Opposing Response Profiles and Individual Differences for Two Types of Meditation
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Introduction

Individuals differ significantly in their response to meditation (May et al., 2012). The magnitude of variability between individuals on different physiological and psychological variables is an open, and underexplored, empirical question. Underestimating the degree of variability leads to the risk of conducting studies with inadequate sample sizes to detect an effect, and thus a higher likelihood of committing a Type II error. Increasing sample sizes in meditation studies is often not an option, however; providing adequate meditation training can be resource intensive. Moreover, null and alternative hypotheses apply to samples, not individuals. If only a minority of individuals benefit from a meditation regimen, there may not be a significant group effect. Nevertheless, those effects on the minority are important to extract to advance our understanding of meditation. Single-subject designs provide a way to complement more common group experimental designs to determine the impact of meditation practice.

Method

We employed an alternating treatment single-subject design following an initial baseline week (ABCBCCBC) with 16 inexperienced participants. For eight weeks, participants alternated weekly between concentration meditation and loving-kindness meditation. Participants meditated for 15 minutes, four times per week, following guided meditations created by the first author. We chose these two very different types of meditation in an effort to increase the range of observable individual differences from week to week.

Each week, participants completed the Five Factor Mindfulness Questionnaire (Baer et al., 2006), the Profile of Mood States (Curran, Androrykowski, & Studts, 1995), a Global-Local Task, and a Stroop Task. Electrocardiography measures were also taken during both a baseline period and a meditation period each week.

There were a total of seven alternations between meditation conditions, as numbered here: AB1C2B3C4B5C6B7C. We predicted that if the two types of meditation had a differential impact on a participant, data would follow one of two patterns: a saw-tooth pattern wherein scores increased in the first transition, decreased in the second, and repeated for the remaining transitions; or the reverse saw-tooth pattern (see the Center-Top figure for examples). Given 7 transitions in which scores either increased or decreased, there are $2^7 = 128$ possible response profiles for an individual. The chance probability of a sequence of 5 consecutive transitions following one of the two predicted orders in an array of 7 transitions is $6/128 = .047$. We therefore considered 5 or more consecutive pattern-following transitions as statistically significant evidence for a causal effect of meditation type on a particular dependent variable for an individual.

Results

The Center-Middle figure illustrates, for each dependent variable, the number of participants exhibiting a significant difference between meditation conditions, colored according to which was more beneficial.

- For 13 dependent variables, at least one individual was causally impacted by one or both types of meditation.
- The two variables most impacted (Observe and Non-React), were effected in 5 of 16 participants.
- Meditation type had a differential effect on 8 of the 13 impacted dependent variables.

The Center-Bottom figure illustrates, for each participant, the number of dependent variables significantly effected, colored to show the relative impact of each meditation type.

- Within 6 of the 16 individuals, some dependent variables were beneficially impacted by loving-kindness meditation, while others were effected by concentration meditation.
- Another 6 of 16 benefited from just one of the two types of meditation.

The number of variables impacted for individuals ranged from 0-6.

Conclusions

Using an alternating treatment single-subject design yielded fresh insights into the effects of meditation. Loving-kindness and concentration meditations impacted numerous dependent variables, often differentially. These two meditations also had differential effects on particular individuals. However, the number of individuals exhibiting an effect for any given dependent variable, and the number of variables that were impacted for any given individual, were in the minority. As such, more traditional group experimental designs and analytic methods would have been blind to these effects. While researchers know that the failure to reject the null hypothesis does not mean there is not in an effect in the population, in practice that distinction often becomes blurred. These results demonstrate causal effects that may not have otherwise been statistically significant.

These results indicate that many individuals would benefit from practicing not just one, but both types of meditation. Perhaps more interestingly, they suggest there may not be a “best” meditation type for a range of dependent variables. These results underscore the value of using a combination of contemplative styles, as is done, for example, in Mindfulness-Based Stress Reduction.

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References