

Motion and Emotion: Using Kinect to Force Ideomotor Empathy

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According to Enz (2009) motor impulse is an important component of empathy ('ideomotor empathy'), along with cognition and emotion. This is in line with the notion of cortical 'mirror neurons', and with theories about so-called 'ur-emotions' (Parrott, 2010) that stress activation and action readiness as foundations of higher cognitive and emotional experiences. Yet, appropriate methods to measure ideomotor empathy need to be found as, e.g., self-reports and questionnaires are not suited for on-line measurement and suffer from the difficulty of rating motor involvement on questionnaire scales.

In the present experiment, we assess the impact of 'forced ideomotor empathy', i.e. the effect of a coerced combination of perception and action by imitating performed movements, on emotional state and empathy. Further, we address the above mentioned methodological problem by testing whether the commercial off-the-shelf sensor Microsoft Kinect can serve as a more valid and reliable device for measuring motor involvement.

For the first part of the experiment, participants were assigned to one of three experimental conditions: In condition (1) they watched a video showing an actress who performed pronounced gestures while speaking a highly emotional monologue ('monologue scene'). In condition (2) and (3) they were additionally asked to synchronously re-enact the actress' gestures while watching the same monologue or this scene performed without speech ('gesture scene') with the actress wearing a sports outfit, respectively. Participants' positions and postures were tracked via Kinect and rendered as a simple moving skeleton on the scene. Thus, participants were driven to focus on the actress' gestures and their own movements at the same time and to check for congruency of their limb positions with the actress' gestures. In the second part of the experiment, participants performed a visual sorting task via Kinect; speed and precision were measured. Finally, data on emotional state

(PANAS; Thompson, 2007) and empathic behavior (Enz, 2009) were gathered.

Comparing conditions (1) and (2), we expect to determine the impact of forced ideomotor empathy on emotional state and empathy. Condition (3) serves as a baseline revealing the influence of the movement task alone. Furthermore, by comparing the PANAS-results, the empathy scale outcome, and the performance in the sorting task, we evaluate whether there is an increment in validity and reliability when measuring ideomotor empathy via Kinect as compared to common questionnaire instruments.

References

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cVIS – Combining Visualization and Cognition

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To study the perception and cognitive processes when users are working with visualizations we are developing the cVIS framework with three modules. The three modules are: eye tracking analysis, semantic visualization models and a cognitive simulation based on ACT-R. Visualizations are for example bar charts, pie charts or scatter plots. The cVIS framework aims at providing a simulation framework for the optimization of visualizations from a user centered perspective.

We have performed several eye tracking user experiments, which show that general eye movement strategies can be found when participants are solving tasks by using data visualizations. Beside heat maps and scan path visualizations we have used the Parallel Scan-Path Visualization technique to find common scan paths in our user experiments. This new eye tracking visualization technique provides an AOI based