Conscience and emotion: Does mindfulness improve performance in Emotional Stroop?

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BACKGROUND & AIMS

- **Mindfulness** is a **third-wave behavioral technique** whose effectiveness in a wide range of psychological problems is well stablished. However, in spite of the research about outcomes of mindfulness, there is a lack of studies addressing why mindfulness is effective treating psychological suffering.

- Until date, the vast majority of explanations published are based in biological conceptualizations (Chiesa, Calati & Serretti, 2011). In psychological processual terms, only **Mindfulness and Acceptance Theory** (MAT) has suggested that the effectiveness of mindfulness is related with acceptance or with enhanced monitoring of the psychological experience (Lindsay & Creswell, 2017).

- The data available points to an early – and surprising – effect over these cognitive domains only with a **brief session of mindfulness**. Nevertheless, experiments testing this early effect were conducted with modified classical paradigms, small-sized samples, or without active control conditions. Taken together, the internal consistency may be compromised, so there is a need to test this effect in a strong unmodified experimental paradigm using a large sample size.

- Therefore, the aim of our study was to test if a brief mindfulness session can affect monitoring and acceptance of emotions. To face this challenge, we used the **Emotional Stroop Task** (EST), a well-known task in experimental psychology that disentangles the distractor effect of emotional and neutral stimuli.

METHOD

- **Participants**: 180 undergrad students were recruited from the Psychology Grade at the University of Oviedo (Spain).

- **Procedure**:
  - a 3×2 mixed factorial design was employed, with intervention condition (mindfulness vs. control audio vs. muscular relaxation) and word-type (emotional vs. neutral) as between-subject factors. The participants were randomly assigned to the between-subject conditions, with 60 participants in each condition.
  - participants completed FFMQ, STAI and a sociodemographic record form and then randomized to one of the three experimental interventions. The audio recording was presented through headphones. Afterwards, they were presented with a computerized version of the Emotional Stroop task. Participants were informed that words in various font-colours would be presented and their task was to indicate the font-colour of the word.

- **Experimental interventions**: There were three intervention arms – control audio, muscular relaxation and mindfulness induction – delivered through an audio recording.

- **Measures**:
  - Case Report Form to collect age, sex as well years of education.
  - Trait Mindfulness was measured using the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006).

- **Stimuli**: for the purposes of the experiment, 10 negative emotional words and 10 neutral emotionnal words were driven from the Spanish MADS list (Hinojosa et al., 2016).

- **Data Analysis**: if normality were not met, then the analyses were performed using bootstrapped sampling. Groups were compared to detect differences in demographic or mindfulness dimensions. To test out main hypothesis we conducted an ANCOVA setting intervention and valence as factors, and FFMQ dimensions as covariates.

RESULTS

- There were no differences between groups in demographic or FFMQ dimensions.

- Analysis of main effects revealed a **significant interaction between Intervention and Valence** (F= 7.25, p<0.001, d= 0.01).

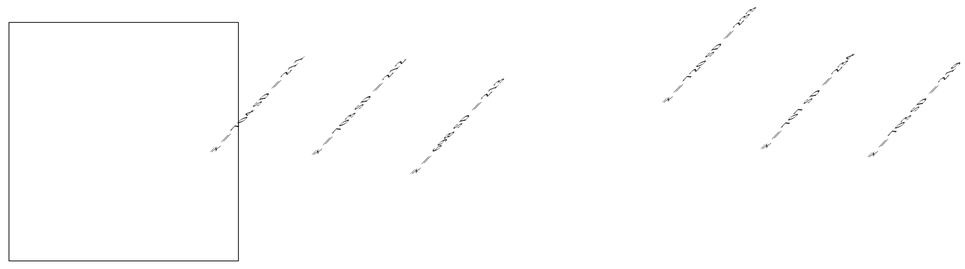

Figure 1. Mean and standard deviation of reaction times (ms)

- Post-hoc analyses revealed **no difference between groups in neutral valence trial**.

- **In negative valence trials, the comparison between Mindfulness and Control Audio** (F= 3.39, p= 0.015, d= 0.09) **and PMR and Control audio** (F= 3.01, p= 0.040, d= 0.07) **reached statistical signification, while Mindfulness and PMR did not** (F=0.37, p=0.999, d= 0.01).

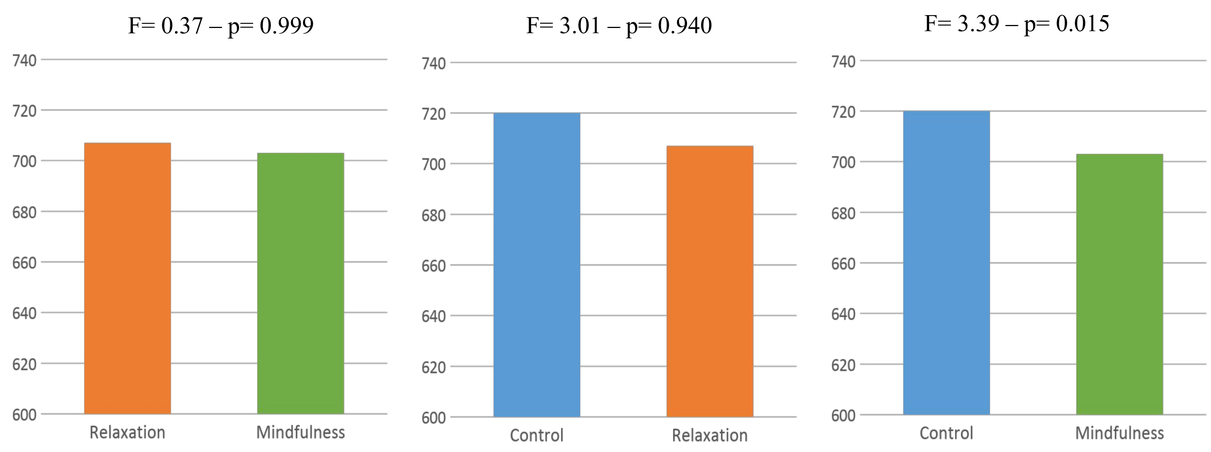

Figure 2. Group comparison in negative valence stimuli condition (ms)

CONCLUSIONS

- The main finding of the study is that **mindfulness lessens the distractor effect of emotional content of the words**.

- Convergent with Watier & Dubois (2016), **mindfulness blunts the Emotional Stroop effect**. Our data points that **brief mindfulness meditation is as effective as relaxation** blunting the Emotional Stroop effect of negative emotions.

- Main strengths are the **large sample size** which enables detection of small effect sizes, and the use of a **well-stablished experimental paradigm**.

- Weakness of the experiment are the **origin of the sample** which may bias the results, and the **examination of immediate effects of mindfulness**.

- Further research should address if the mechanism of mindfulness is analogue to that recruited with relaxation, as well the **effects of prolonged mindfulness training**.

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