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To cite this version:
Coline Joufflineau, Coralie Vincent, Asaf Bachrach. Changes in temporal cognition as a measure of "bodymind" contagion between dancers and spectators. 11th International Conference on Cognitive Science (ICCS 2017), Sep 2017, Taipei, Taiwan. hal-01587655

HAL Id: hal-01587655
https://hal.archives-ouvertes.fr/hal-01587655
Submitted on 14 Sep 2017

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Changes in temporal cognition as a measure of bodymind contagion between dancers and spectators

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Exploration of body-mind contagion during live contemporary dance performance

Introduction

TIME PERCEPTION: Temporal cognition is an indicator of our "body-mind" state at the present moment (Bergson, 1889; Husserl, 1904-1905; Pöppel, 1997; Wittmann, 2011). The perceived duration is linked to our internal tempo (Bautin et al., 2006) and can expand or contract according to internal and external events. Our internal tempo is entrained by a musical tempo or the rhythm of the one we are watching (Laroche et al., 2014), or the one beside which we are seated (Richardson et al., 2007). Two components are considered to play a major role in changes in perception of temporal intervals: attention and physiological arousal (Cañón, 1969). That is why we consider changes in time perception as an indicator of inter-personal "body-mind" state contagion.

DANCE SPECTATING: Aesthetic response consists of the activation of embodied mechanisms encompassing the simulation of actions, emotions and corporeal sensation (Freedberg & Gallese, 2007). The co-presence of bodies inherent to live performance brings about kinesthetic empathy (Foster, 2011), interactive coupling (Dumas et al., 2016; Husserl, 1904-1905; Pöppel, 1997; Wittmann, 2011). The perceived duration is linked to our internal tempo (Richardson et al., 2007). Two components are considered to play a major role in changes in perceived duration: attention and physiological arousal (Cañón, 1969). That is why we consider changes in time perception as an indicator of inter-personal "body-mind" state contagion.

In this study we worked with the french choreographer Myriam Gourfink who have been using contemplative practice for more than twenty years to produce an extremely slow and continuous dance based on extended respiration and body-oriented attention (Gourfink, 2013).

Goals

1/ Quantify changes in temporal cognition after spectating a very slow dance based on a contemplative practice.
2/ Evaluate whether these changes are related to the experiential reports of the spectators concerning interoceptive and exteroceptive attention.
3/ Evaluate whether these changes are related to changes in physiological arousal.

Methods

As part of the project Labodanse (Joufflineau and Bachrach, 2016), we administered to an audience two measures of temporal cognition before and after a 45-min live performance (12 subjects in group A and 8 subjects in group B) a Spontaneous Tempo Production (STP) task (McAuley et al., 2006) and a task assessing the temporal window inducing the Apparent Motion effect (AM) (Marusich & Gilden, 2014). The same temporal tasks (group C, 14 subjects) were tested with a control group of the same duration that is not based on a contemplative practice (no voluntary control of breathing or attention, standard speed). Experiential reports concerning interoceptive and exteroceptive attention, arousal and engagement were collected post performance (semi-directed questionnaire). Physiological data (heart and breathing rate) were also collected as indicators of physiological arousal.

Participants: 20 subjects (group A, Gourfink = 9, group C, Control = 11).

Task: (based on McAuley et al., 2006): Three blocks: (1) Tap as fast as you can in a regular fashion (100 taps) (2) Tap as slow as you can in a regular fashion (20 taps) (3) Tap in your internally paced tempos (70 taps). Data analyzed using Linear Mixed Models (LMM) (LME4 for R, Bates et al., 2015).

Results: We observed a significant slowing down of STP (p=1.0, p=2.2e-16) after the Gourfink performance. This effect was not observed in the control condition.

Conclusion

We interpret the STP results as a slowing down of the internal tempo of spectators. The AM results suggest an expansion of the "body-mind" state contagion. While the changes in physiological rhythms indicate an overall decrease in arousal post-performance (an interpretation supported by individual reports), these changes were not correlated with task effect size. Correlations with subjective reports show a link between paying attention consciously to the breath of the dancer and the change in the perception of apparent motion. In a preceding study we found that the breath-synchronizing mechanism between dancers and spectators during the choreography was important for spectators that report that they had "paid attention to their own breath many times" (Bachrach et al., 2015). Our results suggest that paying attention to breath, our own or one of the others, seems linked to the increase of inter-subjective process of attentum and "body-mind" contagion.