

Everyone Project, Cohort 1. Quantitative analysis of pre and post Mindfulness Based Living Course data; initial findings.

8th March, 2017

SUMMARY

This short report provides a summary of the quantitative results from the pre- and post- MBLC course questionnaires returned from the first cohort of Everyone funded projects.

120 pre-course questionnaires were received and 74 post-course, giving 74 paired questionnaires used in the analyses presented here. The overall dropout rate, as measured from the course questionnaires, was 38.3%, and ranged from 0 to 82% amongst courses.

The results show significant differences in the participant's responses to all questions before and after the courses. Specifically:

- There was a large, significant increase in the measure of WHO-5 ($p < 0.001$) following the MBLC course.
- Results for the Perceived Stress Scale (PSS-10) indicate that the effect measured effect of each of the individual questions was small to medium, while the overall effect of the stress levels on the participants was a large decrease in perceived stress ($p < 0.001$).
- The largest effect (measured using Cohen's *d*) was measured with the Mindful Attention Awareness Scale (MAAS) where large increases were observed between the overall pre and post-course results ($p < 0.001$).

Although I have made some comments here regarding the results, I have not presented a discussion of these. The next stage in interpreting these results will be to compare them to previously published data – this is not an insignificant task, given the volume of published literature on this.

I would recommend that if possible we try to publish something on this quickly (i.e., before the end of this year), then publish the results from the second cohort separately.

Here, I have pooled all the pre and post-course data, looking at the overall impact of the MBLC course. Future work might also look at differences between courses but I do not believe that the present data set is large enough to do this in a statistically valid way.

Copies of the data sets, and all the output files from the analyses, accompany this report.

METHODS

120 questionnaires were obtained from the pre-course questionnaires, and 76 from the post-course questionnaires (Table 1). From this, 74 valid pre and post-course comparisons could be made. The data were initially entered into Excel, which was then imported into IBM SPSS Version 24 for statistical analyses.

Ref	Title	Pre-course	Post-course	Dropout %
EV3	Unity Peer supervision Group Mindfulness for Refugees and	11	11	0.0
EV6	Asylum Seekers	8	8	0.0
EV9	Strathaven Cares	16	6	62.5
EV10	Wellbeing Hay Mindfulness	3	2	33.3
EV11	Mindfulness For Carers with VOCAL Mindfulness for Everyday and	11	9	18.2
EV12	Everyone	21	13	38.1
EV13	CLASP	11	3	72.7
EV14	St Teresa's regeneration Project	11	2	81.8
EV15	What's Happening on North Street	10	7	30.0
EV17	Mindful Living	12	9	25.0
EV18	Family Carers	6	4	33.3
	Total	120	74	38.3

Table 1: Summary of pre and post-course questionnaires received, together with Dropout rates. Two additional post-course questionnaires were received for EV11, and one for EV13, although no corresponding pre-course questionnaires were received.

Paired samples t-tests were carried out using the combined data sets. Not all participants replied to all questions, so the number of responses to some questions varies. I did not include pre- or post-course questionnaires where no corresponding post or pre-course questionnaires were present.

The results of three questionnaires are presented: WHO-5 (Section 2 in the questionnaires given to participants), The Perceived Stress Scale (Section 2; 10 questions), and MAAS (Section 3; 15 questions). Background information on these questionnaires has been presented previously. Results are presented individually for these three questionnaires.

The magnitude of the effect of the course (i.e., responses to questions post course to pre-course) was assessed using Cohen's d , calculated using Microsoft Excel. Table 2 contains descriptors for magnitudes of Cohens's d from 0.01 to 2.0, as suggested by Cohen (1988) and expanded by Sawilowsky (2009).¹

Effect size	d	Reference
Very small	0.01	Sawilowsky, 2009
Small	0.20	Cohen, 1988
Medium	0.50	Cohen, 1988
Large	0.80	Cohen, 1988
Very large	1.20	Sawilowsky, 2009
Huge	2.0	Sawilowsky, 2009

Table 2: Descriptors for "Cohen's d "

¹ Sawilowsky, S (2009). "New effect size rules of thumb.". *Journal of Modern Applied Statistical Methods*. **8** (2): 467–474.

RESULTS

WHO-5

	Mean	N	S.D.	S.E.
WHO-5 Pre-Course	47.17	72	22.98	2.71
WHO-5 Post-Course	60.22	72	18.32	2.16

Table 3: Paired Sample Statistics for WHO-5 results, pre and post- course. S.D. = Standard Deviation. S.E. = Standard Error.

72 results for WHO-5 were compared from the pre and post-course questionnaires (Table 1). This showed that there was an overall increase in WHO-5 from 47.17 to 60.22 at the end of the course. Results from the t-test showed that this increase is highly significant ($p < 0.001$; Table 4), with Cohen's *d* indicating that this can be described as a medium sized effect.

Mean	S.D.	S.E.	t	Significance	Cohen <i>d</i>	Effect
13.06	16.90	1.99	6.55	0.000	0.770	Large

Table 4: Differences in Paired Sample t-tests for WHO-5 pre and post-course.

For the WHO-5, the minimum clinically important difference has been suggested to be a change of 10% on standardized percentage scores, indicating that the 13% mean increase observed here are clinically significant.

For comparison, (Hoffman, Ersser et al. 2012) tested the effect of MBSR versus “standard care” among patients with breast cancer. The WHO-5 baseline score in each of the groups was approximately 50, which the authors consider to be indicative of reduced well-being. The difference between the effect of the MBSR and the control group was approximately 10 points on the WHO-5, i.e. just barely clinically significant, but the patients in the active group still had mean WHO-5 values below the general population norm at the end point.

As a slight aside, a noticeable feature of the pre-course questionnaires were the extremely low results returned for EV6 (i.e., Mindfulness for Refugees and Asylum seekers). For example, in the pre-course questionnaires three people scored zero for WHO-5, and the highest score was 16%. While this might genuinely reflect the mental state of the participants on this course it is possible that this reflects other factors, such as the participants first language not being English so not fully understanding the questions or answers, participants copying each other's answers, or returning low scores as they might feel that they have to justify being on the course. The analysis was therefore repeated excluding the EV6 data, and the results were still highly significant for all questions except Questions 4 and 5 of PSS and Question 1 of MAAS.

Perceived Stress Scale (PSS)

Perceived Stress Scale Scoring Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items (i.e., questions 4, 5, 7 and 8) are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress. PSS-10 scores are obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2.

	Pre-course			Post-course		
	Mean	S.D.	S.E.	Mean	S.D.	S.E.
Q1	2.36	0.92	0.11	1.92	0.86	0.10
Q2	2.35	1.00	0.12	1.93	0.96	0.11
Q3	2.65	0.90	0.10	2.15	0.86	0.10
Q4	2.45	0.92	0.11	2.74	1.01	0.12
Q5	2.14	0.96	0.11	2.50	0.88	0.10
Q6	2.22	0.90	0.10	1.86	0.91	0.11
Q7	2.27	0.75	0.09	2.65	0.75	0.09
Q8	2.08	0.80	0.09	2.42	0.94	0.11
Q9	2.35	0.94	0.11	1.76	0.92	0.11
Q10	2.19	1.12	0.13	1.54	1.09	0.13
Score	21.19	6.22	0.72	16.82	6.40	0.74

Table 5: Paired Sample Statistics for WHO-5 results, pre and post- course. S.D. = Standard Deviation. S.E. = Standard Error. N= 74 for all samples, except Q8, where N=73. [Note that the scores for questions 4, 5, 7 and 8 are reversed for calculating the final “score”, so that this does not simply reflect the total of the means of the 10 questions.]

	Mean	S.D.	S.E.	t	Significance	Cohen's <i>d</i>	Effect
Q1	-0.45	0.85	0.10	-4.53	0.000	-0.53	Medium
Q2	-0.42	1.22	0.14	-2.96	0.004	-0.34	Small
Q3	-0.50	0.95	0.11	-4.51	0.000	-0.52	Medium
Q4	0.30	0.96	0.11	2.66	0.010	0.31	Small
Q5	0.36	1.00	0.12	3.14	0.002	0.36	Small
Q6	-0.35	0.85	0.10	-3.55	0.001	-0.41	Small
Q7	0.38	0.89	0.10	3.67	0.000	0.43	Small
Q8	0.34	0.85	0.10	3.43	0.001	0.40	Small
Q9	-0.59	1.02	0.12	-5.02	0.000	-0.58	Medium
Q10	-0.65	1.05	0.12	-5.30	0.000	-0.62	Medium
Score	-4.36	4.60	0.54	-8.16	0.000	-0.95	Large

Table 6: Results for Paired Sample t-tests for Perceived Stress Scale pre and post-course individual questions and overall result.

The negative results indicated in Table 6 this relates to the nature of the questions, and “which way round” these are.

The results for the Perceived Stress Scale indicate that the effect measured effect of each of the questions was small to medium, while the overall effect of the stress levels on the participants was a large decrease in perceived stress ($p < 0.001$; Table 6).

Mindful Attention Awareness Scale (MAAS)

	Pre-course				Post-course			
	Mean	N	S.D.	S.E.	Mean	N	S.D.	S.E.
Q1	3.70	74	1.36	0.16	4.01	74	1.29	0.15
Q2	4.03	74	1.54	0.18	4.55	74	1.39	0.16
Q3	3.07	74	1.35	0.16	3.84	74	1.14	0.13
Q4	3.33	73	1.52	0.18	4.25	73	1.27	0.15
Q5	3.01	74	1.35	0.16	3.85	74	1.22	0.14
Q6	2.41	74	1.35	0.16	3.18	74	1.29	0.15
Q7	2.92	73	1.28	0.15	3.84	73	1.13	0.13
Q8	3.47	73	1.23	0.14	4.07	73	1.16	0.14
Q9	3.26	73	1.30	0.15	3.82	73	1.12	0.13
Q10	3.00	74	1.29	0.15	3.68	74	1.25	0.15
Q11	3.18	74	1.31	0.15	3.70	74	1.28	0.15
Q12	3.91	57	1.57	0.21	4.75	57	1.21	0.16
Q13	2.62	74	1.21	0.14	3.28	74	1.24	0.14
Q14	2.99	74	1.22	0.14	3.73	74	1.26	0.15
Q15	3.58	74	1.65	0.19	4.35	74	1.42	0.16

Table 7: Paired Sample Statistics for MAAS results, pre and post- course. S.D. = Standard Deviation. S.E. = Standard Error.

	Mean	S.D.	S.E.	t	Significance	Cohen's <i>d</i>	Effect
Q1	0.31	1.25	0.15	2.14	0.036	0.25	Small
Q2	0.53	1.35	0.16	3.37	0.001	0.39	Small
Q3	0.77	1.23	0.14	5.37	0.000	0.62	Medium
Q4	0.92	1.37	0.16	5.72	0.000	0.67	Medium
Q5	0.84	1.53	0.18	4.72	0.000	0.55	Medium
Q6	0.77	1.23	0.14	5.37	0.000	0.62	Medium
Q7	0.92	1.32	0.15	5.94	0.000	0.70	Medium
Q8	0.60	1.29	0.15	4.00	0.000	0.47	Small
Q9	0.56	1.25	0.15	3.85	0.000	0.45	Small
Q10	0.68	1.38	0.16	4.22	0.000	0.49	Small
Q11	0.53	1.24	0.14	3.65	0.000	0.42	Small
Q12	0.84	1.53	0.20	4.15	0.000	0.55	Medium
Q13	0.66	1.31	0.15	4.36	0.000	0.51	Medium
Q14	0.74	1.21	0.14	5.30	0.000	0.62	Medium
Q15	0.77	1.44	0.17	4.61	0.000	0.54	Medium

Table 8: Results for Paired Sample t-tests for MAAS pre and post-course results.

Analysis of the individual questions for the MAAS indicates that there was a significant increase ($p < 0.001$) in the scores for all questions, except Question 1, where the mean increase was not statistically significant ($p = 0.036$).

With the MAAS, the total score is calculated as the mean of responses to all questions, with a higher score corresponding to a greater mindfulness level. This was complicated, however, by gaps in the data (Table 7), particularly for Question 12 ($N=57$). This question asks “I drive places on ‘automatic pilot’ and then wonder why I went there.”; which clearly makes the assumption that the person answering the questionnaire is a driver [reflecting the bias of the people initially designing the questionnaire]. Problems associated with this question have been noted by previous researchers (Pallozzi et al., 2016).

Overall comparisons between data sets were therefore carried out in two different ways: (1) using the entire data set, excluding any questionnaires where any blanks for MAAS results were encountered, and (2) by excluding Question 12 from the analysis, then excluding any questionnaires where blanks were present for the other questions.

Tables 9 and 10 present the results for MAAS when all “blanks” are excluded from the analysis (i.e., any question where a result has not been given). This indicates a highly significant, large increase in MAAS score in the post-course questionnaires when compared to the pre-course questionnaires.

	Mean	N	S.D.	S.E.
MAAS Pre-Course	50.81	54	11.22	1.53
MAAS Post-Course	61.07	54	10.13	1.38

Table 9: Paired Sample Statistics for MAAS, pre and post- course, excluding all questionnaires where questions were left blank. S.D. = Standard Deviation. S.E. = Standard Error.

Mean	S.D.	S.E.	t	Significance	Cohen <i>d</i>	Effect
10.26	11.20	1.52	6.73	0.000	0.92	Large

Table 10: Differences in Paired Sample t-tests for MAAS pre and post-course results, excluding all questionnaires where questions were left blank.

Analyses were also carried out by removing Question 12, then deleting any participants where questions had been left blank (Tables 11 and 12). As would be expected, the mean results are lower when deleting Question 12, as this includes the totals of only 14 questions, although 15 more questionnaires are included in the analysis. Again, however, it was observed that there was a significant ($p < 0.001$) increase in MAAS scores after the course, compared to before the course, with this effect size “large”. Both manipulations of the MAAS therefore produce comparable overall results.

	Mean	N	S.D.	S.E.
MAAS Pre-Course	45.10	69	11.64	1.40
MAAS Post-Course	54.41	69	11.36	1.37

Table 11: Paired Sample Statistics for MAAS, pre and post- course, excluding Question 12, and any questionnaire where questions were left blank. S.D. = Standard Deviation. S.E. = Standard Error.

Mean	S.D.	S.E.	t	Significance	Cohen <i>d</i>	Effect
9.30	9.96	1.20	7.76	0.000	0.93	Large

Table 12: Differences in Paired Sample t-tests for MAAS pre and post-course results, excluding Question 12, and any questionnaire where questions were left blank.