The Effect of Meditation on Concentration

In recent times, Yoga and meditation have been widely described as effective tools to channel your concentration. Some studies have shown that persons who engaged in regular meditation reported better concentration and higher energy levels on an average as compared to those. These, however, are purely observational studies. They show correlation between the two, but we know that correlation does not always imply causality. To study the causality, we need to design an experiment, in which we introduce an intervention(treatment) and then observe how our outcome changes. In the experiment described ahead, we aim to study the effect meditation has on concentration. More specifically, we aim to answer the following: *Does meditation boost concentration skills in humans?*

Scientists have long been trying to understand the workings of the human mind and unravel the mysteries behind disorders such as Attention Deficit Hyperactive Disorder (ADHD) among children. We have not been able to arrive at cures for certain disorders yet. If meditation is found to have a positive effect on such concentration problems, then we may be able to design treatment programs in order to boost concentration among children (and potentially, adults). The results from this study, if positive, will be a significant step towards designing such treatments. The implications would be far-reaching; meditation could be potentially introduced as part of school curriculums and recreational activities among older adults suffering from Alzheimer's and related syndromes.

In order to study the effect of meditation on concentration, we propose an experiment. As part of our experiment, we measure concentration levels in the presence and absence of meditation activity among our test subjects. As instruments for measuring concentration, we use standardized tests. These tests are nothing but activities which can test concentration. One example of such an activity is remembering patterns of cards between two panels, finding the differences between two very similar images, and so on. We would draw on existing literature from psychology and neurology to identify the most feasible and accurate testing methodologies, as well as the quantification and interpretation of the results.

We recruit our subjects from UC Berkeley. At least 100 subjects would be recruited. We shall aim to balance out our selection of subjects in terms of age, gender, occupation and economic status. After selecting the subjects, we would present statistics that show a reasonable mix of subjects across all of these factors. Doing so avoids any selection bias. For example, if we do not make sure of having this balance, we may end up having all subjects in their twenties, with

STEM studies/professions which supposedly require more concentration. This selection bias would interfere with our results.

We randomly divide the subjects into two groups: control and treatment. Our experiment will be carried out in two phases. For the first phase, both groups will follow the same procedure. During this time, all subjects are given tasks/tests which will evaluate their concentration skills. This will set a baseline measure of concentration abilities. In the second phase, we expose the treatment group to a guided meditation session of about 5 minutes before every task. There are several meditation apps like *Calm* and *Breathe* available; we may use any of these. However, we use the same meditation activity for all participants.

We will compare the differences in concentration levels at the end of the second phase. We expect the concentration in the treatment group to be higher than in the control group. If this is found to be true, then it is a step towards proving our hypothesis.

Because our treatment assignment is random, the effect seen may have been purely due to chance. That is, individuals with better concentration skills may have been placed in treatment. In order to account for such situations, we will repeat the experiment multiple times. Although repeating it over 50 times may seem to be appropriate, it is not feasible to execute within the scope of the class. In order to fit in with the class timeline, we plan to repeat the experiment at least thrice.

As described previously, there may be a bias in the treatment and control splits. For instance, in one possible random assignment of control and treatment groups, more mathematics majors could be in treatment; they would inherently be better at the math and memory tests for concentration. In another case, the treatment may consist mainly of older adults, who would have less concentration than the younger subjects in the control. To control for these effects, we can do blocking by major as well as age. We split our participants into treatment and control groups such that each group has the same number of science-related majors and the distribution of ages is similar.

As with any experimental study, our design is susceptible to confounding variables. There may be several unobserved conditions which may be affecting our outcome. For example, because our experiment runs over multiple weeks, circumstances may change with time. In periods of exams or submissions, sleep and work times vary, and hence concentration will also be affected. Some results may be seen due to the participants having seen the puzzles and solved them another time beforehand. In addition, all participants have different lifestyles, exercise, diets and schedules. Finally, the participants may simply be getting better at solving the concentration

puzzles due to practice over time. We hope that our randomization and repeating actions could help diminish the effects of these confounds.

In conclusion, our goal is to test the hypothesis that meditation improves concentration. To do so, we set up an experiment, in which our treatment (intervention) is meditation. We should take appropriate measures to ensure that the effect of unobserved confounding variables is kept to a minimum.