

the amount and length of INMI experiences. In addition, we used two methods for learning the novel tune – active (singing) and passive (listening). **Aims:** The aim of this research project was to test whether INMI episodes for novel tunes can affect how well one can remember that tune. It was hypothesised that the number of INMI experiences reported and duration (relating specifically to the novel tune), as well as the type of learning method used would affect the memory recall accuracy of the tune. **Method:** 44 participants learned 'April Showers' (a novel tune) – by either singing along or listening to it. For the next three days, participants recorded their INMI episodes in an INMI diary. After, they were given a surprise memory test in a two-alternative force choice format (where they were presented with two versions of 'April Showers'). **Results:** Signal detection theory was used to obtain memory recall accuracy scores (represented by  $d'$ ), then they were entered into a multiple regression analysis with the predictor variables of this study - the amount of INMI, length of INMI, musical training and active engagement. The overall analysis was not significant  $F(4, 39) = 2.30, p = .08$ , yet individually the length of INMI ( $\beta = -.95, p = .05$ ) and musical training ( $\beta = .08, p = .02$ ) significantly predicted variability in memory accuracy. The direction of the relationship for the length of INMI and memory accuracy implies that shorter INMI episodes were related to higher accuracy rates of memory recall, whereas musical training acting as a positive predictor variable indicates that higher musical training was associated with more accurate memory recall. In regards to the type of learning method affecting recall accuracy, a chi-squared test with ranks did not show any significant effects,  $\chi^2(1) = .11, p = .74$ . Thus whether 'April Showers' was learnt in an active or passive manner did not have a significant effect on the participants' ability to accurately recall this novel tune. **Conclusions:** To conclude, this study was the first in the field of INMI research to look at INMI having a potential role in daily life that is associated with the consolidation of new musical memories. Analyses of the data were not able to provide any significant findings that could have provided indications into the amount of INMI episodes reported, active musical engagement of the participants or the type of learning method used for the novel musical tune having an effect on the memory accuracy for the tune. Thus none of the hypotheses were supported. It did however show that the length of INMI and musical training ability were able to significantly predict variability in the memory accuracy scores. The significant but negative relationship between INMI length and memory accuracy recall does not support a memory consolidation account of INMI. This could possibly be explained by the way in which the INMI duration variable was operationalized – it was perhaps not a reliable measure. Future work is needed to clarify the relationship between INMI duration and memory. Yet, the findings relating to the significance of musical training can be deemed plausible as previous research has shown how musically trained individuals have better musical memory compared to those who have minimal musical training. Despite these results failing to demonstrate another potential function of INMI in daily life, it does manage to shed light on the concept that memory, specifically musical memories, are susceptible to influences from internal and external variables. This is in line with previous literature surrounding factors affecting memory consolidation.

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### In the Zone: An interactive educational technology based on symmetrical entrainment

Benno Spieker

*EWI - Human Media Interaction, University of Twente, The Netherlands*

b.p.a.spieker@utwente.nl

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**Background:** In order to benefit from the contributions of rhythmic skills for acquiring language skills and reading abilities in primary education (Overly, 2003; Rautenberg, 2015), interactive music systems (IMS) may be useful to support teachers who lack knowledge, skills, and confidence in music teaching as reported in Hoogeveen et al. (2014) by providing insight in the musical process. However, little research addresses the use of IMS for use

in music education in primary education and still more research on effectiveness is needed (King & Himonides, 2016). A common way to learn concepts of rhythm is by playing rhythms together and by finding and keeping the beat where musicians both adapt to each other's music playing (symmetrical entrainment) or musicians adapt their music playing to a metronome (asymmetrical entrainment). Teaching methods include both strategies, but opposed to asymmetrical entrainment, little research has been focused on symmetrical entrainment (see Repp & Su, 2013). **Aims:** As a first step in exploring how IMS can contribute to music education in primary education, a new social music game *In the Zone* (ITZ) was developed and tested. ITZ consists of four drum pads, positioned around a computer screen facing upwards. ITZ allows participants to drum together while receiving visual feedback on the accuracy of in synchronization of the joint drumming in real time. When a certain degree of accuracy in synchronicity is established over a certain amount of hits, a circle is presented on a screen. This may challenge participants to synchronize more accurately. Key questions here: 1) Is ITZ suitable for research in symmetrical entrainment? 2) How does visual feedback presented by ITZ influences symmetrical entrainment? **Method:** A repeated measures experiment was executed to discover the effects of visual feedback on accuracy in synchronicity when playing together a regular beat (four crotches in common time). Participants (14 females, 10 males, age 18-55,  $M=39.5$ ,  $SD=10.73$ ) performed, in groups of four, simple drum tasks under several conditions, ranging from no visual feedback to seeing one, or all, other three participants to only seeing the feedback presented on the screen. Participants also filled in three questionnaires to investigate the participants' experience in synchronizing to a visual or aural beat, the experienced difficulty and the participants' own perception of how well they synchronized their music playing. **Results:** For 23 out of 24 participants the results show significant differences in the accuracy in synchronization in different conditions. However, results are not unambiguous. For example, seeing another participant resulted for some participants in a more accurate synchronization, where for others synchronization turned out to be less accurate. **Conclusions:** The experiment proofed that ITZ can correctly log entrainment data and can interact with participants, by showing direct feedback and challenging them to improve their joint synchronicity in playing a beat together. Nevertheless, ITZ is still a prototype with a basic design of interactivity and there are challenges to overcome. Currently, ITZ is being further developed with a focus on overcoming some of these challenges and on expanding the system. A further analysis of the obtained data is planned.

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