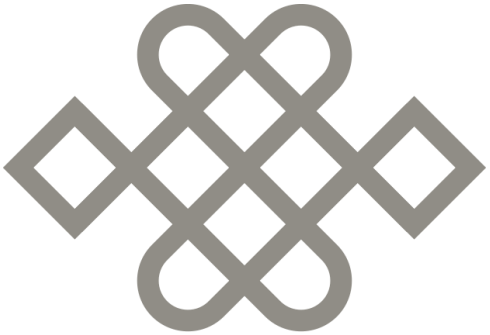

MINDFULNESS
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Everyone Project, Cohort 2. Report on the quantitative analysis of pre and post Mindfulness Based Living Course questionnaires.

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SUMMARY

This report presents a summary of results from the pre- and post- MBLC course questionnaires completed as part of the second cohort of Everyone funded projects. This follows on from the research carried out on the first cohort of Everyone projects, and the report produced for this in March 2017. This initial report examined 71 sets of paired questionnaires, carried out pre and post-course, the results of which showed a significant overall increase in the measure of WHO-5 ($p<0.001$), together with a large decrease in perceived stress ($p<0.001$; measured using the Perceived Stress Scale, PSS-10), with highly significant increases also observed ($p<0.001$) using the Mindful Attention Awareness Scale (MAAS).

The research methods employed for the first cohort of Everyone projects were repeated with the second round of projects, using the same questionnaires, with a further 24 funded projects. From these additional projects, 271 pre-course questionnaires were returned, together with 192 post-course questionnaires. This produced 181 pairs of questionnaires that have been analysed in the present report.

In contrast to the report from Cohort 1, the results for individual questions are not presented, only the overall results for each questionnaire. This more detailed information all available on request.

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

- There was a medium, but highly 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 overall effect of the stress levels on the participants was a highly significant ($p<0.001$), large decrease in perceived stress.
- A large effect was also measured with the Mindful Attention Awareness Scale (MAAS) where highly significant increases were observed between the pre and post-course results ($p<0.001$).

The results of the present study confirm the findings from the first cohort of Everyone projects, with highly significant improvements in all measures assessed. The overall results were broadly similar between the two studies.

While some comments have been made on the results, a full discussion of these is not presented. At the end of this report, however, I have included some thoughts on potential limitations of the data set, and suggestions for future research.

METHODS

271 completed questionnaires were obtained pre-course, and 192 post-course questionnaires (Table 1). Overall, 71% of pre-course questionnaires had a corresponding pre-course questionnaire (176 in total), although the number of pre and post-course comparisons that could be made varied between the different questionnaires, as all questions were not always answered, leaving gaps in the data.

No questionnaires were obtained from EV29 as the supporting organisation did not give permission for these to be used.

Reference	Pre-course	Post-course	% Paired
EV19	16	4	25
EV20	14	14	100
EV22	9	8	89
EV24	9	9	100
EV25	10	7	70
EV26	10	7	70
EV28	4	2	50
EV29	0	0	0
EV30	10	7	70
EV31	11	6*	45
EV35	15	8*	47
EV37	8	8*	88
EV38	15	10	67
EV40	13	10	77
EV41	11	4	36
EV42	13	12	92
EV43	16	10***	31
EV44	19	17	89
EV45	13	5	38
EV46	9	7	78
EV47	14	14*	93
EV48	11	6	55
EV49	10	7	70
EV50	11	10**	73
Total:	**271**	**192**	**71**

Table 1: Number of paired pre and post-course questionnaires received. % = The percentage of completed, paired questionnaires relative to the number of pre-course questionnaires. * = One additional post-course questionnaire received. ** = Two additional post-course questionnaires received. *** = Five additional post-course questionnaires received.

Three questionnaires were used during this study: The WHO-5, the Perceived Stress Scale (PSS) and the Mindful Attention Awareness Scale (MAAS).

The WHO-5 is a short questionnaire consisting of 5 simple and non-invasive questions, which tap into the subjective well-being of the respondents. The scale has adequate validity both as a screening tool for depression and as an outcome measure in clinical trials and has been applied successfully across a wide range of study fields (Topp, Ostergaard et al. 2015). It is among the most widely used questionnaires assessing subjective psychological well-being. Since its first publication in 1998, the WHO-5 has been translated into more than 30 languages and has been used in research studies all over the world. The WHO-5 was developed as a generic scale without any diagnostic specificity. Each of the five questions contained in this questionnaire was rated on a 6-point Likert scale from 0 (= not present) to 5 (= constantly present). Scores were added, with the raw score ranging from 0 to 25. The scores were transformed to a percentage by multiplying by 4, with higher scores meaning better well-being.

The PSS is the most widely used psychological instrument for measuring the perception of stress (Cohen, Kamarck et al. 1983). It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The items are easy to understand, and the response alternatives are simple to grasp. Moreover, the questions are of a general nature and hence are relatively free of content specific to any subpopulation group. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way. The PSS contains 10 questions, each of which was 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) were reverse scored, and the ratings summed, with higher scores indicating more perceived stress. PSS-10 scores were obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2, etc.

MAAS is the most widely used mindfulness scale to date (Medvedev, Siegert et al. 2016). This is a 15-item scale designed to assess a core characteristic of dispositional mindfulness, namely, open or receptive awareness of and attention to what is taking place in the present (Brown, Ryan 2003). Responses to the 15 questions contained in the MAAS questionnaires were indicated on a 6-point Likert-scale, ranging from 1 (Almost Always) to 6 (Almost Never). A total score was calculated as the mean of responses to all items, with a higher score corresponding to a greater mindfulness level.

The data were initially entered into Excel, which was then imported into IBM SPSS Version 24 for statistical analyses. Paired samples t-tests were carried out using the combined (pre and post-course) data sets.

The magnitude of the effect of the course on the questionnaire results (i.e., responses to questions post course to pre-course) was assessed using Cohen's *d*. The aim of this is to give

a concrete sense of whether a difference between the two groups is meaningfully large, independent of whether the difference is statistically significant. Table 2 contains descriptors for magnitudes of Cohen's *d* from 0.01 to 2.0, as suggested by (Cohen 1988) and expanded by (Sawilowsky 2009, Cohen 1988).

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"

RESULTS

WHO-5

172 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 43.93 to 61.73 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 effect.

	Pre-course			Post-course		
	Mean	**S.D.**	**S.E.**	**Mean**	**S.D.**	**S.E.**
Total	43.93	22.53	1.72	61.72	18.10	1.38

Table 3: Paired Sample Statistics for total WHO-5 results, pre and post- course. S.D. = Standard Deviation. S.E. = Standard Error. N = 172.

	Mean	**S.D.**	**S.E.**	**t**	**Significance**	**Cohen's *d***	**Effect**
Total	17.79	23.60	1.80	9.89	0.000	0.75	Medium

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 17.79% mean increase observed here was clinically significant. This agrees with the findings from the Cohort 1 data, where there was a highly significant increase mean increase of 13.7% observed for WHO-5.

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.

Perceived Stress Scale (PSS)

The results for the Perceived Stress Scale indicate that there was a highly significant ($p<0.001$; Table 6) overall decrease in perceived stress in the participants following the course, and that this effect, measured using Cohen's *d*, was large.

This agrees with the findings of the Cohort 1 analyses, which showed highly significant decrease in perceived stress ($p<0.001$; Table 6), from 21.16 to 16.84; figures very similar to those recorded here.

	Pre-course			Post-course		
	Mean	**S.D.**	**S.E.**	**Mean**	**S.D.**	**S.E.**
Total	21.31	6.66	0.54	16.01	6.19	0.50

Table 5: Paired Sample Statistics for WHO-5 results, pre and post- course. N= 154.

	Mean	**S.D.**	**S.E.**	**t**	**Significance**	**Cohen's *d***	**Effect**
Total	-5.30	6.66	0.54	-9.87	0.000	-0.80	Large

Table 6: Results for Paired Sample t-tests (paired differences) for Perceived Stress Scale, post-course minus pre-course.

Mindful Attention Awareness Scale (MAAS)

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=140). 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 (e.g., (Pallozzi, Wertheim et al. 2017). For this reason, Question 12 has therefore been excluded from the results presented here, in line with what was carried out with the Cohort 1 data.

Tables 7 and 8 indicates a highly significant ($p<0.001$), increase in MAAS score from 44.24 pre course to 55.32 in the post-course questionnaires, with this effect being classed as large.

This result is very similar to the results obtained from the Cohort 1 data, where there was a highly significant, large overall increase from 44.85 to 53.86.

	Pre-course			**Post-course**		
	Mean	S.D.	S.E.	Mean	S.D.	S.E.
Total	44.24	12.78	0.97	55.32	12.86	0.97

Table 7: Paired Sample Statistics for MAAS individual questions, pre and post- course. S.D. = Standard Deviation. S.E. = Standard Error. N = 174

	Mean	**S.D.**	**S.E.**	**t**	**Significance**	**Cohen's *d***	**Effect**
Total	11.08	12.91	1.07	11.45	0.000	0.86	Large

Table 8: Paired differences for t-tests for MAAS totals, pre and post-course.

“The Group Effect”

While the data presented here clearly shows the benefits to participants of attending the MBLC course, what is not measured is “the group effect”, although group learning is recognised as being an important aspect of the training. In the online meetings that took place during and after courses there were many comments from tutors on how participants had found it helpful to express their shared experience of being, for example, carers or refugees, and there was a general feeling that this might have contributed to the positive outcomes of the course. This is an aspect of mindfulness courses that has been overlooked (McCown 2013), with researchers often approaching mindfulness courses (such as MBLC and MBCT) as a “standard product”. This does not take into account the “poetics” of teaching mindfulness, however; i.e., the ability of mindful teachers to adapt courses according to the needs of the particular participants. One example that was discussed for the Everyone courses was the introduction of the body scan later in the curriculum for people who have experienced trauma, as the body can often be a threatening place for them.

The group effect has been shown to be important in mindfulness courses. The first study on this was by (Imel, Baldwin et al. 2008) who measured how 600 participants, in 60 different groups, differed in symptom change before and after attending a mindfulness course. They calculated that the group effect, with any effect of the teacher factored out, accounted for seven percent of the variability in the outcome. A five percent variability is considered to indicate a statistically significant change. It is possible that this effect may be especially important with disadvantaged groups, such as those included in the Everyone project, and future research might help clarify this.

Limitations of the data set, and suggestions for future research

While the findings of the research which have been presented here are unequivocal, there are clearly limitations to the data set, which it might be useful to address in future Everyone research studies.

The questionnaires may have not been the most suitable for all the groups that mindfulness courses were being taught to. Although I wasn't aware of who the groups were, from the demographic information I became aware that e.g., one group contained people under the age of 18.

Also, from the online discussions that were held, it appears that some participants found answering all three questionnaires difficult, and that this took a significant amount of time during the first class. This may be particularly true when the participants first language is not English, and some of the nuances of the questions are probably lost. Also, considerations should be made for groups who might have lower literacy rates, or learning difficulties.

Although, the tutors were asked to keep a record of how many sessions the participants attended, unfortunately most did not provide this data (there may have been some confusion here, as this information was not asked from the first cohort). While I removed people from the data set who attended less than six of the sessions, for the majority I was unsure how many they attended, so included them in the study.

There can be a problem with questionnaires in that people simply don't read them. For example, I received a few where people simply filled in the maximum or minimum value for every question. Of course, this may simply reflect the fact that they were having a particularly good or bad day. However, with the perceived stress scale, four of the questions are "reversed", so this indicates that people have simply gone down and circled e.g., all the zeros – in one case I removed a set of questionnaires, as somebody had appeared to do this throughout all the questionnaires.

In hindsight, I feel that it would be good to give tutors much clearer guidelines of what to do and not do. There are some things that may be obvious to a researcher which is possibly not obvious to a tutor who is simply trying to be helpful, e.g., that it is not alright for tutors to complete the questionnaires over the phone with participants who missed the last session, or to draw happy/sad faces on the questionnaires (wrongly, in the case of the PSS questionnaire).

Despite these limitations, we now have a large dataset showing very clearly the effectiveness of the MBLC, as measured using the WHO-5, PSS, and MAAS. It is possible that, for example, a future PhD student may wish to replicate this, to produce data that they feel confident in publishing themselves, but it may also be that they wish to extend the quantitative research by using different questionnaires, that may be more suited towards the particular groups being studied.

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