ns	ns	**	ns	ns	ns
Fatig	decr	**	**	*	**	**	**	**	**
	same	ns	ns	ns	*	*	*	ns	*
	incr	ns	ns	ns	ns	ns	**	ns	ns
Gloomy	decr	ns	*	ns	*	**	*	**	*
	same	*	ns	ns	*	*	*	ns	ns
	incr	ns	ns	ns	ns	ns	ns	**	ns
Overall	decr	ns	*	**	*	ns	ns	ns	**
	same	ns	ns	ns	ns	*	ns	ns	*
	incr	**	**	**	**	**	**	ns	**

* p<0.050; ** p<0.01

However, only for the decreased 'Fatigued' subgroup do changes in all the other subscales become significant, whereas for all the no-change 'Anxious', 'Confused', 'Relaxed', 'Lively' and 'Confused' subgroups, no changes in any of the other subscales are significant.

3.1.5. Correlations between NRS-Post minus NRS-Pre subscale changes

As might be expected, therefore, changes in 'Fatigued' correlate with all other subscale changes. Changes in 'Gloomy' correlate with fewest other subscale changes (only two: 'Confused' and 'Fatigued'). **Table 9** shows the significant correlations found (Spearman's *rho* was used to test for these, as none of the Pre-Post differences were normally distributed).

Table 9. Correlations between NRS Pre-Post changes.

rho	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
Anx			**			**		**
Comf			**	**	**	*		**
Relax	**	**		**		**		**
Lively		**	**		*	*		**
Confus		**		*		**	*	
Fatig	**	*	**	*	**		**	*
Gloomy					*	**		
Overall	**	**	**	**		*		

* p<0.050; ** p<0.01

3.1.6. Splitting the data by respondents' overall positive mood change (NRS-Post – NRS-Pre subscales)

Changes in Pre-Post mood can be increases (+1), decreases (-1) or no-changes (0). Adding these directional scores separately for the four 'positive' and four 'negative' moods results in overall positive and negative scores of between -4 and +4 for each respondent. The difference between these positive and negative scores can be considered as a measure of 'overall positive mood change' (OPMC) for that individual.

In this sample, 47 respondents showed OPMC ('positive responders'), 21 more overall negative changes ('negative responders'), and three no overall change. Of these, the sum of positive changes was +4 or more for 29 respondents, and the sum of negative changes -4 or less for 11, with sums between -3 and +3 for the remaining 31 cases.

If the sample is split by OPMC score for the different subscales, changes in value become significant as shown in **Table 10.**

Table 10. Significant changes in NRS Pre-Post changes, data split by direction of change in OPMC.

	+1,0,-1	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
OPMC	decr	*	*	*	*	*	**	ns	**
	same	ns	ns	*	ns	*	ns	ns	ns
	incr	**	**	**	**	**	**	*	**

* p<0.050; ** p<0.01

(The Kruskal-Wallis test, comparing subscale differences for OPMC increasers, no-changers and decreases, shows p<0.001 for all subscale differences except 'Gloomy', for which p=0.017.)

Counts of significant Pre-to-Post decreases, increases and no changes for 'positive' and 'negative' moods (from row counts in **Table 8**), are shown in **Table 11**.

Table 11. The Chi^2 test again demonstrates an increase in 'positive' moods, and a decrease in 'negative' moods.

Significant changes	Positive moods	Negative moods
decreases	13	27
no change	6	8
increases	28	6

Pearson's Chi^2=19.101, df=2, p<0.001.

3.2. Emotional intelligence (TEIQue-SF)

Values for several of the EI dimensions assessed in this study using the TEIQue-SF appear to be higher than the reference values provided for the full version of the questionnaire using a normative sample whose average age (29.7 years, SD 11.9) was probably not dissimilar to that in the current study – although the female-to-male ratio here was probably somewhat higher than that for the normative sample (0.84) (Petrides 2009) (see **Table 12**). This is a small-to-medium effect size.

Table 12. Findings in this study, with means and SDs compared to reference values for the full version of the TEIQue-SF (153 items) [Petrides 2009].

Domain	Mean (SD)				Median	Quartile1	Quartile4
	This study	Ref ♂	Ref ♀	Diff		This study	
Global EI	5.07 (0.58)	4.95^{ns} (0.61)	4.82** (0.57)	≥	4.87	4.58	5.49
Wellbeing	5.61 (0.84)	5.28** (0.83)	5.19** (0.83)	>	5.67	5.00	6.17
Self-control	4.48 (0.96)	4.69^{ns} (0.74)	4.26* (0.76)	≈	4.42	4.00	5.00
Emotionality	5.33 (0.81)	4.92** (0.73)	5.13* (0.68)	>	5.19	4.63	5.88
Sociability	4.70 (0.84)	5.04** (0.76)	4.77^{ns} (0.72)	≤	4.67	4.00	5.33
[Adaptability]	5.37 (1.14)	4.73** (0.85)	4.56** (0.84)	>	5.50	5.50	6.00
[Self-motivation]	4.93 (1.27)	4.77^{ns} (0.82)	4.70^{ns} (0.81)	≈	5.00	4.00	6.00
[Stress management]	4.74 (1.22)	4.82^{ns} (0.89)	4.30* (1.00)	≈	4.50	4.00	5.50
[Empathy]	5.32 (1.14)	4.99* (0.80)	5.22^{ns} (0.74)	≥	5.50	4.00	6.38
[Optimism]	5.78 (1.01)	5.22** (0.96)	5.25** (0.98)	>	6.00	5.00	6.50

** p<0.01; * p<0.05 (1-sample T-test).

There was a significant difference between respondents from the three colleges in Global EI (but not the other TEIQue-SF dimensions), with LSBU showing the greatest Global EI and NCA the least (Kruskal-Wallis test Chi^2=6.59, p=0.037).

3.3. Jungian (JTT) typology

The 16 combination types – combinations of Introverted/Extraverted, Intuitive/Sensing, Feeling/Thinking and Perceiving/Judging – were allocated numbers from 1 to 16, and their four subtype components (IE, InS, FT and PJ) considered as binary (1/0) rather than scale:

ISTJ	1	(1,0,0,0)	ESTP	9	(0,0,0,1)
ISFJ	2	(1,0,1,0)	ESFP	10	(0,0,1,1)
INFJ	3	(1,1,1,0)	ENFP	11	(0,1,1,1)
INTJ	4	(1,1,0,0)	ENTP	12	(0,1,0,1)
ISTP	5	(1,0,0,1)	ESTJ	13	(0,0,0,0)
ISFP	6	(1,0,1,1)	ESFJ	14	(0,0,1,0)
INFP	7	(1,1,1,1)	ENFJ	15	(0,1,1,0)
INTP	8	(1,1,0,1)	ENTJ	16	(0,1,0.0)

The numbers of the different JTT combination types in this sample are shown in **Table 13A**.

Table 13A. Numbers of different JTT combination types in this sample, and by College.

#	Jungian (JTT) combination type	ALL	CICM	LSBU	NCA
1	ISTJ	2	1	1	0
2	ISFJ	8	4	1	3
3	INFJ	6	1	1	4
4	INTJ	3	3	0	0
5	ISTP	2	1	0	1
6	ISFP	2	2	0	0
7	**INFP**	**12**	**3**	**3**	**6**
8	INTP	1[a]	1[a]	0	0
9	ESTP	0	0	0	0
10	ESFP	3[a]	1[a]	0	2
11	ENFP	9[a]	4[a]	2	3
12	ENTP	2	2	0	0
13	ESTJ	1	1	0	0
14	ESFJ	5[a]	1[a]	1	3
15	ENFJ	7	4	2	1
16	ENTJ	2	1	1	0
	Totals	**65**	**30**	**12**	**23**

Notes: Jungian type was not assessed in group LSBU1 (*N*=13). Information was not provided by another 10 participants; a. Two CICM participants were undecided (one scoring ESFP/ENFP, the other ISFP/INTP). Both were scored here as 'S' rather than 'N' types.

The most common type among students (particularly from the NCA) was INFP (introverted, intuitive, feeling, perceiving), closely followed by ENFP (although a Chi^2 test for the above Table, with so many

empty cells, did not give a significant result) . A quite similar distribution was found by Myers and McCaulley for counsellors, using the Myers-Briggs Type Indicator (MBTI), as shown in **Table 13B** and **Figure 2** below [Bayne 1995, p 138]

Table 13B. Percentages of different JTT combination types in this sample, and of MB types in a sample of359 counsellors [Bayne 1995, p 138].

#	JTT or MBTI combination type	This study	Counsellors
1	ISTJ	3.1	5.8
2	ISFJ	12.3	5.6
3	INFJ	9.2	7.8
4	INTJ	4.6	3.1
5	ISTP	3.1	1.1
6	ISFP	3.1	4.5
7	**INFP**	**18.5**	**13.9**
8	INTP	1.5	2.5
9	ESTP	0	1.1
10	ESFP	4.6	3.1[a]
11	ENFP	13.8	23.4
12	ENTP	3.1	3.1
13	ESTJ	1.5	5.0
14	ESFJ	7.7	6.7
15	ENFJ	10.8	11.4
16	ENTJ	3.1	1.9
	Totals	**100**	**100**

a. Erroneously stated as 6.1% in the original publication cited by Bayne.

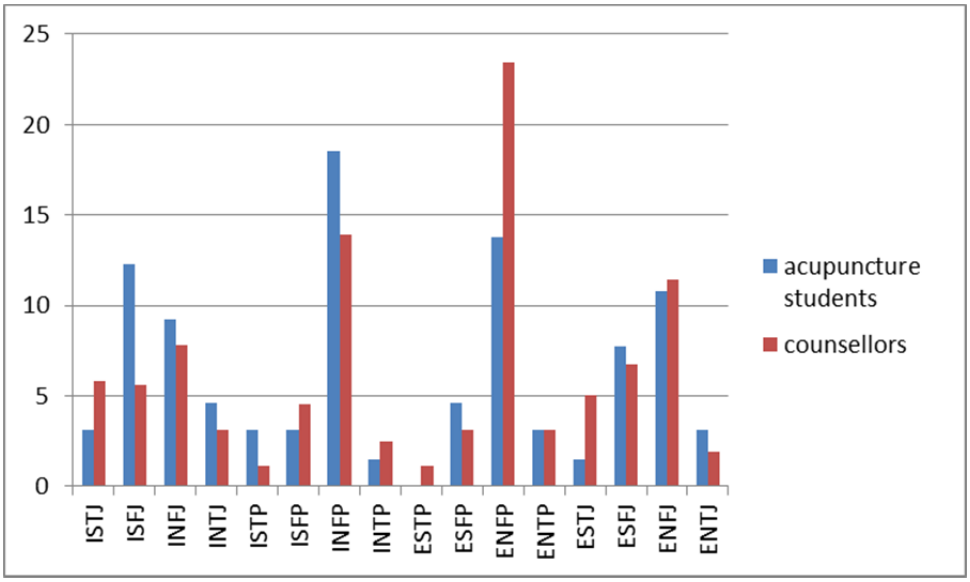


Figure 2. JTT combination types in this study, compared with MBTI types for counsellors.

Combination types in the upper quartile for both samples were INFP, ENFP and ENFJ, with ISFJ also in the upper quartile for acupuncture students, and INFJ for counsellors. Combination types in the lower quartiles for both were INTP and ESTP, with ESTJ also in the lower quartile for the acupuncture students, and ISTP for counsellors.

Counts for the different I/E, In/S, F/T and P/J subtypes, are shown separated out in **Table 14**.

Table 14. Counts for the different I/E, In/S, F/T and P/J JTT subtypes, separated **out.**

#	Jungian (JTT) subtype	ALL	CICM	LSBU	NCA
I	Introverted	36	16	6	14
In	Intuitive	44	21	9	14
F	Feeling	52	20	10	22
P	Perceiving	31	14	5	12
E	Extraverted	29	14	6	9
S	Sensing	21	9	3	9
T	Thinking	13	10	2	1
J	Judging	34	16	7	11

A Chi-square test shows $p<0.001$ ($Chi^2=163.0$, $df = 8$) for INFP, and $p<0.001$ ($Chi^2=97.0$, $df = 8$) for ESTJ, suggesting different types in the different college groups.

Percentage proportions of College respondents rather than simply counts are shown in **Table 15**, compared to norms for the United States population (Stone n.d.). A Chi^2 test shows that this there is, for example, a significant difference for the Intuitive and Sensing subtypes when compared to the US population ($Chi^2=30.45$, df=1, $p<0.001$; with Cramer's V=0.39, indicating a medium effect size).

Table 15. Percentage proportions of College respondents (rather than simply counts).

#	Jungian (JTT) subtype	Norms (U.S.)	ALL (*N*=88)	CICM (*N*=37)	LSBU (*N*=25)	NCA (*N*=26)
I	Introverted	40	55.4	53.3	50.0	**60.9**
In	Intuitive	**29**	**67.7**	**70.0**	**75.0**	**60.9**
F	Feeling	50	**80.0**	**66.7**	**83.3**	**95.7**
P	Perceiving	44	47.7	46.7	41.7	52.2
E	Extraverted	60	44.6	46.7	50.0	**39.1**
S	Sensing	**71**	**32.3**	**30.0**	**25.0**	**39.1**
T	Thinking	50	**20.0**	**33.3**	**16.7**	**4.3**
J	Judging	56	52.3	53.3	58.3	47.8

Bold type indicates significant I/E, In/S, F/T and P/J type ratios, using the Binomial test (I+E=In+S=F+T=P+J=100%)

These results are shown graphically in **Figure 3**.

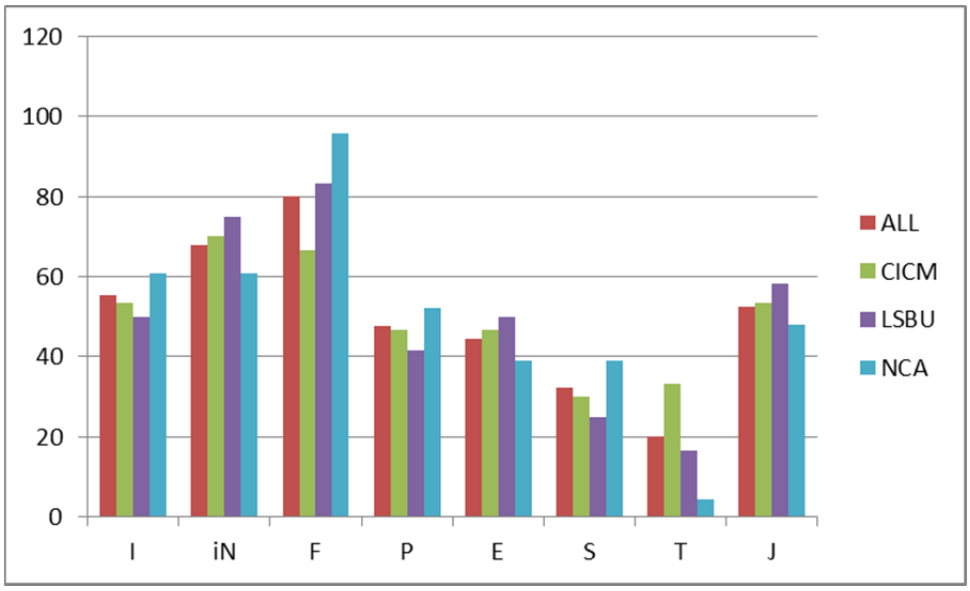


Figure 3. Percentages of the different Jungian types at the three Colleges, and for the complete sample.

Curiously, NCA students showed as markedly less 'Thinking' types than those from the other two colleges (and correspondingly more 'Feeling'), CICM students as more so (and therefore somewhat less 'Feeling'). Cramer's V for the association between 'College' and JTT Feeling/Thinking is indeed significant ($p<0.001$) at 0.309 (df=1), indicating a medium effect size.

3.4. Helpfulness of prior acupuncture (AHQ)

68 respondents had received prior acupuncture treatment, three stated they had not, and the remainder did not answer this question. AHQ scores of those that did are shown in **Table 16**.

Table 16. AHQ scores for the complete sample (n/a: Scale not completed).

N scores	n/a	1	2	3	4	5	6	7
Overall	8	0	0	0	3	8	21	25
Physical	9	0	2	4	7	10	19	17
Functional	10	0	1	1	7	14	19	15
Mental-emotional	6	1	0	2	10	8	21	19
Advice	11	4	1	3	9	13	16	10

Clearly, those who invested in acupuncture training were very convinced, from their own experience, of its helpfulness – particularly for overall helpfulness and mental-emotional conditions, slightly less for physical and functional/medically unexplained symptoms, but not really for the advice given (using a test proportion of 61%, p values for the Binomial test of scores of 1-5 vs scores of 6-7 were, respectively, <0.001, <0.001, 0.001, 0.001 and 0.158).

These results are shown graphically in **Figure 4**.

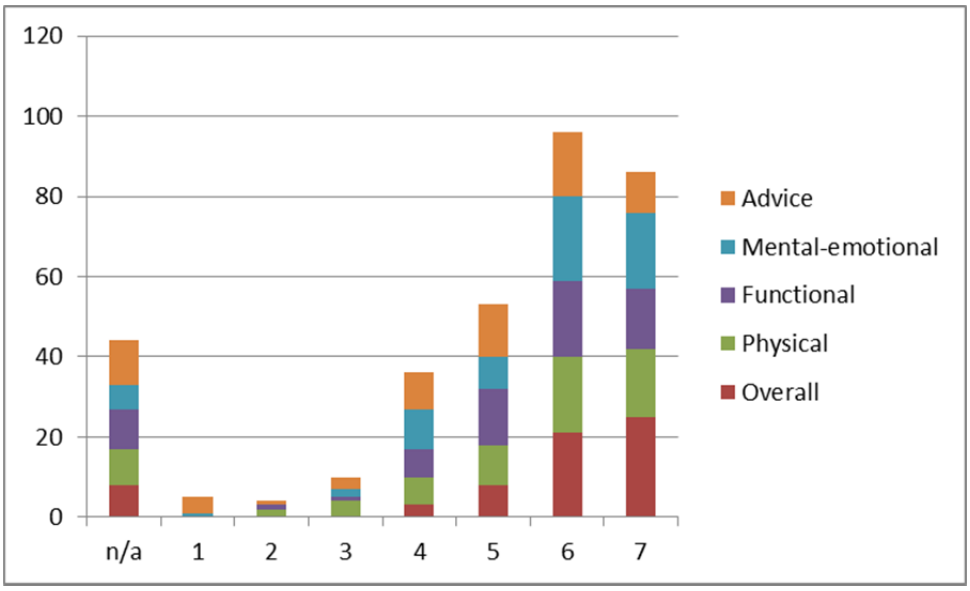


Figure 4. Self-assessed helpfulness of prior acupuncture treatment.

There is no significant correlation between the average of all four individual 'Helpfulness' measures and 'Overall helpfulness' (*rho*=0.095, p=0.452).

Prior Overall acupuncture helpfulness was greatest for respondents from LSBU, and least for the NCA respondents (Kruskal-Wallis test Chi^2=8.986, p=0.011). There were no significant differences between Colleges for the other AHQ subscales.

Relationships between measures

4.1. Jungian (JTT) combination and subtypes and the TEIQue-SF

Associations between the Jungian (JTT) combination types and subtypes and dimensions of the TEIQue-SF were examined using the crosstabs coefficient of correlation η, followed by the Mann-Whitney U test or Kruskal-Wallis test, as appropriate. Results are shown in **Table 17**.

Table 17. Associations between the Jungian (JTT) combination type and subtypes and dimensions of the TEIQue-SF, showing significance of Mann-Whitney U or Kruskal-Wallis tests, values of the crosstabs coefficient of correlation η (in parentheses), and median values of the TEIQue-SF dimensions for the two JTT subtypes in each column.

JTT/EI	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Global EI	ns (**η=0.783**)	ns (**η=0.785**) mdns 4.9 vs 5.1	ns (η=0.683) mdns 5.1 vs 4.8	ns (η=**0.769**) mdns 4.9 vs 5.1	ns (η=**0.747**) mdns 4.9 vs 5.0
Wellbeing	ns (η<0.5)	ns (η=0.660) mdns 5.7 vs 5.8	ns (η=0.660) mdns 5.8 vs 5.7	ns (η<0.5) mdns 5.7 vs 5.8	ns (η=0.540) mdns 5.8 vs 5.7
Self-control	ns (η=0.501)	ns (η=0.524) mdns 4.4 vs 4.5	ns (η=0.557) mdns 4.5 vs 4.2	ns (η=0.586) mdns 4.3 vs 4.8	ns (η=0.574) mdns 4.2 vs 5.9
Emotionality	ns (η=0.523)	ns (η=0.519) mdns 5.4 vs 5.3	ns (η=0.636) mdns 5.3 vs 5.3	ns (η<0.5) mdns 5.5 vs 4.9	ns (η=0.559) mdns 5.3 vs 5.6
Sociability	ns (η=0.693)	**p=0.006** (η=0.676) mdns 4.3 vs 5.2	ns (η=0.530) mdns 4.7 vs 4.7	ns (η=0.560) mdns 4.7 vs 5.0	ns (η<0.5) mdns 4.8 vs 4.6
[Adaptability]	ns (η<0.5)	ns (η<0.5) mdns 5.5 vs 6.0	ns (η<0.5) mdns 5.5 vs 5.0	ns (η<0.5) mdns 5.5 vs 5.5	ns (η<0.5) mdns 6.0 vs 5.3
[Self-motivation]	**p=0.035** (η<0.5)	ns (η<0.5) mdns 4.8 vs 5.0	ns (η<0.5) mdns 4.8 vs 5.0	ns (η<0.5) mdns 4.5 vs 6.0	ns (η<0.5) mdns 4.5 vs 5.0
[Stress management]	ns (η<0.5)	ns (η=0.501) mdns 4.5 vs 5.0	ns (η<0.5) mdns 4.5 vs 4.5	ns (η<0.5) mdns 4.5 vs 5.0	ns (η<0.5) mdns 4.5 vs 4.8
[Empathy]	ns (η<0.5)	**p=0.012** (η<0.5) mdns 6.0 vs 5.0	ns (η<0.5) mdns 5.5 vs 6.0	ns (η<0.5) mdns 5.5 vs 5.5	ns (η<0.5) mdns 6.0 vs 5.5
[Optimism]	ns (η<0.5)	ns (η<0.5) mdns 6.0 vs 6.0	ns (η<0.5) mdns 6.0 vs 6.0	ns (η<0.5) mdns 6.0 vs 6.0	ns (η<0.5) mdns 6.0 vs 6.0

The Mann-Whitney U test (comparing TEIQue-SF dimensions for the four type dyads) shows only two significant results, and the Kruskal-Wallis test for the TEIQue-SF dimensions and the JTT combination types only one. The crosstabs coefficient of correlation η (assessing association between the TEIQue-SF dimensions and the dyads, the latter dependent on the former) was >0.7 only for Global EI (η for the JTT subtypes was consistently small with the TEIQue-SF dimensions dependent, but not necessarily for the JTT combination types). The associations of empathy with introversion, and of sociability with extraversion, are understandable. The association of self-motivation with the JTT combination types is less clear: mean and median self-motivation scores were highest for types ENTP (6.5) and ESTJ (7.0), lowest for types ISTP (3.75) and ENFP (mean 3.78, median 3.5).

4.2. Jungian (JTT) type and the helpfulness of past acupuncture treatment

Only one JTT association with the helpfulness of past acupuncture resulted in a value of $\eta > 0.5$ (JTT combination type vs helpful for 'purely physical or biomedical problems') – although this was not significant when using the Kruskal-Wallis test for the 16 combination types (p=0.265).

However, the Mann-Whitney U test was significant (*N*=60, U=135.0, r=0.38, p=0.003) for overall helpfulness of past acupuncture vs JTT 'FT' type, with the 12 'Thinking' types stating that they considered acupuncture as more helpful (median 7, mean 6.75) than the 48 'Feeling' types (median 6, mean 5.04).

4.3. Emotional intelligence (TEIQue-SF) and the helpfulness of past acupuncture treatment

Significant correlations between TEIQue-SF and the helpfulness of past acupuncture treatment (using Spearman's *rho* for nonparametric data) are shown in **Table 18**.

Table 18. Significant correlations between TEIQue-SF and the helpfulness of past acupuncture treatment (using Spearman's *rho*).

Helpfulness	TEIQue	*rho*	p-value	*N*
Overall	Global EI	0.348	0.005	65
	Wellbeing	0.251	0.043	
	Self-control	0.250	0.044	
	Sociability	0.265	0.033	
	[Self-motivation]	0.343	0.005	
Physical	Wellbeing	0.241	0.048	68
	[Self-motivation]	0.240	0.049	
Functional/MUS	*none*	n/a	n/a	n/a
Mental/emotional	Global EI	0.310	0.011	67
	Wellbeing	0.300	0.014	
	Emotionality	0.353	0.003	
	Sociability	0.246	0.045	
	[Adaptability]	0.259	0.034	
	[Empathy]	0.260	0.034	
	[Optimism]	0.314	0.010	
Advice given	Wellbeing	0.257	0.036	67
	[Optimism]	0.243	0.048	
Average	Global EI	0.309	0.010	68
	Wellbeing	0.362	0.002	
	Sociability	0.240	0.049	
	[Self-motivation]	0.305	0.012	

Thus, using the TEIQue-SF to assess emotional intelligence, there appears to be no relationship between whether someone stated they found acupuncture helpful for functional conditions or 'medically unexplained symptoms', but some association between helpfulness for mental/emotional conditions and 6 of the 9 TEIQue traits, as well as Global EI, as might be expected.

4.4. The JTT and NRS

4.4.1. NRS-Pre

As shown in **Table 19**, There were no significant relationships between Jungian typology (JTT scores) and how respondents scored NRS-Pre subscales, using η as the measure of association (with NRS_Pre dependent). Correspondingly, there were no significant differences using the Kruskal-Wallis test (data split by JTT combination types) or the Mann-Whitney U test (data split by JTT subtype pairs).

Table 19. Associations between the Jungian (JTT) combination types and subtypes and dimensions of the TEIQue-SF, showing significance of Mann-Whitney U or Kruskal-Wallis and Mann-Whitney tests, and values of the crosstabs coefficient of correlation η (in parentheses).

NRS-Pre	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Anxious	ns (η>0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Comfortable	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Relaxed	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Lively	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Confused	ns (η>0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Fatigued	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Gloomy	ns (η>0.6)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Overall mood	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)

4.4.2. NRS-Post

There were also no significant relationships between Jungian typology (JTT scores) and how respondents score NRS-Post subscales, using η as the measure of association (with NRS_Pre dependent). However, although there were no significant differences using the Kruskal-Wallis test (data split by JTT combination types), the Mann-Whitney U test *was* significant for post NRS subscales when data was split by the JTT Introvert/Extravert subtype pair (*N*=57, with 31 more Introverted and 26 more Extraverted) (**Table 20**).

Table 20. Associations between the Jungian (JTT) combination type and subtypes and NRS-Post subscales, showing significance of Mann-Whitney U or Kruskal-Wallis tests, values of the crosstabs coefficient of correlation η (in parentheses), and median values of the NRS-Post subscales for the two JTT subtypes in each column.

NRS-Post	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Anxious	ns (η<0.5)	**p=0.022** (η<0.5) U=260.5; Z=-2.293; mdns 30.0 vs 9.0	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Comfortable	ns (η>0.5)	**p=0.010** (η<0.5) U=243.0; Z=-2.570; mdns 60.0 vs 70.0	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Relaxed	ns (η>0.5)	**p=0.009** (η<0.5) U=240.0; Z=-2.625; mdns 59.0 vs 70.0	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Lively	ns (η>0.5)	**p=0.015** (η<0.5) U=251.0; Z=-2.442l mdns 50.0 vs 68.5	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Confused	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Fatigued	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Gloomy	ns (η<0.5)	**p=0.040** (η<0.5) U=275/5; Z=-2.055; mdns 30.0 vs 12.0	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Overall mood	ns (η>0.5)	**p=0.015** (η<0.5) U=252/5; Z=-2.429; mdns 62.0 vs 76.0	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)

Thus, by the end of the teaching session introverts were likely to be more anxious, less comfortable or relaxed, and more gloomy, than extraverts, with a lower overall mood.

4.4.3. NRS difference scores

The JTT appears to have virtually no impact on NRS changes in this context (**Table 21**).

Table 21. Associations between the Jungian (JTT) combination type and subtypes and NRS-Post minus NRS-Pre subscale differences, showing significance of Mann-Whitney U or Kruskal-Wallis tests and values of the crosstabs coefficient of correlation η (in parentheses, with results for absolute differences in square brackets).

NRS Changes	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Anxious	ns (η>0.5 [>0.6])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Comfortable	ns (η>0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Relaxed	ns (η>0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Lively	ns (η<0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Confused	ns (η<0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Fatigued	ns (η<0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Gloomy	ns (η<0.5 [<0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)
Overall mood	ns (η>0.6 [>0.5])	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)	ns (η<0.5)

However, if responders are divided into those who are more or less responsive (see section 5.2 below), then the Mann-Whitney U test does become significant – for those who are *less* responsive in general, but not for those who are more responsive – for:

- The effect of JTT-IE on the change in feeling Lively (*N*=35, U=84.0, *r*=0.37, p=0.027) [mean and SD greater for 'Extraverted'].
- The effect of JTT-PJ on the change in feeling Confused (*N*=35, U=61.5, *r*=0.47, p=0.005) [mean greater for 'Introverted', SD marginally greater for 'Extraverted'].

The test also becomes significant for those who are *more* responsive, but not for those who are less responsive in general – for:

- The effect of JTT-IE on the *absolute* change in feeling Comfortable (*N*=19, U=9.5, *r*=0.67, p=0.003) [mean and SD greater for 'Introverted']
- The effect of JTT-IE on the *absolute* change in feeling Relaxed (*N*=19, U=17.0, *r*=0.53, p=0.021) [mean and SD greater for 'Introverted']
- The effect of JTT-IE on the *absolute* change in feeling Lively (*N*=19, U=20.5, *r*=0.47, p=0.042) [mean and SD greater for 'Introverted']
- The effect of JTT-IE on the *absolute* change in feeling Confused (*N*=19, U=17.0, *r*=0.53, p=0.022) [mean and SD greater for 'Extraverted']
- The effect of JTT-IE on the *absolute* change in Overall mood (*N*=19, U=17.5, *r*=0.53, p=0.022) [mean greater for 'Introverted', SD greater for 'Extraverted'].

And if responders are divided into those who respond more 'positively' (1) or 'negatively' (-1) (see section 3.1.6. above *et pass*), then two Mann-Whitney U tests (but no Kruskal-Wallis tests) become significant, as shown in **Table 22**. Extraverted 'negative' responders were more confused than

Introverts, and Sensing type 'negative' responders more relaxed than the Intuitives. However, numbers remaining after repeatedly subdividing the sample in this way were too small to draw any particularly useful conclusions (3 vs 6 for the IE difference, and 2 vs 7 for the InS difference).

Table 22. Significant associations between the Jungian (JTT) subtypes and NRS-Post minus NRS-Pre subscale differences for 'negative' responders, using the Mann-Whitney U test.

NRS Changes	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Anxious	ns	ns	ns	ns	ns
Comfortable	ns	ns	ns	ns	ns
Relaxed	ns	ns	(-1) * [*]	ns	ns
Lively	ns	ns	ns	ns	ns
Confused	ns	(-1) *[*]	ns	ns	ns
Fatigued	ns	ns	ns	ns	ns
Gloomy	ns	ns	ns	ns	ns
Overall mood	ns	ns	ns	ns	ns

[In square brackets: significance for absolute values of Post-Pre differences]

4.4.4. Direction of change in NRS scores

Is there a relationship between Jungian typology (JTT scores) and whether respondents score NRS-M subscales as increasing, decreasing or remaining the same following a brief treatment, using Cramer's V as the measure of association?

This only appears to be the case for 'Confused' (**Table 23**). This feeling decreased for 28 respondents, 20 of whom were more Judging than Perceiving types; in contrast, 10 felt more confused towards the end of the session, seven of whom were more Perceiving than Judging types. Sixteen experienced no change (seven Judging and nine Perceiving types).

Table 23. Direction of change in feeling 'Confused': dependence on JTT Perceiving/Judging typology.

JTT type	Direction of change	V	p-value	*N*
Perceiving/Judging (PJ)	Confused	0.344	0.041	54

If overall positive mood change (OPMC) is considered, there appear to be no significant associations between OPMC and JTT scores (Chi^2 tests and Cramer's V not significant).

However, using η to assess associations between NRS Post minus NRS-Pre differences and JTT scores is of interest, when the data is split according to whether OPMC was positive (1) or negative (-1), and disregarding respondents whose OPMC was minimal (0) (**Table 24**). Although significant differences between the changes for JTT subtypes were significant for 'Confused', with changes greater for Introverts who were also negative OPMC scorers, again numbers remaining after repeatedly subdividing the sample in this way were too small to draw any particularly useful conclusions (3 vs 6 for the IE difference).

Table 24. Respondents with positive (1) or negative (-1) OPMC, assessing the associations between NRS Post minus NRS-Pre differences and JTT types, using η (values shown when η > 0.5).

NRS Changes	JTT combination types	Introvert/ extravert (IE)	Intuitive/ Sensing (In/S)	Feeling/ Thinking (FT)	Perceiving/ Judging (PJ)
Anxious	(1) >0.7 [0.8] (-1) >0.8 [0.8]			(-1) >0.6	
Comfortable	(1) >0.7 [0.7] [(-1) >0.5]				
Relaxed	(1) >0.8 [0.8] (-1) >0.8 [0.8]		(-1) >0.6 [0.6]		
Lively	(1) >0.7 [0.7] (-1) >0.7 [0.5]	(-1) >0.5			
Confused	(1) >0.7 [0.6] (-1) >0.9 [0.9]	(-1) >0.9[a] [0.9]		(-1) >0.6 [0.6]	
Fatigued	(1) >0.5 [0.8] (-1) >0.8 [0.8]	(-1) >0.6 [0.6]	(-1) >0.5 [0.5]	(-1) >0.6 [0.6]	
Gloomy	(1) >0.6 [0.6] (-1) >0.7 [0.8]				[(-1) >0.5]
Overall mood	(1) >0.9 [0.9] (-1) >0.5 [=0.5]				

a. Mann-Whitney U test only significant for negative OPMC: *N*=9, U=0.00; *r*=0.78, p=0.020. [In square brackets: η for absolute values of Post-Pre differences]

4.5. The TEIQue-SF and NRS

4.5.1. NRS-Pre

Most of the significant correlations between the TEIQue-SF and NRS-Pre are self-evident, but not particularly strong (**Table 25**). Nonsignificant results for Global IE and Wellbeing vs Comfortable are perhaps somewhat surprising, but may help to tease out differences between 'Comfortable' and 'Relaxed'.

Table 25. Correlations between the TEIQue-SF and NRS-Pre using Spearman's *rho* (p-values in parentheses).

rho	Anxious	C'ftable	Relaxed	Lively	Confused	Fatigued	Gloomy	Overall
Global EI	-0.451 (<0.001)	n.s.	0.332 (0.004)	n.s.	n.s.	n.s.	-0.255 (0.027)	0.268 (0.020)
Wellbeing	-0.291 (0.012)	n.s.	0.345 (0.002)	0.271 (0.019)	n.s.	n.s.	-0.334 (0.003)	0.393 (<0.001)
Self-control	-0.403 (<0.001)	0.246 (0.035)	0.270 (0.019)	n.s.	n.s.	n.s.	n.s.	n.s.
Emotionality	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Sociability	-0.387 (0.001)	0.231 (0.048)	0.272 (0.018)	n.s.	n.s.	n.s.	n.s.	n.s.
[Adaptability]	-0.330 (0.004)	n.s.	n,s,	n.s.	n.s.	n.s.	-0.238 (0.039)	n.s.
[Self-motivation]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Stress management]	-0.360 (0.002)	0.325 (0.005)	0.337 (0.003)	0.323 (0.005)	n.s.	-0.263 (0.022)	n.s.	0.274 (0.017)
[Empathy]	-0.258 (0.026)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.280 (0.015)
[Optimism]	-0.325 (0.005)	n.s.	0.319 (0.005)	n.s.	n.s.	n.s.	-0.372 (0.001)	0.352 (0.002)

4.5.2. NRS-Post

Correlations between the TEIQue-SF and NRS-Pre using Spearman's *rho* are shown in **Table 26.**

Table 26. Correlations between the TEIQue-SF and NRS-Pre using Spearman's *rho* (p-values in parentheses).

rho	Anxious	C'ftable	Relaxed	Lively	Confused	Fatigued	Gloomy	Overall
Global EI	-0.365 (0.001)	**0.323 (0.005)**	**0.348 (0.002)**	n.s.	n.s.	n.s.	n.s.	**0.342 (0.003)**
Wellbeing	n.s.	**0.303 (0.009)**	0.281 (0.015)	0.253 (0.029)	n.s.	n.s.	-0.235 (0.044)	**0.432 (<0.001)**
Self-control	-0.360 (0.002)	**0.281 (0.015)**	**0.290 (0.012)**	n.s.	n.s.	n.s.	n.s.	n.s.
Emotionality	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Sociability	-0.270 (0.020)	**0.368 (0.001)**	**0.331 (0.004)**	n.s.	n.s.	n.s.	**-0.233 (0.046)**	**0.307 (0.008)**
[Adaptability]	-0.230 (0.049)	n.s.	n,s,	n.s.	n.s.	n.s.	n.s.	**0.250 (0.032)**
[Self-motivation]	**-0.325 (0.005)**	n.s.	**0.238 (0.041)**	n.s.	n.s.	n.s.	n.s.	**0.314 (0.006)**
[Stress management]	-0.357 (0.002)	0.314 (0.006)	**0.351 (0.002)**	0.244 (0.036)	n.s.	n.s.	**-0.275 (0.018)**	**0.281 (0.015)**
[Empathy]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Optimism]	-0.317 (0.006)	**0.258 (0.026)**	0.311 (0.007)	**0.303 (0.009)**	**-0.266 (0.022)**	n.s.	-0.335 (0.004)	**0.462 (<0.001)**

Correlations in bold were stronger for NRS-Post than for NRS-Pre, but still not very strong.

4.5.3. NRS difference scores

Correlations between the TEIQue-SF and NRS-Post minus NRS-Pre differences using Spearman's *rho* are shown in **Table 27.**

Table 27. Correlations between the TEIQue-SF and NRS-Post minus NRS-Pre differences using Spearman's *rho* (p-values in parentheses, results for absolute differences in square brackets).

rho	Anxious	C'ftable	Relaxed	Lively	Confused	Fatigued	Gloomy	Overall
Global EI	n.s.	n.s.	n.s.	n.s.	n.s. [0.296, 0.012]	n.s. (-*) [(-*+)]	n.s. [-0.249, 0.036]	n.s.
Wellbeing	n.s. [(+*-)]	n.s.	n.s. (*) [(+*-)]	0.271 (0.019)	n.s. [0.251, 0.035]	n.s.	n.s. (+*) [(+*-)]	n.s.
Self-control	n.s. [-0.248, 0.037] [(+*-)]	n.s.	n.s.	n.s.	n.s. [0.304, 0.010] (-*) [(+*+)]	n.s. (-*) [(-*+)]	n.s. [(+*-)]	n.s.
Emotionality	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.(-*-)	n.s.
Sociability	n.s.	n.s.	n.s.	n.s.	n.s.	n.s. (-*) [(-*+)]	n.s.	n.s.
[Adaptability]	n.s. [(+*-)]	n.s.	n.s.	n.s.	n.s. [0.265, 0.025]	n.s. (-*) [(-*+)]	n.s.	n.s.
[Self-motivation]	n.s.	n.s.	0.241 (0.043)	n.s.	n.s.	n.s. (-*)	n.s.	n.s.
[Stress management]	n.s. [(+*-)]	n.s.	n.s.	0.323 (0.005)	n.s. [0.258, 0.030] (-*)	n.s. (-*) [(-*+)]	n.s.	n.s.
[Empathy]	n.s. (+*)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-0.349 (0.003) (+*-) [(+*-)]
[Optimism]	n.s. [(+*-)]	n.s.	n.s. [(+*-)]	n.s.	n.s.	n.s.	n.s.	n.s.

(+*) Significant for 'positive' scorers; (+*-)Significant negative correlation for 'positive' scorers ; (-*) Significant for 'negative' scorers; (-*-) Significant negative correlation for 'negative' scorers.

Curiously, the *absolute* difference in Confused (NRS-Post minus NRS-Pre) correlate quite well with five of the 10 TEIQue-SF dimensions, i.e. greater changes in Confused (whether increases or decreases) are associated with several positive aspects of emotional intelligence.

4.5.4. Direction of change in NRS scores

Is there a relationship between emotional intelligence (TEIQue-SF scores) and whether respondents score NRS-M subscales as increasing, decreasing or remaining the same following a brief treatment, using η as the measure of association? **Table 28** demonstrates possible relationships between Global EI and directions of change of all the NRS subscales, and possibly between Emotionality and directions of change of 'Comfortable' and 'Relaxed'. However, Kruskal-Wallis and Mann-Whitney tests only indicated significant differences in Empathy between the increasers, decreasers (and no changers) for 'Lively' and 'Overall mood'.

Table 28. Associations (η) between EI and directions of change in the NRS scores.

η	Anxious	C'ftable	Relaxed	Lively	Confused	Fatigued	Gloomy	Overall
Global EI	>0.7	>0.7	>0.7	>0.7	>0.8	>0.7	>0.7	>0.7
Wellbeing	<0.5	>0.5	<0.5	<0.5	>0.5	<0.5	>0.5	>0.5
Self-control	>0.5	>0.5	>0.5	>0.5	>0.5	<0.5	>0.6	>0.5
Emotionality	<0.5	>0.7	>0.6	>0.5	>0.5	>0.5	<0.5	>0.5
Sociability	>0.5	<0.5	>0.5	<0.5	<0.5	>0.5	>0.5	>0.5
[Adaptability]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
[Self-motivation]	<0.5	<0.5	>0.5	<0.5	<0.5	>0.5	<0.5	<0.5
[Stress management]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
[Empathy]	<0.5	<0.5	<0.5	**<0.5**[a]	<0.5	<0.5	<0.5	**<0.5**[b,c]
[Optimism]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Kruskal-Wallis test significant for differences in Empathy between Lively increasing, decreasing or remaining the same: a. Chi^2=8.161, df=2, p=0.017; b. Kruskal-Wallis test significant for differences in Empathy between 'Overall mood' increasing, decreasing or remaining the same Chi^2=10.026, df=2, p=0.007; c. Mann-Whitney U test significant for differences in Empathy between 'Overall mood' increasing or decreasing: *N*=52, U=155.5, *r*=0.43, p=0.002 (Empathy greater in both 'Lively' and 'Overall mood' decreasers than in increasers).

Given the secondary nature of the TEIQue-SF items in square brackets, it is perhaps not surprising that η for virtually all of them in the above Table is <0.5.

Using the OPMC score for each respondent and the Kruskal-Wallis and Mann-Whitney U tests, there were no significant associations between TEIQUe-SF emotional intelligence items and whether respondents tended to be more overall 'positive responders' or 'negative responders'.

4.6. The AHQ and NRS

4.6.1. NRS-Pre

No correlations between NRS-Pre and the AHQ are significant, using Spearman's *rho*.

4.6.2. NRS-Post

Nor are there any significant correlations between NRS-Post and the AHQ.

4.6.3. NRS difference scores

Some correlations were found between the NRS-Post minus NRS-Pre difference and AHQ items, using Spearman's *rho* (**Table 29**).

Table 29. Correlations between NRS-Post minus NRS-Pre difference and AHQ items, using Spearman's *rho*.

Helpfulness	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
Overall		0.327 (0.017) (0*+) (↓*+)			[0.341 (0.012)] [-*+] [↑*+]	(-*+) [-*+]		0.274 (0.048) (↓*+)
Physical		[-*-]		[-*-]			[↓*-]	
Functional/MUS					[0*+] [↑*+]			[-0.287 (0.033)] [↑*-]
Mental/emotional					[0.291 (0.031)] [↑*+]			[↑*-]
Advice given	[0*+]		[↓*-]	[-*-]		(-*-) [-*- & [0*+] (↑*-)		
Average				[-*-]			[+*-] [↓*-]	

(-*+): significant positive correlation for 'negative' scorers; [0*+]: significant positive correlation with *absolute* values of the Post-Pre difference, for zero scorers (i.e., neither particularly negative or positive); ↑*+: significant positive correlation for good responders (2); ↓*- significant negative correlation for poor responders (1)

Splitting the data by OPMC does increase the number of significant correlations, from 5 to 14 occurrences out of a possible 48. Splitting the data by good/poor responders (using the 2-cluster solution) increases occurrences, but only to 11.

4.7. NRS-Pre initial values and changes

Correlations between NRS Pre and NRS-Post minus NRS-Pre differences (using Spearman's *rho*) are shown in **Table 30**.

Table 30. Correlations between NRS Pre and NRS-Post minus NRS-Pre differences (Spearman's *rho*). Significant correlations of NRS-Pre with absolute values of the NRS-Post minus NRS-Pre differences are shown in brackets.

rho		NRS-Post minus NRS-Pre →							
		Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
NRS-Pre ↓	Anx	-0.502** [+.477**]	n.s. [n.s]	+0.240* [n.s.]	n.s. [-.305*]	-0.342** [n.s.]	n.s. [n.s.]	n.s. [+.299*]	n.s. [n.s.]
	Comf	n.s. [n.s.]	-0.717** [-.329**]	-0.452** [-.245*]	-0.478** [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	-0.409** [n.s.]
	Relax	n.s. [n.s.]	-0.509** [n.s.]	-0.553** [-.361**]	-0.349** [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	-0.365** [-.273*]
	Lively	n.s. [n.s.]	-0.378** [-.310**]	n.s. [-.309**]	-0.690** [-.404**]	n.s. [n.s.]	n.s. [+.248*]	n.s. [n.s.]	-0.415** [n.s.]
	Confus	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	-0.537** [+.336**]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]
	Fatig	n.s. [n.s.]	0.344** [+.236*]	n.s. [n.s.]	0.371** [n.s.]	n.s. [n.s.]	-0.625** [n.s.]	n.s. [n.s.]	0.301* [n.s.]
	Gloomy	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	-0.273* [n.s.]	-0.541** [+.482**]	n.s. [n.s.]
	Overall	n.s. [n.s.]	-0.344** [n.s.]	-0.305* [-.257*]	-0.399** [n.s.]	n.s. [n.s.]	n.s. [n.s.]	n.s. [n.s.]	-0.547** [-.469**]

** p<0.01; * p<0.05.

So, for example, as shown by the trendline in the scatterplot below (**Figure 5**), the higher the initial values of 'Comfortable', the greater reduction there was likely to be in feeling Comfortable over the course of the teaching session, whereas lower values were likely to increase – a 'regression to the median' that was to be expected from our previous findings (cf Table 27 in Mayor & Steffert 2016).

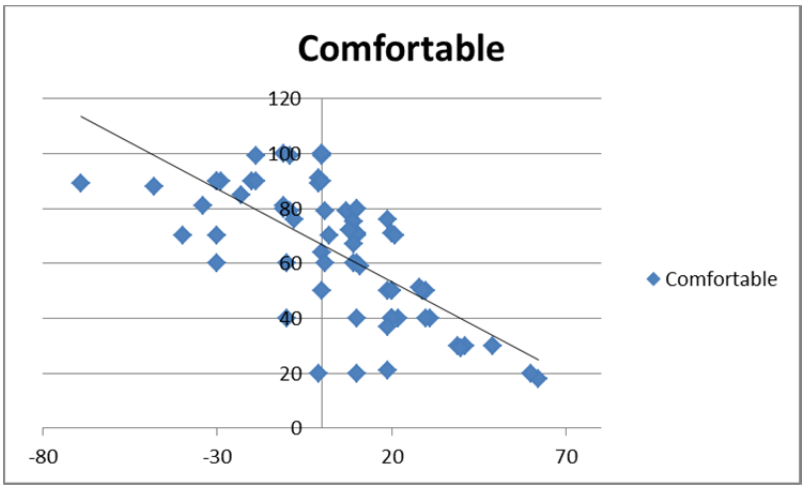


Figure 5. Scatterplot of NRS-Pre vs NRS-Post minus NRS-Pre difference in 'Comfortable'.

Some of these relationships – such as that between initial Anxiety and changes in Confusion – were not altogether expected.

Secondary measures

Descriptive statistics for *how* the primary measures were completed (styles of response) are shown in **Table 31**.

Table 31. Styles of response (how the primary measures were comlpeted).

Primary measure	Group	scores	*N*	consistency (2 good, 1 partial)
NRS	Response Style	ERS	15	
		MRS	6	
	Response	good	32	
		mid	9	
		poor	29	
	Response Cluster	good	26	
		poor	45	
	Shannon Entropy	inc	35	
		same	5	
		dec	32	
	Verticality	above	6	(2:3; 1:3)
		on line	17	(2:8; 1:9)
		below	47	(2:36; 1:11)
	Size	large	2	(2:0; 1:2)
		small	3	(2:3; 1:0)
	Shape	X	32	(2:25; 1:7)
		O	26	(2:10; 1:16)
		Other	2	(2:1; 1:1)
	Open Ɵ	Open	7	(2:2; 1:5)
	Decade scoring	above	9 (12[a])	
		on	31	
		below	7	
TEIQue-SF	Response Style	ERS	15	
		MRS	25	
		Other	44	

a. Including 3 above mid-decade scorers (i.e., 6 or 7 rather than 5).

5.1. Response style

5.1.1. Response style 1. NRS

Subscales most and least often completed using an ERS in both NRS-Pre and NRS-Post were 'Anxious' and 'Lively', respectively. Using the basic rescores, there were 71 ERS for Anxious (all low scores, <15), and 20 for Lively (16 of these being high scores, >85).

Subscales most and least often completed using a MRS in both NRS-Pre and NRS-Post were 'Lively' and 'Gloomy', respectively, although in NRS-Pre 'Overall good mood' was completed most

frequently using a MRS (i.e. between 40 and 60, inclusive). Using the basic rescores, there were 58 MRS for 'Lively', and 27 for 'Gloomy'.

The following respondents showed ERS and MRS in their NRS scoring.

ERS: 4, 5 (Pre only), 7 (Pre only), 9 (Post only), 10, 11 (Post only), 26, 30, 32 (Post only), 37 (Post only), 42 (Post only), 64 (Pre only), 80 (Post only), 82 (Post only), 87 (Post only);

MRS: 18 (Pre only), 19 (Pre only), 22, 31, 52 (Post only), 53 (Post only).

Thus there were 15 ERS respondents, and six MRS respondents.

5.1.2. Response style 2. TEIQue-SF

The following participants showed ERS and MRS in their TEIQue-SF scoring.

ERS: 2,**4**,**5**,**11**,17,26,31,**32**,33,34,41,66,67,73,**82**;

MRS: 6,21,25,28,37,38,39,40,44,45,46,47,**52**,**53**,54,55,57,60,65,69,70,79,80,81,83.

(Overlaps between NRS and TEIQue-SF RS shown in **bold**; in red, one participant who may not have received treatment.)

Thus there were five ERS overlaps between NRS (15) and TEIQue-SF (15) participants, but only two MRS overlaps (6 and 25 MRS scorers, respectively).

5.2. NRS responsiveness

5.2.1. NRS responsiveness 1. By subscale

Taking absolute values of Pre-to-Post NRS difference scores (using the basic rescores in multiples of 5) and the counts of scores above a given number, from 25 to 70, differences in 'Fatigued' were most frequent, and those in 'Relaxed' and 'Overall good mood' least frequent (**Figure 6**).

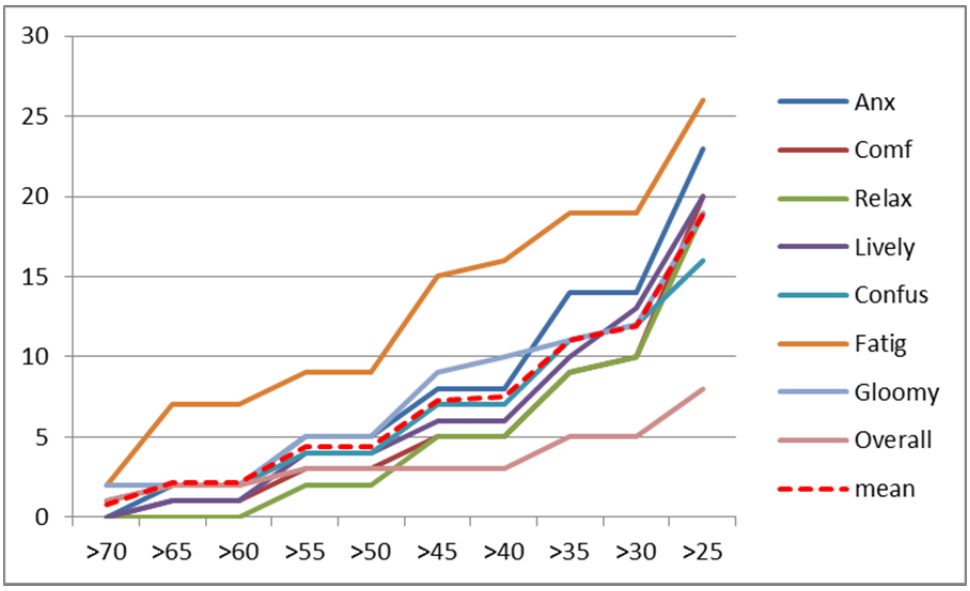


Figure 6. Counts of Pre-to-Post NRS subscale difference scores.

5.2.2. NRS responsiveness 2. By respondent

Taking *absolute* values of Pre-to-Post NRS difference scores, the following individuals showed particular patterns of response:

A. Neither in the top decile of absolute differences, nor showing any 'no differences' at all:

14, 44, 48.

B. Showing one 'no difference', but none in the top decile:

18, 19*,31, 34, 45, 54

[* if not using the 'extended' decile of 7 + any differences equal to the lowest difference in the top decile]

Those in categories A and B might be predominantly midpoint scorers ('middle-of-the-roaders').

C. Showing more than one 'no difference', and none in the top decile (numbers of 'no differences' in parentheses):

1 (2), 6 (3), 8 (3), 9 (3), 15 (**4**), 21 (2), 22 (2), 30 (**7**), 32 (3), 39 (3), 41 (**5**), 46 (**4**), 47 (**4**), 49 (3), 50 (2), 55* (3), 56* (**4**), 57 (2), 62 (2), 65 (2), 67 (2), 69 (**5**), 70 (3), 71* (**4**), 78* (2), 80 (**4**), 82 (2), 86* (3), 87* (2).

[* if not using the 'extended' decile of 7 + any differences equal to the lowest difference in the top decile; in red: 82 may not, and 86 definitely did not receive treatment.]

At least some of those in this category – especially those with higher numbers of 'no difference' scores in list C (e.g. 4 or above) – might describe themselves, on reflection, as 'poor responders'.

D. Showing at least one difference in the top decile of differences, but no 'no difference':

13 (3), 17 (2), 25 (**5**), 40 (2), 52 (1), 53 (1), 63 (2), 84 (1), 85 (2).

E. Showing at least one difference in the top decile of differences, but only one 'no difference':
3 (2), 12 (2), 16 (1), 24 (2), 27 (1), 29 (**4**), 42 (4), 43 (1), 51 (1), 68 (1).

F. Those scoring a mix of 'top decile' and more than one 'no difference' scores (first and second numbers in parentheses, respectively):
4 (1,4), 5 (1,3), 7 (1,3),10 (1,4), 11 (1,4), 20 (1,2), 23 (3,4), 26 (3,3), 28 (1,3), 37 (1,4), 64 (1,3), 66 (2,2), 83 (1,2).

Any participants in these last 3 categories might be considered as 'good responders'.

5.2.3. NRS responsiveness 3. Confirmatory respondent cluster analysis

As in our prior publication (Mayor & Steffert 2016), Ward's method of hierarchical cluster analysis was used (with squared Euclidean distances). From the dendrogram (**Appendix C**), the most feasible result, with clusters of approximately equal size, appears to be 2 clusters (rather than 3 or more). The first cluster, C1 (*N*=45), represents primarily poor responders (along with 10 good responders and 7 of the 9 'middle-of-the-roaders'), and the second, C2 (*N*=26), primarily the good responders (along with the other two 'middle-of-the-roaders' and two poor responders) .

Thus there appears to be a general agreement between the two measures of responsiveness (Chi^2=57.05, p<0.001), despite 21 respondents whose cluster allocation appears 'ambivalent'.

5.3. NRS subscale cluster analysis

A cluster analysis by subscales (variables) rather than respondents (cases) shows very clear 2-cluster solutions for NRS-Pre, NRS-Post, NRS-Post minus NRS-Pre and the absolute values of the latter that correspond precisely to the distinction between 'positive' and 'negative' moods (cf Mayor & Steffert 2016).

5.4. Shannon entropy

5.4.1. Shannon Entropy 1. By respondent

Shannon entropy (ShannEn) was normally distributed for NRS-Pre, but not for NRS-Post or for the TEIQue-SF. Values were similar for NRS-Pre and NRS-Post, but quite different for TEIQue-SF (**Table 32**).

Table 32. Shannon entropy (ShannEn) for NRS-Pre, NRS-Post and the TEIQue-SF.

ShannEn	Pre	Post	TEIQue-SF
2 max counts (modes)	2.33 (17) 2.15 (9)	2.15 (12) 2.33 (11)	
Mean (SD)/ Median	2.03 (0.36) 2.15	2.02 (0.41) 2.15	2.21 (0.13) 2.23
quartiles	1.83; 2.33	1.93; 2.30	2.13; 2.32

Thus the Wilcoxon signed ranks test showed no significant difference between ShannEn for NRS-Pre and NRS-Post, but a significant difference between both those and ShannEn for the TEIQue-SF (p=0.001).

If the whole sample is split by Course, the difference between ShannEn for NRS-Pre and NRS-Post becomes significant for one group (NCA1, *N*=11), with p=0.003. It is not significant if the sample is split by College. However, NRS-Post ShannEn was higher for the NCA than for the other two colleges (Kruskal-Wallis Chi^2=13.49, p=0.001). In contrast, TEIQue-SF ShannEn was significantly higher for the CICM respondents than for those from the other two colleges (Kruskal-Wallis Chi^2=7.51, p=0.023).

There was no consistent direction for NRS-Post minus NRS-Pre ShannEn differences, other than in group NCA1 (**Table 33**).

Table 33. Increases, decreases and no changes in NRS-Post minus NRS-Pre ShannEn differences.

Group	Totals	Decreases	No changes	Increases
CICM1	18	7	1	10
CICM2	11	5	2	4
LSBU1	12	7	0	5
LSBU2	9	6	1	2
NCA1	11	**1**	0	**10**
NCA2	11	6	1	4
Totals	**72**	**32**	**5**	**35**

However, if the sample is split by whether ShannEn decreases, increases, or does not change, then the Wilcoxon test is significant for all three subgroups (p<0.001). (See below for further exploration of this finding.)

Correlation was significant, if not high, between ShannEn for NRS-Pre and NRS-Post (*rho*=0.266, p=0.043). With the data split by Course, the correlation is significant only for one group (CICM1, *N*=18): rho=0.597, p=0.009. It is not significant if the data is split by College.

Correlation was not significant between either NRS and the TEIQue-SF. However, the following five participants were in the ShannEn upper quartile ('top 18') for both TEIQue-SF and either NRS-Pre or NRS-Post:

14 (Post), 21 (Pre), 50 (Post), 68 (Post), 86 (Pre).

There were also eight respondents in the 'top 18' for both NRS-Pre and NRS-Post:

39, 40, 43, 45, 54, 66, 68 and 71 (coded '1' in SPSS ShannEn_Hi_lo)

And five respondents in the 'bottom 18' for both NRS-Pre and NRS-Post:

19, 22, 23, 30 and 79 (coded '0' in SPSS ShannEn_Hi_lo).

In addition, the following respondents were in the 'top 17'for ShannEn Pre-to-Post differences:

5, 10, 13, 17, 22, 25, 30, 37, 41, 42, 44, 45, 46, 55, 63, 78, 82 (coded '1' in SPSS ShannEn_Diff_Hi_lo)

Those in the 'top 16'for *absolute* ShannEn Pre-to-Post differences were:

5, 9, 10, 11, 13, 16, 41, 42, 44, 46, 47, 52, 53, 61, 62, 70 (coded '1' in SPSS ShannEn_Diff_Hi_lo-Abs).

The following were in the 'bottom 18'for ShannEn Pre-to-Post differences:

4, 8, 9, 11, 16, 23, 47, 52, 53, 61, 62, 64, 69, 70, 83, 85, 86, 87 (coded '0' in SPSS ShannEn_Diff_Hi_lo)

And those in the 'bottom 18'for *absolute* ShannEn Pre-to-Post differences were:

3, 6, 7, 20, 26, 27, 28, 29, 31, 32, 34, 51, 54, 65, 66, 67, 71, 79 (coded 0' in SPSS ShannEn_Diff_Hi_lo_Abs).

In the 'bottom 18' (17 for NRS-Pre, to avoid taking in 8 participants all with ShannEn of 1.9301), the following eight overlaps with the TEIQue-SF occurred:

2 (Pre), 5 (Pre), 9 (Post), 37 (Pre), 41 (Pre), 52 (Post), 55 (Pre) and 79 (both Pre and Post).

5.4.2. Shannon entropy 2. Cluster analyses

Cluster analyses following the same procedures described above for NRS-M alone (section 5.2.3) were conducted for ShannEn together with the various NRS subscales – for NRS-Pre, NRS-Post and their (signed, not absolute) differences. Dendrograms indicated two clusters as the optimum solution for NRS-Post, two or four for NRS-Pre, and two or three for their differences. For consistency, the 2-cluster solution was used for all three. The resulting clusters, removing respondents excluded from one or more of the three analyses because of missing data, are shown in **Appendix C** (**Table C2**), but were not explored in further analysis.

5.4.3. Shannon Entropy 3. By NRS subscale

NRS-Pre to NRS-Post changes in ShannEn were not consistent in direction for any subscale, even when subgroups were considered, and no subgroup changes were significant. Most consistent direction of change was for 'Lively' (ME increased in four subgroups, decreased in two). Normalised ME differences – i.e. (difference in ME)/(NRS-Pre ME)*% - were in general <10%, except for Comfortable (LSBU2) (-15.49%), Gloomy (NCA1) (+11.93%) and Confused (NCA2) (+20.98%). ME rather than ShannEn differences were considered because Pre and Post string lengths differed in many instances.

ME correlations were significant, indeed high, between ShannEn for NRS-Pre and NRS-Post for all subscales (**Table 34**).

Table 34. Correlations (Spearman's *rho*) between ShannEn for NRS-Pre and NRS-Post for the NRS subscales.

Subscale	*rho*	p-value
Anxious	0.973	0.001
Comfortable	0.879	0.021
Relaxed	0.957	0.003
Lively	0.915	0.011
Confused	0.831	0.040
Fatigued	0.977	0.001
Gloomy	0.915	0.011
Overall good mood	0.993	<0.001

5.5. Graphology variables

5.5.1. Verticality

Despite instructions to place a mark *on* the horizontal line of the NRS, only 17 did so. In addition, six participants positioned their marks consistently above the line, while the great majority (47, or 67%) placed theirs below the line (**Table 31** above).

5.5.2. Size

Only five respondents used overly large or small marks when scoring the NRS (**Table 31** above). These results were therefore not analysed.

5.5.3. Shape

As can be seen from **Table 31** above, despite instructions to place a *cross* (X) on the horizontal line of the NRS, only 32 respondents (36.4%) did so consistently, whereas 26 (29.5%) used a circle (a non-significant difference according to the Binomial test). Two respondents used other marks, and a number were inconsistent in their way of scoring.

5.5.4. Openness

Of those who marked their score using a circle, seven (26.9%) often did not close the circles, but left them open. These were respondents 11, 27, 32, 37, 68, 69, 86. Of these, four were good and two or three poor responders; likewise, there were no obvious patterns in response style or Shannon entropy for these seven respondents. These results were not analysed further.

5.5.5. Decade scoring

5.5.5.1. Results by subscale

If NRS-M scores were randomly distributed, the number of scores 'greater than' and 'less than' multiples of five should be approximately equal. Assuming this equal distribution (50%) and taking results for NRS-Pre and NRS-Post together, the only significant difference (with 11 scores greater

than 5s, two less than 5s) was for Anxiety (p=0.022, Binomial test). This could well be a chance finding (with eight subscales, there are 16 comparisons in all, so at the 5% level of probability, it is likely that one of these will be significant).

5.5.5.2. Results by participant

63 out of 88 participants scored predominantly around the decade markers (multiples of 10 ±2) – with 'predominantly' interpreted as 12 or more times out of 16 items, NRS-Pre and NRS-Post considered together. Of these, only 31 participants scored predominantly precisely on the decade markers.

In contrast, only 3 scored around the mid-decades [10*n + 5 (±2), 0≤n≤9], none of these predominantly on the mid-decade markers.

The following cases tended to score predominantly below or above the decades or mid-decades (i.e., with a difference of 4 or more between the number of 'below' and 'above' decade or mid-decade scores) (**Table 35**).

Table 35. Respondents who scored frequently off the decade and mid-decade markers, showing the numbers of times they did so and, in the second and subsequent columns, the total numbers of respondents as well.

Respondent	Below decade	Above decade	Below mid-decade	Above mid-decade
21	8			
25	9			
26		5		
40	4			
43				12
47	4			
49		6		
54				7
55				11
56		7		
57	4			
59	5			
66		4		
67		8		
78		8		
79	6			
80		8		
85		6		
88		4		
Totals 19	7 (40)	9 (56)	0 (0)	3 (30)

'Below' scorers were given the index -1, 'on' scorers 0, and 'above' scorers '1' in SPSS. Some respondents, of course, scored inconsistently: Case 49 scored predominantly on the decade (10 times) but also above mid-decade (6 times), case 47 predominantly on the decade, but also 4 times

below the decade and never above it, case 66 predominantly on the decade, but also 4 times above the decade and never below it.

If those scoring above the decade *and* mid-decade markers are considered together, the number of times marks were positioned above the markers was significantly greater than the number of times they were positioned below them (Binomial test, $p<0.001$). However, the numbers of participants did not differ significantly between these two.

6. Secondary measures: some interactions

6.1. Prior acupuncture and responsiveness: Only three of 71 respondents (32, 48 and 55) stated that they had not had prior acupuncture. None of these were 'good responders'. Otherwise no conclusions could really be drawn on how prior acupuncture affected any of the other measures in this study.

6.2. Responsiveness and OPMC (units): Unsurprisingly, the association between these was significant ($Chi^2 = 8.031$, $p=0.018$ for method 1; $Chi^2 = 8.333$, $p=0.012$ for method 2).

6.3. Graphology variables

6.3.1. Verticality and shape: Of those marking above the line, 5 used a X; of those marking on the line, all 17 used a cross, and of those marking below the line, 7 used a cross and 25 a circle (shape was not consistent or unrecorded for 14 other participants who marked below the line). Thus the Chi^2 test was significant here, indicating a strong interaction, between Verticality and Shape ($Chi^2=32.87$, $p<0.001$) (see below, section 7.4.1).

Verticality and Shape both showed reasonable associations with Global EI ($\eta \geq 0.7$), but Global EI did not vary significantly for the different Verticality and Shape subtypes (Kruskal-Wallis and Mann-Whitney U tests, $p>0.05$).

6.3.2. Verticality and on/off decade scoring: The majority of those scoring below the line (21 of 27) did so on the decade, so it is not surprising that the Chi^2 test was significant here ($Chi^2=9.709$, $df=4$, $p=0.046$).

6.3.3. Shape and College: Fourteen of the 26 NCA students followed the NRS instructions and used a cross, with only six using a circle or other mark. In contrast, the majority of CICM and LSBU students (23 vs 18) appeared to prefer not to follow instructions and did not use a cross to mark their NRS scores (this disregards the participants for whom marking preference was inconsistent or not recorded). (The Chi^2 test for this finding narrowly missed reaching significance: $Chi^2=3.671$; $p=0.055$.)

6.4. Shannon entropy and other secondary measures

6.4.1. Response style (RS): η was <0.4 for ShannEn vs RS, with ShannEn dependent (Mann-Whitney test results were non-significant). However, if RS is considered as dependent on ShannEn, values of η are compelling: 0.853 for ShannEn-Pre, 0.782 for ShannEn-Post, and 1.000 for their difference. In fact, of course, ShannEn is more likely to be dependent on RS than the other way round.

6.4.2. Responsiveness: With responsiveness considered as dependent on ShannEn, η was >0.7 for the Post-Pre ShannEn difference vs responsiveness (assessed using either method). As for RS, ShannEn is more likely to be dependent on Responsiveness than the other way round.

6.4.3. Graphology variables: Similarly for associations with the graphology variables, such as Verticality and Shape, or whether respondents score on or off decades.

No other interactions between secondary measures were significant.

7. Effects of the secondary measure scores on the JTT, TEIQue-SF, AHQ and NRS

7.1. Response style: ERS vs MRS

Using the Mann-Whitney U test, no significant differences between ERS and MRS respondents were found for Acupuncture helpfulness or the JTT. However, the following were significant for the TEIQue-SF (*N*=21):

Global EI (p=0.029, U=17.0, r (Z/√*N*) = 0.48)	e
Self-control (p=0.014, U=14.0, r=0.53)	e
Sociability (p=0.019, U=15.0, r=0.51)	e
Stress-management (p=0.007, U=11.0, r=0.59)	e
Optimism (p=0.032, U=18.5, r=0.47)	e

As indicated by the letter 'e', all showed greater median and mean values for ERS than MRS (i.e., TEIQue-SF scores tended to be negatively skewed).

Significant differences using the Mann-Whitney U test were found for all NRS-Pre subscales except 'Fatigued' and 'Gloomy', for all NRS-Post subscales, but only for the NRS Post – NRS Pre 'Anxious' absolute difference (*N*=21) (results not shown). Somewhat unexpectedly, median and mean values were greater for the 'positive' subscales in the ERS group, but greater for the 'negative' subscales in the MRS group (**Table 36**).

Table 36. Significant differences between MRS (m) and ERS (e) score for the NRS subscales.

Response style	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
NRS-Pre	e<m	m<e	m<e	m<e	e<m	n.s.	n.s.	m<e
NRS-Post	e<m	m<e	m<e	m<e	e<m	e<m	e<m	m<e
NRS Post-Pre (Abs)	e<m	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

This suggests that those with clear response style may score the positive and negative subscales differently. However, Cramer's V was not significant for the association between Response style and OPMC units.

On the other hand, Cramer's V was high (0.830, p=0.021) for the association between NRS response style and Group, suggesting different response styles in the different teaching groups (for Colleges, Cramer's V was lower, at 0.566, but still significant, with p=0.035).

7.2. Responsiveness

7.2..1. Using 'good responders' (2) vs 'non-responder' (1) scores only

Table 37 shows significant differences in primary measures with high and low responsiveness.

Table 37. Significant differences in primary measures with high and low responsiveness.

Responsiveness	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
NRS-Pre	n.s.	0.049[a]	n.s.	0.046[a]	n.s.	n.s.	n.s.	n.s.
NRS-Post	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
NRS Post-Pre (Abs)	0.010[a]	n.s.	n.s.	0.013[a]	n.s.	<0.001[a]	0.034[a]	0.001[a]
JTT	Combi	IE	InS	FT	PJ			
(Cramer's V)	n.s.	n.s.	n.s.	n.s.	n.s.			
Helpfulness	Overall	Physical	Function	Mental-emot	Advice	Average		
(Mann-Whitney U)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		
TEIQue-SF	Global	Wellb	S-cntrl	Emot	Sociab	Adapt	S-motiv	S-mge
(Mann-Whitney U)	n.s.	n.s.	0.035[a]	n.s.	n.s.	n.s.	0.007[a]	0.046[a]

a. 2>1.

(All comparisons made using the Mann-Whitney U test apart from JTT vs Responsiveness, for which Cramer's V was used as a measure of association.)

7.2.2. Using 'ambivalent' responders rescored as (2) or (1), in line with cluster analysis

Table 38 shows significant differences in primary measures with high and low responsiveness.

Table 38. Significant differences in primary measures with high and low responsiveness.

Responsive b.1.	Anx	Comf	Relax	Lively	Confus	Fatig	Gloomy	Overall
NRS-Pre	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
NRS-Post	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
NRS Post-Pre (Abs)	n.s.	0.029[a]	0.031[a]	0.003[a]	0.011[a]	<0.001[a]	n.s.	0.001[a]
JTT	Combi	IE	InS	FT	PJ			
(Cramer's V)	n.s.	n.s.	n.s.	n.s.	n.s.			
Helpfulness	Overall	Physical	Function	Mental-emot	Advice	Average		
(Mann-Whitney U)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		
TEIQue-SF	Global	Wellb	S-cntrl	Emot	Sociab	Adapt	S-motiv	S-mge
(Mann-Whitney U)	n.s.	n.s.	0.007[a]	n.s.	n.s.	n.s.	0.035[a]	0.013[a]
							Empath	Optim
							n.s.	0.018[a]

a. 2>1.

(As above, all comparisons made using the Mann-Whitney U test apart from JTT vs Responsiveness, for which Cramer's V was used as a measure of association.)

It is self-evident that NRS-Post minus NRS-Pre differences would be greater for good than for poor responders. It is less obvious that the TEIQue dimensions Self-control, Self-motivation, Self-management and (when 'ambivalent' responders are rescored) Optimism should be significantly greater for good responders than for poor responders.

7.3. Shannon entropy

7.3.1. Correlations

Correlations between Post-Pre differences in ShannEn and NRS-Pre, NRS-Post and their difference, OPMC, past acupuncture Helpfulness and TEIQue-SF were investigated.

Of the numerous possible correlations, only the following were significant, although not impressively so (scatter plots were not encouraging):

- NRS-Post – NRS-Pre difference in Lively (*rho*=-0.255, p=0.032)
- Absolute NRS-Post – NRS-Pre difference in Confused (*rho*=-0.259, p=0.029)
- OPMC (*rho*=-0.241, p=0.042).

7.3.2. ShannEn and the NRS-M

Considering only those respondents for whom the ShannEn for NRS-Pre *and* NRS-Post was in the upper or lower quartile of ShannEn values (section 5.4.1 above), the following differences in median values were significant, using the Mann-Whitney U test for independent samples:

Lively (Post)	*N*=13, U=4.00, *r*=0.65, p=0.019 (median/mean higher for respondents showing *low* ShannEn)
Relaxed (Difference)	*N*=13, U=5.00, *r*=0.61, p=0.030 (median/mean higher for respondents showing *low* ShannEn)
Comfortable (ABS Difference)	*N*=13, U=6.50, *r*=0.56, p=0.045 (median/mean higher for respondents showing *high* ShannEn)
Lively (ABS Difference)	*N*=13, U=4.50, *r*=0.67, p=0.017 (median/mean higher for respondents showing *high* ShannEn).

Considering now only the respondents for whom the difference between ShannEn for NRS-Pre and NRS-Post was in the upper or lower quartile of the ShannEn *difference* values, the following differences in median values were significant, using the Mann-Whitney U test:

Lively (Difference) *N*=34, U=84.0, *r*=0.36, p=0.037
(median/mean higher for respondents showing *low* ShannEn)

Confused (ABS Difference) *N*=34, U=85.0, *r*=0.36, p=0.041
(median/mean higher for respondents showing *low* ShannEn).

Repeating this for the upper and lower quartiles of the *absolute* values of the ShannEn Pre-to-Post NRS differences:

Fatigued (Pre) *N*=34, U=70.0, *r*=0.44, p=0.11
(median/mean higher for respondents showing *low* ShannEn differences)

Fatigued (Difference) *N*=33, U=43.00, *r*=0.58, p=0.001
(median/mean higher for respondents showing *high* ShannEn differences).

In contrast, there were no significant differences between high and low ShannEn (or ShannEn difference) scorers for the TEIQue-SF.

The following associations with categorical measures are potentially of interest:

Upper or lower quartile of ShannEn values vs 'Shape' (rescored as 0 or 1):
Cramer's V = 0.655 (*N*=10, p=0.038)

High or low values of the ShannEn Pre-to-Post NRS differences vs JTT Perceiving/Judging subtype:
Cramer's V = 0.463 (*N*=26, p=0.018)

High or low *absolute* values of the ShannEn Pre-to-Post NRS differences vs JTT Introvert/Extrovert subtype:
Cramer's V = [-]0.486 (*N*=24, p=0.017)

7.3.3. ShannEn and the JTT

ShannEn (whether for NRS-Pre, NRS-Post, or the difference between them) was not significantly dependent on any JTT types, or the composite type ($\eta<0.5$ for each comparison).

7.3.4. TEIQue-SF ShannEn and the AHQ

The only significant correlation for TEIQue-SF ShannEn was with 'Acupuncture helpful for mental/emotional difficulties' (*N*=67): *rho*=0.261 (p=0.033).

7.4. Graphology variables

7.4.1. Verticality

The Kruskal-Wallis test was used to assess differences in NRS, TEIQue-SF and ShannEn with Verticality. Very interestingly, the only two significant results were for NRS-Pre 'Gloomy', for which Chi^2=6.744, and p=0.034 (df=2), and TEIQue-SF 'Optimism', for which Chi^2=6.843, and p=0.033 (df=2).

Of the 70 respondents who felt gloomy initially, 47 scored below the line, but only six above (17 on the line). However, the initially optimistic also scored predominantly below the line (46 below, 6 above and 17 on the line), so the intuitively inviting conclusion that 'up' is 'good' and 'down' is 'bad' should perhaps be avoided!

However, if consistent Verticality scores were split between those who used a X and those who used a O, all of the latter scored below the line (circling the numbers positioned there), whereas those who used an X scored either above (5), on (17) or below (7) the line, or inconsistently (3), so there is a strong interaction, between Verticality and Shape (Chi^2=32.87, p<0.001).

Table 39 shows the numbers of high, median and low Optimism and 'Gloomy' scores above, on and below the line of the NRS.

Table 39. The numbers of initially high, median and low Optimism and 'Gloomy' scores above, on and below the line of the NRS.

Item	Verticality	Shape (X)			Shape (O)		
		>median	=median	<median	>median	=median	<median
Optimism	above	3	1	1	0	0	0
	on	3	2	12	0	0	0
	below	2	0	5	9	8	8
Gloomy	above	5	0	0	0	0	0
	on	11	1	5	0	0	0
	below	4	1	2	10	4	11

Median 'Optimism' was highest for those scoring above the line (at 6.25; 6.5 for X-scorers), lower for those scoring on the line (5.5; 5.2 for X-scorers) or below it (6.0; 6.1 for X-scorers). Median 'Gloomy' was highest for the X-scorers below the line (at 38.5), lower (30.0) for those scoring on the line, and least (8.5) for those scoring above the line. Thus perhaps, after all, the intuitively appealing conclusion may be correct (although these differences were not significant using the Kruskal-Wallis test, with numbers being too small to apply a Chi^2 test).

7.4.2. Shape (X or O)

Curiously, TEIQue-SF Empathy and Optimism scores differed with shape, being greater for those scoring using a O (Mann-Whitney U test results: *N*=58, U=290.0, *r*=0.26, p=0.046, and *N*=58,

U=285.5, *r*=0.27, p=0.038, respectively), although counts of empathisers and optimists were very similar for the two shapes. In contrast, there was no significant difference with Self-motivation or Stress management scores (p>0.05), although means and medians were slightly higher for O than X scores.

7.4.3. Decade scoring

No significant relationships were found between patterns of decade scoring and the NRS or TEIQue-SF.

7.5. Late arrivers or early leavers (i.e. not completing one or other of the NRS) did not show any particular NRS or TEIQue-SF scoring characteristics, nor any significant or instructive associations with graphology or other categorical variables.

Discussion

Many statistical tests were conducted in this study to assess differences and associations between the various primary and secondary measures used. By chance, around 5% of these could be expected to yield significant results. Given that there were 54 original and derived scales yielding continuous interval data, as well as 17 categorical variables (with 79 separate categories), clearly an enormous number of potentially interesting results might appear to be significant without actually being so (a rough calculation estimates this number at around 170). Because different types of statistical test were conducted on all these variables, no simple correction method could be applied – either for family-wise error rates – such as the Bonferroni correction (Dunn 1961) – or for false discovery rates, such as the Benjamini-Hochberg procedure (Benjamini & Hochberg 1995). Therefore the findings of this small study need to be treated with caution rather than embraced uncritically. They were not sufficiently robust, for example, to enable us to build any sort of model of who is likely to be a 'good' or 'positive' responder to EA using regression analysis.

In particular, results for the graphology variables are very tentative. To our knowledge, these have not been investigated before, nor has Shannon entropy in the way it was explored here.

8.1. Changes in mood

Changes in mood exhibited a 'regression to the median': initially high scores for 'Anxious', for example, would decrease, and low scores for 'Comfortable' would increase (sections 3.1 & 4.7).

Furthermore, the NRS subscales fall clearly into two clusters, whether considering NRS-Pre, NRS-Post or their differences. These can be characterised simply as 'positive' and 'negative' moods (section 5.3). The 'positive' moods tended to increase and 'negative' moods to decrease (sections 3.1, 3.1.3). Significant increases occurred for 'Comfortable' and 'Lively', and decreases for 'Confusion' (sections 3.1.2-3). These are welcome findings in a teaching situation with an experiential component.

There were negative correlations between initially feeling 'Anxious' and the change in feeling 'Confused', and between initially feeling 'Comfortable' and the change in feeling 'Lively', positive

correlations between feeling 'Fatigued' initially and subsequent changes in feeling 'Comfortable', 'Lively' and in 'Overall good mood' (section 4.7). These were not altogether expected, and merit further investigation.

8.1.2. Changes in mood and Jungian typology

By the end of the teaching session Introverts were likely to be more anxious, less comfortable or relaxed, and more gloomy, than Extraverts, with a lower overall mood. It is surprising that the introvert-extravert dyad was so significant in NRS-Post, but not at all in NRS-Pre, and not in the NRS-Post minus NRS-Pre differences either.

Furthermore, of the 'good responders', Introverts experienced greater (absolute) changes than Extraverts in feeling comfortable, relaxed, lively and an overall good mood, but lesser changes than the extraverts in feeling confused (for 'poor responders', changes in feeling lively were greater in extraverts, and lesser in introverts). JTT 'Judging' types were more likely to experience a decrease in feeling confused, and 'Perceiving' types possibly more likely to experience an increase.

8.1.3. The TEIQue-SF and changes in mood

Interestingly, all global and dimension EI scores for this sample of acupuncture students appeared significantly higher than the reference norms for the general population (section 3.2).

Curiously, the *absolute* difference in Confused (NRS-Post minus NRS-Pre) correlate quite well with five of the 10 TEIQue-SF dimensions, i.e. greater changes in Confused (whether increases or decreases) are associated with several positive aspects of emotional intelligence. This result could potentially be of interest in exploring the performance of students in classroom or self-study situations.

A result that is puzzling, and may simply be a chance finding, is that TEIQue-SF Empathy was greater in both 'Lively' and 'Overall mood' decreasers than in increasers.

8.1.4. AHQ and changes in mood

AHQ scores suggest that students found from their own past experience that acupuncture in itself could be helpful for a variety of conditions, but that they were not overly impressed by the advice given as part of that treatment by their practitioners (section 3.4). This finding may point to a need for better education in that aspect of acupuncture training.

Although there were no significant correlations between AHQ items and NRS-Pre or NRS-Post subscales, five of 48 possible associations with the NRS-Post minus NRS-Pre differences were significant (and 15 with the absolute values of these differences), even though Spearman's *rho* for these was not particularly impressive (section 4.6.3). So, for example, prior experience of overall helpfulness was positively correlated with changes in 'Comfortable' and 'Overall good mood', and with absolute changes in 'Confused'. For 'negative' scorers, there was also a positive correlation with change in 'Fatigued'. In contrast, helpfulness of past acupuncture for physical conditions was

negatively correlated with absolute changes in 'Comfortable', 'Lively' and (for 'decreasers') 'Gloomy' – i.e., the more helpful it had been found in the past, the *smaller* the absolute changes in mood in the current situation. Intriguingly, past helpfulness for mental/emotional conditions and *absolute* changes were positively correlated for 'Confused ', but negatively correlated for 'Overall good mood'.

8.2. Differences and similarities between Colleges

Acupuncture colleges vary in their approach to training, and so might be expected to attract different types of student. The first result suggesting this can be found in section 3.1.1 above: LSBU students scored NRS-Post most highly for the 'positive' moods, and CICM and NCA students most highly for the 'negative' moods. However, this could also reflect other differences in the teaching situation (classroom and building design, weather, lecturer mood, etc.).

A second result (section 3.3) is that whereas for all three Colleges Intuitive JTT types outnumbered Sensing types, and Feeling types outnumbered Thinking types, there was more or less an even balance between Perceiving and Judging types and (although not for the NCA) of Introverted and Extraverted students. In addition, a very high proportion of NCA students were Feeling rather than Thinking types. There may be variations in the interactions between mood and Jungian typology in the different Colleges that warrant further investigation. However, it does seem that, overall, "people who study acupuncture are particularly iNtuitors and Feelers [and] although anyone might train and do well as a practitioner they are the majority" (Angela Hicks, personal communication, 18 Dec 2015). Our results here – as with those for EI reported above (section 3.2) would support the view of acupuncturists as likely to be – or to consider themselves as – more 'touchy-feely' (more accurately, Intuitive Feeling types) than thinking types.

Varlami and Bayne, using the Keirsey Temperament Sorter II, derived from but different to the MBTI (or JTT), found that counselling psychology students who preferred SJ (Sensing-Judging) were more likely to choose the CBT model of counselling, NFJ (Intuition-Feeling-Judging) types the Psychodynamic model and NFPs (Intuition-Feeling-Perceiving) the Person-Centred model (Varlami and Bayne 2007). It would be interesting to assess students of different types of Oriental medicine in a similar way.

There was a significant difference between Colleges in how helpful overall students had found prior acupuncture. This was greatest for respondents from LSBU, and least for the NCA respondents (section 3.4). All three of those who indicated that they had not received prior acupuncture were NCA students (see under *Respondents*, above). This suggests a possible difference between the Colleges in requirements at enrolment, and possibly something to be addressed – none of the three were 'good responders' (section 6.1).

8.3. Relationships between primary measures

One intriguing finding is that 'Thinking' types considered prior acupuncture as more helpful overall than 'Feeling' types, but this would need to be confirmed in a larger, carefully designed study.

There is some suggestion that those who found acupuncture helpful in the past for mental/emotional conditions were likely to score highly on emotional intelligence. This is perhaps a rather obvious result, but again would merit further exploration in a larger study.

The significant associations between EI and Jungian typology were not particularly revealing. Those of empathy with introversion, and of sociability with extraversion, are understandable, but the association of self-motivation with the JTT combination types is less clear (section 4.1).

8.4. Secondary measures

8.4.1. Differences between respondent types

In any context, variables may increase, decrease or remain the same over time. Changes that may not be significant if 'decreasers', 'no-changers' and 'increasers' are all lumped together may become so – although not necessarily – if they are considered separately (section 3.1.4). This could be considered as statistical cheating, but may also be useful in revealing what underlies how different individuals respond to treatment and score the changes they perceive, particularly if potentially relevant underlying characteristics are investigated at the same time (see for example the acupuncture study of 'augmenters' and 'reducers' by Bäcker et al. 2012). Here, we found 29 respondents whose overall positive mood change (OPMC) was high, 11 for whom it was low, and 31 for whom it was somewhere between (section 3.1.6).

8.4.2. Response style

There were only six consistent MRS respondents for the NRS, but 58 respondents (65.9%) scored 'Lively' using a MRS, for example. Even for the subscale least frequently scored using a MRS, 'Gloomy', there were 27 MRS responses (30.7%). In the same vein, although there were only 15 consistent ERS respondents, an ERS (low scores) was used most for 'Anxious' by 71 respondents (80.7%), and least for 'Lively', by 20 respondents , or 22.7% (mostly high scores) (section 5.1).

Thus it is clear that certain subscales contribute consistently more than others to the respondents' response styles. More specifically, median and mean values were greater for the 'positive' subscales in the ERS group, but greater for the 'negative' subscales in the MRS group. Furthermore, different response styles appeared to predominate in the different Colleges (or College Groups) (section 7.1).

There were rather more MRS scorers for the TEIQue-SF (25) than for the NRS (15) – perhaps reflecting a cautiousness in revealing too much about personal traits as against temporary states (only two respondents demonstrated a MRS for both measures). In contrast there were 15 ERS respondents for each measure, with five respondents consistently using an ERS for both measures (section 5.1.2).

8.4.3. Responsiveness

The most responsive NRS subscale was 'Fatigued', and the least were 'Relaxed' and 'Overall good mood' (section 5.2.1). Of the respondents, 32 might be considered 'good responders', 29 'poor responders', and 9 'middle-of-the-roaders' (section 5.2.2). This distribution differs somewhat from that of the two-cluster solution obtained in a confirmatory cluster analysis, mostly because of 17 respondents who ended up in the 'poor responder' cluster, despite in fact being actually 'middle-of-the-roaders' or 'good responders' (section 5.2.3).

Whereas it is self-evident that NRS-Post minus NRS-Pre differences would be greater for good than for poor responders, an interesting finding is that the TEIQue dimensions Self-control, Self-motivation, Self-management and possibly Optimism appear to be significantly greater for good responders than for poor responders (section 7.2.2). All these have been considered as markers of self-regulation (Beckmann & Kellmann 2004; Leventhal et al. 2016; Rasmussen et al. 2006). Thus an important research question may be whether responsiveness to acupuncture is predicated on an ability for self-regulation.

8.4.4. Shannon entropy

No comparable studies could be found that investigated ShannEn for questionnaire responses. For the two interval measures used here, ShannEn was slightly but significantly greater for the TEIQue-SF than NRS-M (section 5.4.1). Given that complexity of various physiological measures may vary depending on age, severity of disease and degree of stress experienced (Steffert & Mayor 2014), a very tentative interpretation might be, for instance, that respondents found completing the NRS-M (median ShannEn 2.15) more stressful than completing the TEIQue-SF (median ShannEn 2.23). Similarly, for the group NCA1, ShannEn for NRS-Post was greater than for NRS-Pre (**Table 33**), again perhaps suggesting that students were more relaxed (less stressed) towards the end of the teaching session than at the beginning.

However, a lot more research would need to be undertaken to confirm or refute such interpretations. An attempt was made to assess whether higher ShannEn was associated with greater 'positive' NRS subscale scores, and lower ShannEn with greater 'negative' NRS subscale scores (section 7.3.2), but results were not very enlightening:

Those respondents with upper quartile NRS ShannEn showed significantly greater *absolute* Pre-to-Post changes in feeling 'Comfortable' and 'Lively'. However, NRS-Post 'Lively' was higher for those with lower quartile NRS ShannEn, and the (signed) Pre-to-Post difference in 'Relaxed' was again greater for those with lower quartile NRS ShannEn. Respondents with lower quartile Pre-to-Post *differences* in NRS ShannEn showed greater Pre-to-Post differences in 'Lively', and also greater *absolute* changes in Confused. Respondents with lower quartile Pre-to-Post *absolute* differences in NRS ShannEn did show greater initial feelings of 'Fatigue' than those in the upper quartile, but the Pre-to-Post (signed) difference in 'Fatigued' was greater for those with upper quartile Pre-to-Post *absolute* differences in NRS ShannEn.

There also appeared to be no very obvious interpretations of associations between NRS ShannEn and the other secondary measures.

As with NRS-M, there were NRS ShannEn 'decreasers', 'no-changers' and 'increasers', with the Wilcoxon test highly significant within these subgroups.

An intriguing finding was that those had found acupuncture helpful for mental/emotional difficulties in the past were also likely to show greater ShannEn in their TEIQue-SF scores (section 7.3.4). Personal observations from hundreds of completed questionnaires, particularly the Profile of Mood States (POMS) and the Brunel Mood Scale (BRUMS) has led the authors to conjecture whether more variability (or uncertainty) in responses to questionnaires on emotional topics may be associated with more emotional awareness or responsiveness. Again, this is a suggestion that could be explored using Shannon entropy. Another possibility would be to investigate possible relationships between Shannon entropy and what Eysenck called the 'scatter' of marks in a group of subscale tests; however, he found that whereas scatter may be larger than usual in psychotics, it does not differentiate between normals and neurotics, nor between 'hysterics' (extraverts) and 'dysthymics' (introverts) (Eysenck 1961, pp 118-121).

8.4.5. Graphology variables

It is unclear why some respondents – particularly from one College – obediently followed instructions and scored the NRS-M by marking a cross (X) on the line, as instructed, whereas others positioned it above or below the line, or used a circle (O) instead. This could perhaps be explored using one of the 'Big Five' personality traits, Conscientiousness (Roman Kotov, personal communication, 27 Jan 2017), but also raises further questions about obedience/compliance, and rebellion/defiance in self-rating scales in general.

A potentially interesting and intuitively attractive finding is that those who initially felt more 'Gloomy' were slightly more likely to position their X below the line when scoring their moods, whereas TEIQue-SF Optimism tended to be higher in those scoring the NRS-M above the line. These very tentative findings could be worth investigating further, using a larger sample.

Future research could explore the relationship between what has been called 'graphic constriction and expansiveness' and the measures of size and openness introduced here. Wallach and Gahm found, for example, that "social introverts high in anxiety level were more expansive graphically than non-anxious social introverts, while social extraverts high in anxiety were more constricted graphically than non-anxious social extraverts" (Wallach & Gahm 1971). More simply, Eysenck found in a small study that "60% of the patterns produced by dysthymics were compact" (i.e. leaving no spaces between pieces of the pattern), whereas hysterics tended to produce "scattered and intermediate designs", with only 27% producing compact patterns (Eysenck 1961, p 238).

Conclusions

In this small study (*N*=88), we investigated mood changes in response to an electroacupuncture (EA) intervention applied in a teaching situation in three different Colleges/Universities and whether these were related to respondents' Jungian (Myers-Briggs) typology, emotional intelligence or previous personal experiences of acupuncture treatment. We also explored *how* acupuncture students completed these primary measures, in terms of response style (extreme or midpoint), responsiveness (good or poor), a tendency to positive or negative responding, and then some additional novel secondary variables: Shannon entropy and a few graphological characteristics.

Our salient findings were as follows:

1. Mood changes exhibited a 'regression to the median'(initially high scores would decrease, and low scores increase).

2. Furthermore, 'positive' moods tended to increase and 'negative' moods to decrease.

3. Students found from their own past experience that acupuncture in itself could be helpful for a variety of conditions, but they were less impressed by the advice given as part of that treatment by their practitioners.

4. A slightly concerning result (although based only on three cases) was that none of the students who explicitly stated they had not received prior acupuncture were 'good responders', and were all from one College. This may be important in terms of College intake policy.

5. Following EA, students on courses at two of the Colleges scored 'negative' moods most highly, but at the other College the 'positive' moods. A number of factors could be responsible for this difference.

6. For all three Colleges, Intuitive Jungian (Myers-Briggs) types outnumbered Sensing types, and Feeling types outnumbered Thinking types, supporting the view of acupuncturists as likely to be – or to consider themselves as – more 'touchy-feely' than thinking types.

7. In support of this, emotional intelligence (EI) scores for this sample of acupuncture students appeared significantly higher than the reference norms for the general population.

8. Following EA, Introverts were likely to be more anxious and gloomy, and less comfortable or relaxed, than Extraverts, with a lower overall mood. However, of the 'good responders', Introverts experienced greater (absolute) changes than Extraverts in the four 'positive' moods assessed.

9. Dividing respondents into 'decreasers', 'no-changers' and 'increasers' (whether, as here, of mood or Shannon entropy), or 'good responders', 'poor responders' and 'middle-of-the-roaders', may be useful in revealing what underlies how different individuals respond to treatment and score the changes they perceive, rather than being merely a statistical cheat.

10. Median and mean NRS values were greater for the 'positive' subscales in the extreme response style (ERS) group, but for the 'negative' subscales in the midpoint response style (MRS) group. Furthermore, different response styles appeared to predominate in the different Colleges. In this

sample, fewer respondents used a MRS for the EI measure than for the NRS – perhaps reflecting a cautiousness in revealing too much about personal traits as against temporary states.

11. Several dimensions of EI that can be considered as markers of self-regulation were significantly greater for good responders than for poor responders.

12. This first attempt to use Shannon entropy to analyse questionnaire results was disappointing, but could pave the way to investigating whether variability (uncertainty) in responses to self-report instruments is in any way associated (positively) with more openness or awareness, or (negatively) with levels of stress or anxiety.

13. Those who initially felt more 'Gloomy' were slightly more likely to position their X below the line when scoring their moods using the NRS, whereas EI Optimism tended to be higher in those scoring above the line.

However, many statistical tests were conducted to assess differences and associations between the various primary and secondary measures used in this study, so that at least some of these findings are likely to be the result of chance. They should therefore be treated with caution rather than embraced uncritically. Nonetheless, our results may be helpful when entering the uncharted waters of the question 'Who responds well to acupuncture?', our next major project, even if they are not sufficiently robust to allow us at this stage to build a model of who is likely to be a 'good' or 'positive' responder to acupuncture.

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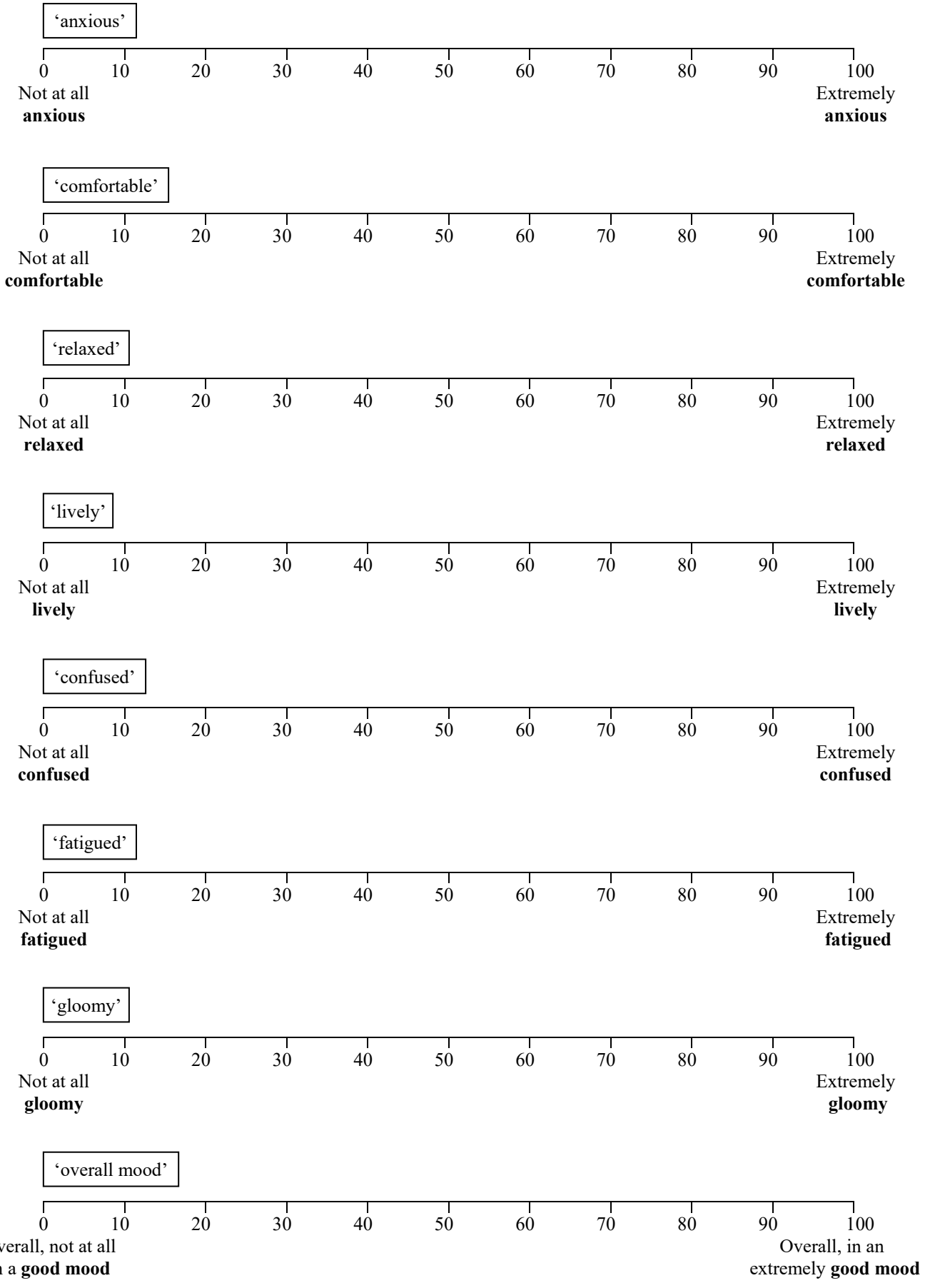
APPENDICES

Appendix A. Multiple Numerical Rating Scale for Mood (NRS-M)

Place a cross on each line to represent **how you feel right now**.



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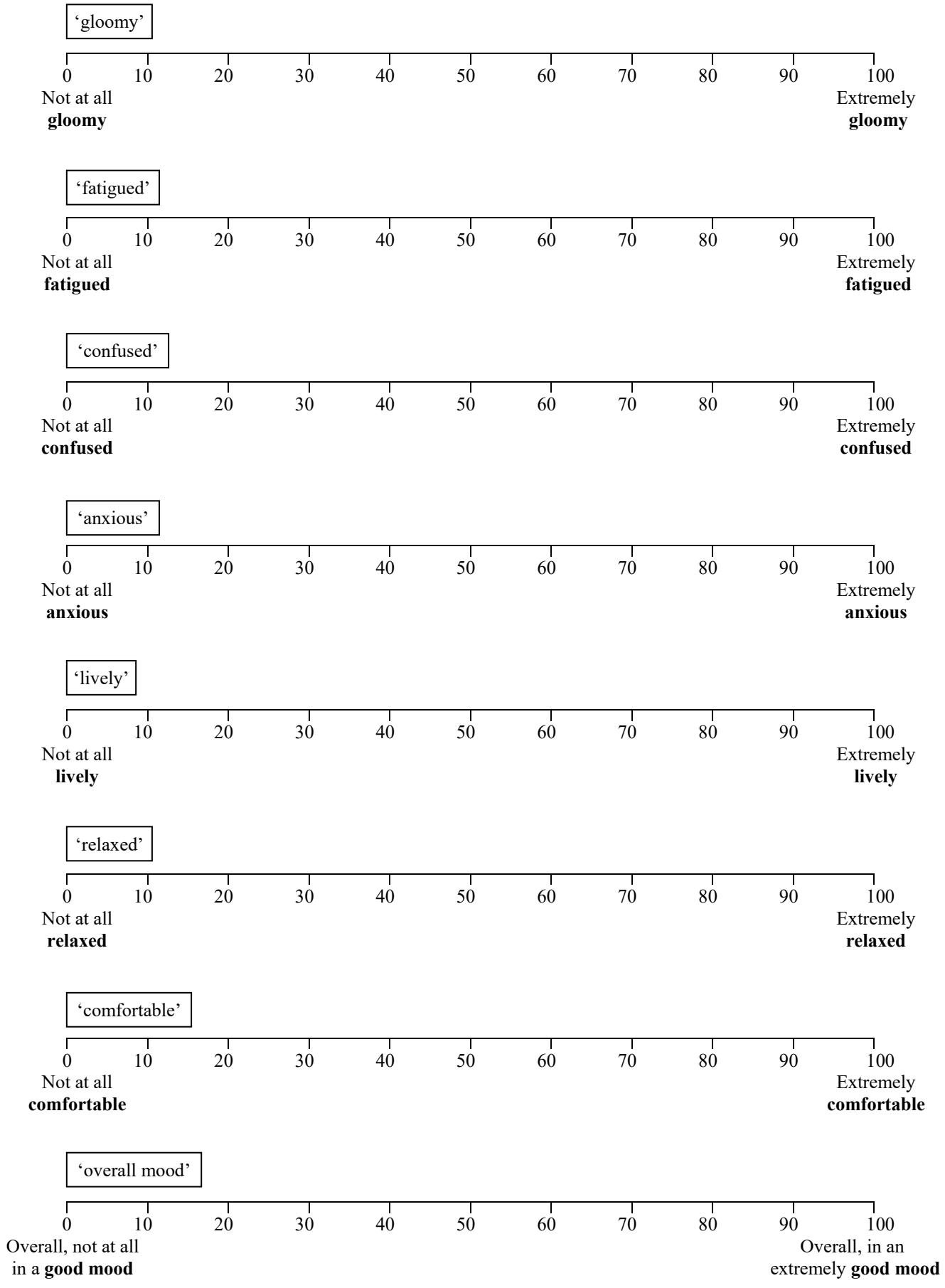
Appendix A. Multiple Numerical Rating Scale for Mood (NRS-M)

Place a cross on each line to represent **how you feel right now**.



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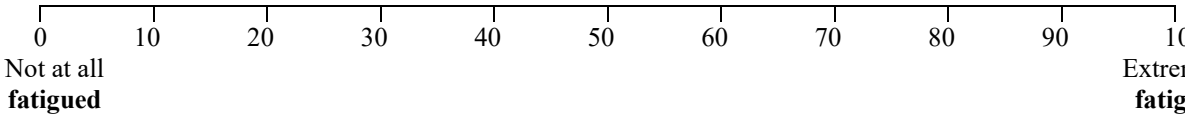
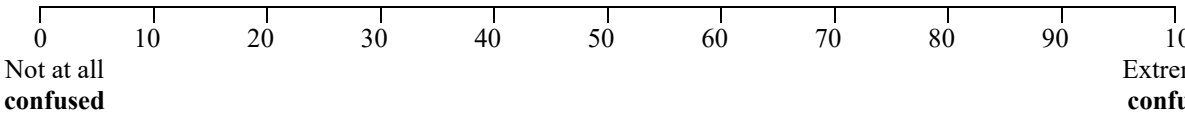
Appendix A. Multiple Numerical Rating Scale for Mood (NRS-M)

Place a cross on each line to represent **how you feel right now**.

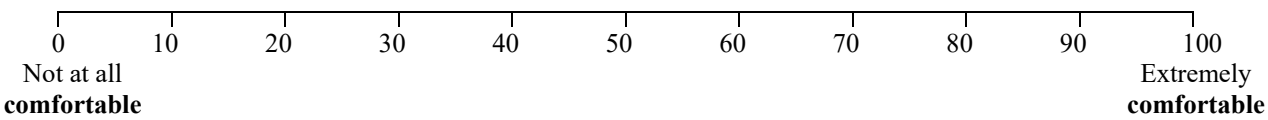
‘fatigued’



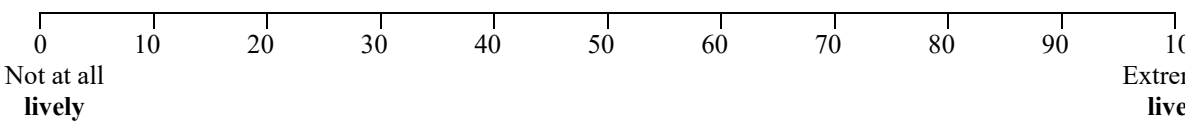
‘confused’



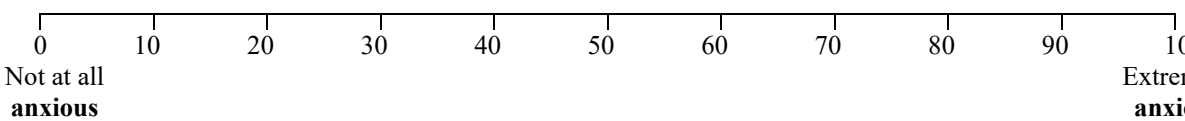
‘comfortable’



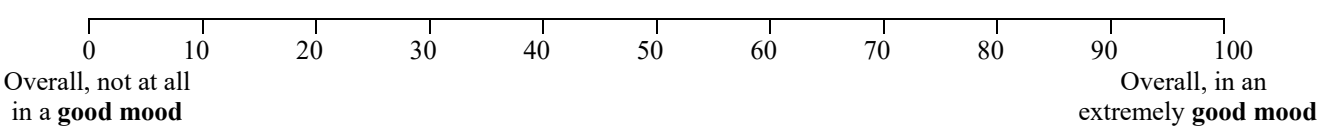
‘lively’



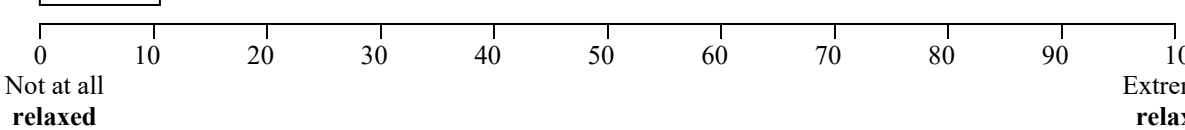
‘anxious’



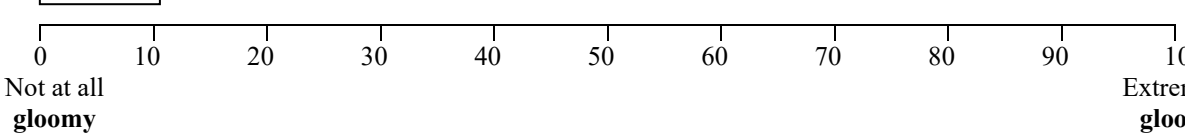
‘overall mood’



‘relaxed’



‘gloomy’

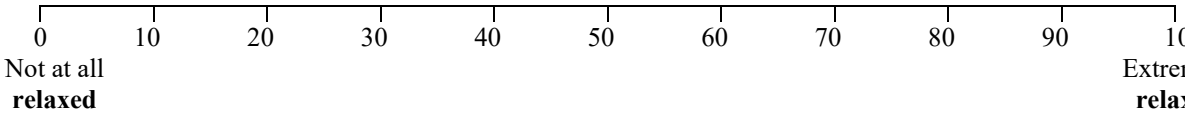


ID _____ Date _____

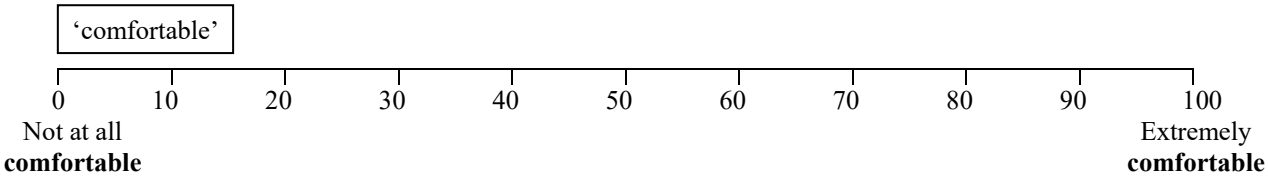
Appendix A. Multiple Numerical Rating Scale for Mood (NRS-M)

Place a cross on each line to represent **how you feel right now**.

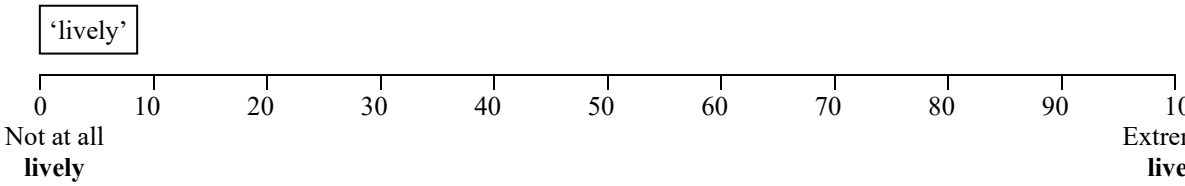
‘relaxed’



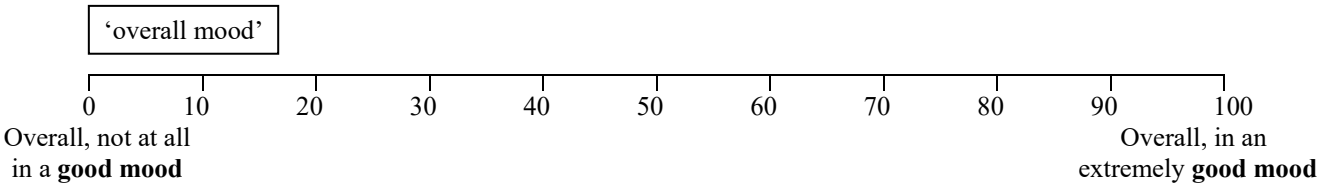
‘comfortable’



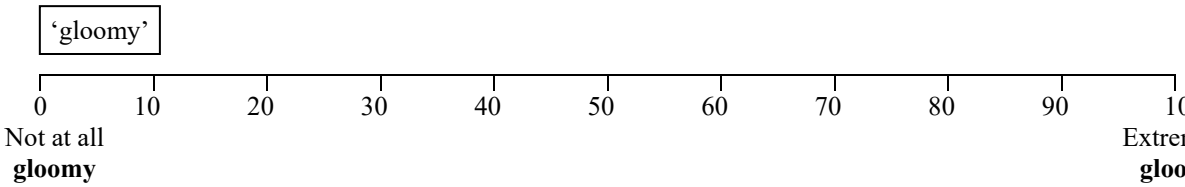
‘lively’



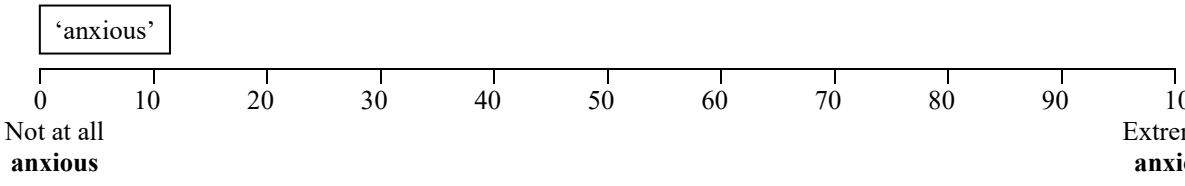
‘overall mood’



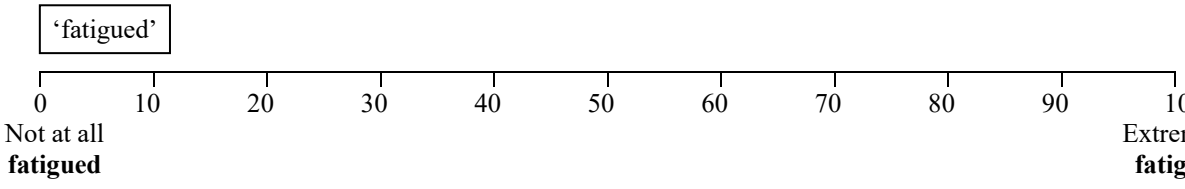
‘gloomy’



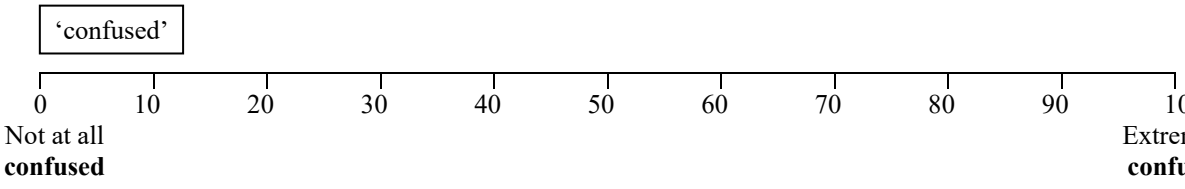
‘anxious’



‘fatigued’



‘confused’



ID _____ Date _____

B. The acupuncture helpfulness questions (AHQ)

1.7. Have you had **acupuncture treatment** in the past, or are you having it currently?

Tick a box:

Yes ☐ No ☐

1.7.1. If you answered 'yes', have you found it helpful? Please circle the number you consider appropriate in the box below.

1 . . . . . 2 . . . . . 3 . . . . . 4 . . . . . 5 . . . . . 6 7

Not helpful at all — Extremely helpful

1.7.2. In particular, have you find it helpful for:

	(not at all)						(extremely)
Purely physical or biomedical problems	1	2	3	4	5	6	7
'Functional' disorders or medically unexplained symptoms	1	2	3	4	5	6	7
Mental/emotional difficulties	1	2	3	4	5	6	7
Lifestyle or other advice given	1	2	3	4	5	6	7

C. Confirmatory cluster analysis for responsiveness

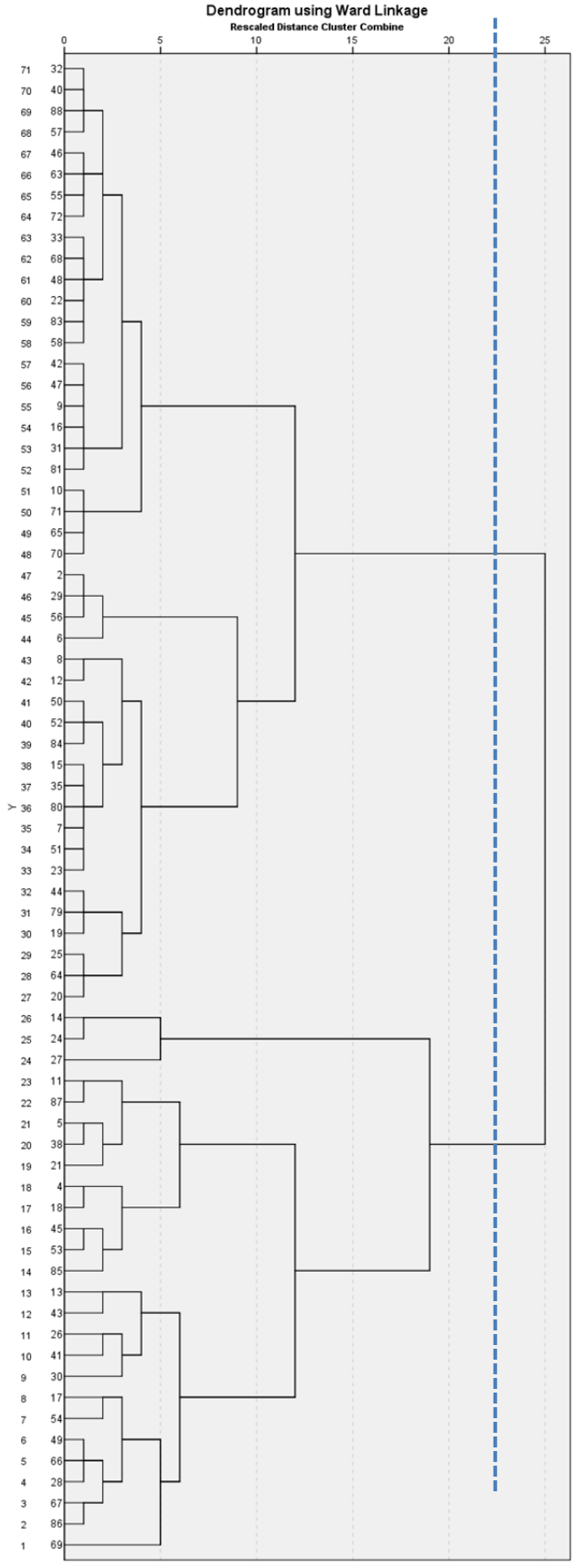


Table C1. Cases in the two clusters

Cluster 1	Cluster 2
1	**3**
5 [21]	**4**
6	**10**
7 [35]	**12**
8	**13**
9	**16**
11 [23]	**17**
14	**20**
15	**23**
18	**25**
19	**26**
21	**27**
22	**29**
24 [25]	**37**
28 [4]	**40**
30	**42**
31	44 [32]
32	48 [61]
34	**52**
39	**53**
41	*65* [49]
43 [12]	**66**
45	**68**
46	**84**
47	**85**
49	*86* [2]
50	
51 [34]	
54	
55	
56	
57	
62	
63 [66]	
64 [28]	
67	
69	
70	
71	
78	
79	
80	
82	
83 [59]	
87	

The lists of participants in the two clusters are derived from those in section 5.2.2 above (NRS responsiveness 2. By participant).

Underlined: possible midpoint responders; *italic*: possible poor responders; **bold**: possible good responders; in red: 82 may not, and 86 definitely did not receive treatment; numbers in brackets: row in dendrogram.

All but two of the 7 underlined are in cluster 1, as are all but two of the italicised cases. However, ten in bold are in cluster 1, with 22 in cluster 2. Thus the clusters do not tally completely with the 'poor/good' responder types suggested above (a difference of 4 in cluster 2 rather than cluster 1, and 9 in cluster 1 rather than cluster 2).

There is no evident dendrogram pattern to these 'ambivalent' cases. They could be placed in additional clusters: C1 = non-responders or midpoint responders; C2 = good responders; C3 = 'ambivalent' responders (in column 1 of the 2-cluster solution); C4 = 'ambivalent' responders (in column 2).

Table C2. Results of cluster analyses for the NRS and NRS ShannEN considered together.

Case	NRS-Pre	NRS-Post	Post-Pre
4	1	1	1
9	1	1	1
15	1	1	1
21	1	1	1
28	1	1	1
30	1	1	1
32	1	1	1
34	1	1	1
37	1	1	1
41	1	1	1
49	1	1	1
56	1	1	1
62	1	1	1
64	1	1	1
66	**1**	**1**	**1**
68	**1**	**1**	**1**
79	1	1	1
80	1	1	1
82	1	1	1
83	1	1	1
84	1	1	1
86	1	1	1
87	1	1	1
10	1	1	2
1	1	2	1
6	1	2	1
14	1	2	1
27	1	2	1

39	**1**	**2**	**1**
43	**1**	**2**	**1**
46	1	2	1
47	1	2	1
67	1	2	1
69	1	2	1
78	1	2	1
85	1	2	1
3	1	2	2
16	1	2	2
17	1	2	2
23	1	2	2
40	**1**	**2**	**2**
42	1	2	2
44	1	2	2
53	1	2	2
7	2	1	1
11	2	1	1
24	2	1	1
25	2	1	1
26	2	1	1
8	2	2	1
12	2	2	1
13	2	2	1
18	2	2	1
19	2	2	1
20	2	2	1
22	2	2	1
29	2	2	1
31	2	2	1
45	**2**	**2**	**1**
48	2	2	1
50	2	2	1
51	2	2	1
52	2	2	1
54	**2**	**2**	**1**
55	2	2	1
57	2	2	1
63	2	2	1
65	2	2	1
70	2	2	1
71	**2**	**2**	**1**

Underlined: In the 'bottom 18' for both NRS-Pre and NRS-Post.

Bold: in the 'top 18' for both NRS-Pre and NRS-Post.

D. Effect size calculations for findings reported in the poster.

1. Mood changes exhibited a 'regression to the median' (initially high scores would decrease, and low scores increase) ($p<0.01$).

*Using G*Power for Sensitivity – computing required effect size given alpha (0.05), power (0.8) and sample size (75 for paired EXPre/EXPost means) – gives a **medium** required effect size of 0.34.*

Anxious	*0.18*
Comfortable	*0.20*
Relaxed	*0.03*
Lively	*0.26*
Confused	*0.24*
Fatigued	*0.15*
Gloomy	*0.20*
Overall mood	*0.20*

*Thus actual effect sizes were all **small**.*

2. Furthermore, 'positive' moods (e.g. 'Relaxation') tended to increase and 'negative' moods (e.g. 'Gloomy') to decrease ($Chi^2=33.99$, $df=2$, $p<0.001$).

*Using Cramer's V as a measure of effect size (Zaiontz 2013), 0.25 is the **medium** effect size achieved.*

3. Intuitive Jungian (Myers-Briggs) types outnumbered Sensing types, and Feeling types outnumbered Thinking types (see Table), supporting the view of acupuncturists as likely to be – or to consider themselves as – more 'touchy-feely' (more accurately, Intuitive Feeling) than thinking types ($p<0.001$).

*3a. Using Cramer's V as a measure of effect size (Zaiontz 2013), 0.31 is the **medium** effect size achieved.*

*3b. Difference in distribution of In and S types between the US norms and this sample ('ALL') is significant: $Chi^2=30.45$, $df=1$, $p<0.001$; with Cramer's V=0.39, again a **medium** effect size.*

4. In support of this, several emotional intelligence (EI) dimension scores for these acupuncture students appeared significantly higher than the reference norms for the general population (1-sample T test, $p<0.01$ or $p<0.05$).

*Using G*Power for Sensitivity – computing required effect size given alpha (0.05), power (0.8) and sample size (84 for TEIQue vs the reference values in a 1-sample T-test) – gives a **small-medium** required effect size of 0.27.*

Actual effect sizes achieved:

	M	F
Global EI	0.21	**0.44**
Wellbeing	0.40	**0.51**
Self-control	0.28	0.29
Emotionality	**0.56**	0.29
Sociability	**0.45**	0.10
[Adaptability]	**0.75**	**0.96**
[Self-motivation]	0.20	0.29
[Stress management]	0.09	**0.44**
[Empathy]	0.41	0.14
[Optimism]	**0.58**	**0.54**

*Thus effect sizes achieved were **medium to large** for five EI dimensions for women, and four for men.*

There were also differences in response between Introverts and Extraverts, the former being likely to be more anxious and gloomy, and less comfortable or relaxed, after EA ($p<0.05$).

*Using G*Power for Sensitivity(Wilcoxon-Mann-Whitney test for two groups), as above, with N set at the numbers of Introverts/Extraverts completing both EXPre and EXPost subscales, required effect sizes were as follows:*

*Anxiety, Comfortable (N=26, 29): 0.70; Gloomy, Lively, Relaxed, Overall good mood (N=26, 30): 0.69. This indicates a **large** required effect size.*

Actual effect sizes achieved (equal groups assumed):

Anxious 0.25
Comfortable 0.17
Relaxed 0.30
Lively 0.28
Confused 0.08
Fatigued 0.08
Gloomy 0.22
Overall mood 0.29

*These are all **small** effect sizes.*

Several dimensions of EI that can be considered as markers of self-regulation (e.g. self-motivation and optimism) were significantly more prominent for 'good responders' than 'poor responders' ($p<0.05$).

*Using G*Power for Sensitivity(Wilcoxon-Mann-Whitney test for two groups), as above, with N set at the numbers of 'good' and 'poor' responders, these differences show a **large** required effect size (0.74).*

Actual effect sizes achieved:

	M
Global EI	0.22
Wellbeing	0.19
Self-control	0.29
Emotionality	0.19
Sociability	0.08
[Adaptability]	0.03
[Self-motivation]	0.09
[Stress management]	**0.33**
[Empathy]	0.19
[Optimism]	**0.35**

These effect sizes are **very small to small**, the greatest being for Stress management and Optimism.

Those who initially felt more 'Gloomy' were slightly more likely to position their X below the line when scoring their moods using the NRS-M, whereas EI 'Optimism' tended to be higher in those scoring above the line (n.s., but intriguing).

Students were enthusiastic about the acupuncture treatment they had received themselves in the past ($p \leq 0.001$), but not overly impressed by the lifestyle advice their practitioners gave them ($p=0.158$).

Odds ratio as a measure of effect size was not calculated.

Reference

Zaiontz C. 2013. Effect Size for Chi-square Test. Available at: http://www.real-statistics.com/chi-square-and-f-distributions/effect-size-chi-square/ [accessed 09 Mar 2017]