**Introduction**
Numerous salutary effects of meditation practice have been documented in a rapidly expanding body of literature. However, it has become clear that there are significant individual differences in the effectiveness of meditation (May et al., 2012). Moreover, individual differences depend on the type of meditation practiced. To better characterize and understand meditation-type-dependent individual differences, we employed an alternating treatment (concentration meditation and loving-kindness meditation) single-subject design with 16 participants. This poster presents group analyses of those 16 participants' data using repeated-measures ANOVA and multilevel modeling.

**Method**
For two months, 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 third author (see christopherjmay.weebly.com).

Participants were evaluated weekly with surveys and physiological recordings. On the first and last weeks, participants completed a battery of surveys, including the Big Five Inventory (John & Srivastava, 1999), the Self-Compassion Scale (Neff, 2003), the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006), the Profile of Mood States (POMS; Curran, Andrykowski, & Studds, 1995), and the Ruminative Responses Scale (Nolen-Hoeksema & Morrow, 1991). In the intervening weeks, participants were administered the FFMQ, POMS, and a 7-point likert-scale gauging meditation preference. Additionally, participants scored an Affect Grid (Russell, Weiss, & Mendelsohn, 1989) indexing arousal and affect before and after each meditation session. We recorded an electrocardiogram during both a baseline period and a meditation period each meditation session. We recorded an electrocardiogram and galvanic skin responses during both a baseline period and a meditation period each week. The electroencephalogram and galvanic skin responses were also recorded, but are not reported here.

To analyze data, we utilized both repeated-measures ANOVA and multilevel modeling. The equation for predicting affect after meditation and the electrocardiogram is listed first below. All other analyses utilized the second equation. $y_i = P_0 + \beta_1 T_{\text{MEDITATION}} + \beta_2 T_{\text{MEDITATION}} \cdot T_{\text{week}} + \beta_3 T_{\text{TIME}} + \epsilon_i$.

**Results**
Participants were less Neurotic at post-test ($M = 2.73$, $SD = .57$) compared to pre-test ($M = 2.96$, $SD = .62$), $F(1,15) = 3.34$, $p = .04$, 1-tailed. Likewise, Brooding significantly decreased from pre-test ($M = 1.95$, $SD = .52$) to post-test ($M = 1.75$, $SD = .42$), $F(1,15) = 7.57$, $p = .02$. There were no significant changes in the other “big five” personality dimensions.

At the conclusion of the experiment, participants reported greater Self-Kindness, $F(1,15) = 8.72$, $p = .01$, feelings of Common Humanity, $F(1,15) = 5.87$, $p = .03$, and Total Self-Compassion, $p = .02$, Wilcoxon signed rank test. Meditation preference was negatively correlated with the difference between Self-Judgment scores at the beginning and end of the experiment, $r = -.519$, $p = .04$. Those with a greater preference for loving-kindness meditation exhibited less self-judgment.

Participants also displayed weekly increases in three of the five dimensions of mindfulness: Observe, $F(1,15) = 2.09$, $p = .03$, 1-tailed, Describe, $F(1,15) = 4.19$, $p < .001$, and Acting with Awareness, $F(1,15) = 2.80$, $p < .01$. Non-judging and non-reactivity increased marginally, but not significantly.

Moods changed significantly across weeks, with declines in Tension, $\tau(15) = -3.12$, $p < .01$, Depression, $\tau(15) = -2.63$, $p < .02$, Anger, $\tau(15) = -2.71$, $p = .02$, Vigor, $\tau(105) = -2.77$, $p = .01$, and Confusion $\tau(15) = -3.86$, $p < .01$. Fatigue did not change significantly.

Participants reported feeling more pleasant after loving-kindness meditation compared to concentration meditation, $\tau(107) = 2.23$, $p = .03$. During loving-kindness meditation, participants evinced a lower sympathovagal balance in their ECG compared to during concentration meditation, $\tau(82) = -2.20$, $p = .03$. Participants had a further parasympathetic nervous system activity, and less sympathetic nervous system activity, during loving-kindness meditation.

**Discussion**
Weekly alternating practice of loving-kindness meditation and concentration meditation for two months caused reductions in neuroticism and brooding, as well as increases in self-kindness, feelings of common humanity, and total self-compassion. Multilevel modeling indicated that each week, participants exhibited increases in three facets of mindfulness: observing, describing, and acting with awareness. Moreover, each week participants showed progressive decreases in tension, depression, anger, vigor, and confusion. Electrocardiogram recordings indicated that loving-kindness meditation was associated with a lower sympathovagal balance, consistent with participant reports of increased pleasant emotions after completing loving-kindness meditation.

Multilevel modeling of mindfulness and mood states did not reveal significant differences between meditation types. However, for a particular individual, one style of meditation may have been more efficacious on a wider range of dependent variables than another style. Single-subject analyses, which are still on-going, will bear on this question. Significant random effects indicate there were substantial individual differences. Nonetheless, en masse, alternating meditation treatments have numerous salutary effects on mindfulness, emotion, and self-compassion.

**References**

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