Forced ideomotoric empathy
A new approach for evoking and testing emotional resonance

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Introduction
We all know this phenomenon: standing in a cheerful crowd—say watching a soccer game or a rock star—is a strong and already in the early days of this academic discipline body control the main effects of movement and emotion we psychological force, empathy (as a mutual impact of people's emotions) has always been a research topic of psychology, and already in the early days of this academic discipline body movements were considered a consequence of "general mental resonance" (Stem, 1898, p.63), and empathy (however, confined to aesthetic experience here) a "resonance (...) of activity or passivity, of unbound striving ahead or of suspension" (Stem, 1898, p.68).

To explore this alleged connection between movement and emotion, there has been a lot of research on the influences of body posture on emotion or cognition, respectively (and vice versa). Riskind & Gotay (1982) showed that subjects assuming a bent posture for several minutes had higher levels in learned helplessness while solving a frustrating task. Other studies (Koch, 2011) focused more on the influence of movement and obtained comparable effects. Furthermore, the importance of motoric actions for empathy has been stressed by Enz (2008).

This study aims to investigate whether combining perception and imitation of an actress performing an emotional scene fosters higher level in the depicted emotion and modifies the subjects' movement-qualities as a result of interaction. To control the main effects of movement and emotion we compared three different groups in a pretest-posttest-design.

Method
Procedure. First, subjects had to fill the Positive Affect Negative Affect Scale (PANAS) (Krohne et al., 1996) to measure their initial emotional state. Subjects in the first condition were shown the actress performing the poem Die Ballade von den Lästerzungen and were instructed to imitate the gesture of the actress (Emotion & Movement Group), while the subjects in the second condition were shown the same video scene but without any instructions (Emotion & Non-Movement Group). In the third condition, participants were shown a different scene containing only the gesture of the actress, but without any emotional context, e.g. without voicing the poem. They were instructed to imitate the movements of the actress (Non-Emotion & Movement Group), too.

The Kinect device served as a means to ensure that test subjects in the Emotion & Movement condition had to stay focused on the actress' gestures, and had a continuous feedback of their performance during the imitation. To avoid a bias in interpretation, we made sure the movements of the actress were the same in all shown videos.

After the video-scene-intervention, the motion-task started. Here, one hand of each participant was captured by the Kinect Sensor after a short calibration.

They were presented consecutively several circles in different sizes on a screen, and were advised to follow the lines of the shown geometric features with their hand, which acted as a virtual pen. The circle was completed by reaching the starting point. Before a new circle could appear, the participants had to "pick and throw" the drawn circle out of the screen.

Finally, the emotional state was measured again by handing out the PANAS scale.

Results & Discussion
We tested for significant differences in PANAS (selecting items appropriate for our hypothesis: active, animated, enthusiastic, proud, alert) concerning pre- and posttest and discovered a significant change for the group Emotion & Non-Movement in two items (alert & animated, MD = 3.42, p = .01 & MD = 75, t(7) = 2.39, p = .06) and a significant increase for three out of five items in the Emotion & Movement group (animated, active, enthusiastic -- MD = .571, t(7) = 2.83, p = .03; MD = .857, t(7) = 3.29, p = .02; MD = 1, t(7) = 3.2, p = .02). The effect sizes (Cohen's d) for these significant changes can all be considered as strong.

For Emotion & Movement group there was no significant change for any of the items. This indicates that the combination of imitative and visual-auditive information affected emotion stronger. No effect was found concerning the movement task which might be due to the huge variance found for the drawing performance. For future research it would be advisable to further refine this Kinect task. We also found that PANAS is not the most appropriate instrument to measure emotions in this task. There was a floor effect for negative items; and most items were not suitable for the emotions we tried to invoke. It would be expedient to make use of a more specific test.

Furthermore, a greater number of subjects would most likely lead to more stable effects and would allow not only to test pre-post changes within a group (as we did here), but also to test differences between groups with reasonable reliability.

Die Ballade von den Lästerzungen (François Villon)
In Kalk, noch ungelöscht, in Eisenbrei, in Salz, Salpeter, Phosphorgluten ...

Fig. 1. Design of the study

To evoke emotions, we filmed an actress while speaking and gesticulating to the poem ‘Die Ballade von den Lästerzungen’ by the French author François Villon, translated into German by Paul Zech. This rather aggressive poem was supposed to generate strong emotions, which we expected to be reflected in the subjects' movement-qualities in a designed motion-task.

Our hypothesis: By forcing ideomotoric empathy, i.e., by instructing persons to synchronously re-enact this emotional scene, we expect a stronger change in the persons’ affective state compared to passively watching the same monologue.

Method
Participants. Twenty-four participants were tested individually (20 females, Mprovince = 23.3 years), with normal or corrected to normal vision. All of them were students of psychology from the University of Bamberg. In each group were eight females.

Apparatus. For capturing the movements of the participants the Kinect Sensor was used. Kinect is a motion sensing input device of the gaming console Xbox 360 from Microsoft. Usually it is used for capturing motions of humans playing video games. In the experiment it was used to measure several aspects of movement during a motion-task. Therefore Kinect was programmed to capture the subjects' hand positions and movements.

The software was written in Processing 1.5.1, a Java-based language. In addition we used SimpleOpenNI version 0.27 to access OpenNI version 1.5.4 and also the processing library GSVideo version 1.0.

The Microsoft Kinect was attached to a Dell laptop as well as to a projector and an audio equipment.

References

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