

## Does prosocial attitude affect creativity in musical improvisation?

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**Disciplinary background A.** Statement of background in Psychology of Creativity: Organizational psychology has demonstrated the importance of social dynamics for group creativity (Hennessey et al., 2020). Prosocial attitudes, e.g., feeling close to each other, can affect joint creativity in different ways (Oztop et al., 2018). It remains unclear whether such findings can be applied to other domains, such as music.

**Disciplinary background B.** Statement of background in Musical Improvisation: Musical improvisation research includes descriptive analyses, as well as investigations based on quantitative methodologies. And although musical improvisation is often participatory, the social dynamics at the heart of such an activity have rarely been addressed from an interdisciplinary perspective that brings together both approaches.

### Abstract

The present research aims to shed light on how intra-group social dynamics shape creative musical improvisation, examining the perspectives of both improvisers and external raters.

To study the impact of prosocial attitude in musical improvisation, we implemented a quasi-social improvisation task (done remotely), in which novices were invited to improvise with a virtual avatar (i.e., a moving stick-figure drummer hitting a cymbal in synchrony with a backing track). Using a virtual improvisation partner ensured comparability of outcomes; and to further reduce the variance among participants we kept the baseline of expertise consistent by only recruiting novices. Furthermore, it has been shown that prosocial attitude towards a virtual partner can increase through an imagined synchronization task (Stupacher et al., 2020). Based on this finding we demonstrated in a preliminary study ( $n = 65$ ) that an overt synchronization task with the virtual drummer can increase prosocial attitude, assessed through felt closeness.

Building on this research, the present empirical study involved two experimental phases: in the first phase ("improvisation"), 18 novices were invited to improvise in three conditions, each starting with a priming task. In condition 1 a neutral prime was used to not alter prosocial attitude; in condition 2 participants had to synchronously move with a black dot to a metronome, which allowed to control for the effect of movement on creativity; condition 3 involved an overt synchronization task to increase the feeling of closeness to the virtual drummer. After each priming task, participants performed three short rhythmical improvisations by triggering two conga samples via a computer keyboard. Participants improvised for 17 seconds along with the avatar playing the drum backing track. Felt closeness to the virtual drummer was assessed before and after the improvisation phase via the "Inclusion of Other in the Self" scale (Aron et al., 1992). In the second phase ("rating"), 30 expert musicians were invited to evaluate how creative these recorded improvisations were.

Our statistical analysis via a linear mixed model points to a significant increase ( $b = 0.47$ , 95% CI [0.22, 0.73]) for closeness averaged over both measurements for condition 3 compared to condition 1. Overall, the analysis implies that for an increase of average closeness the creativity of improvisations significantly decreases ( $b = -0.26$ , 95% CI [-0.43, -0.10]). This only significantly differs ( $b = 0.27$ , 95% CI [0.06 - 0.47]) for condition 2, which suggests that the decrease in creativity in this condition is not mediated by closeness.

**Interdisciplinary implications.** Our findings provide preliminary evidence that an increased feeling of closeness to a virtual partner inhibits creativity in musical improvisation. We suggest that the reason could be the focus on the rigid synchronicity enacted by the improvisation partner in condition 1 and 3. Meaningful musical improvisation requires the establishment of a deep intersubjective relationship between improvisers, in which one's own lived experience includes that of the other, in a constant dynamic interplay of emotions, gazes, expressive strategies, and gestures. Hence, developing flexible forms of entrainment between co-performers might be a key factor in fostering creative musical outcomes.

Our study is a starting point for examining such social dynamics, placing an emphasis on musical creativity both from the perspective of the improvisers and from that of external evaluators. This can help provide new understandings of musical participation and creativity, inviting new interdisciplinary reflections amongst the sciences and the performing arts.

### References

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