

STSM- Short Scientific Report

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The involvement of memory component on temporal processing

1 Purpose of the visit

The purpose of the visit was to design and run two experimental studies to investigate the involvement of modalities and memory load (study 1) and symbolic meaning (study 2) on temporal processing.

2 Description of the work carried out during the visit:

During the visit at the École de Psychologie, Université Laval I designed and run two experiments under the supervision of Prof. Simon Grondin. The first part of this project was dedicated to further investigate the clock and memory components by comparing different tasks, durations and modalities. The memory component was also investigated by manipulating the delay between the presentation of the target and the temporal execution and by manipulating the duration of the temporal intervals. Moreover, we investigated if the over-reproduction observed in Gamache & Grondin 2010 was caused by the overlapping of two temporal intervals, as proposed by the authors or by others factors.

Aim of the second project was to further investigate the effect of symbolic meaning on time perception. Previous studies conducted with children have demonstrated an effect of symbolic meaning on time perception. In particular, stimuli that recalled a meaning of fastness (car and

motorbike) were under-reproduced while stimuli that recalled the meaning of slowness (truck and bicycle) were over-reproduced. The second project was dedicated to investigate if the effect of symbolic meaning is stable and present also in older adults by using a reproduction and a time discrimination tasks.

Study 1

Fifteen university students took part in study 1. Participants performed a time reproduction task with visual and auditory stimuli. Four conditions were included: (1) Only auditory stimuli; (2) Only visual stimuli; (3) Auditory-Visual simultaneously and (4) Visual – Auditory simultaneously. When both stimuli were presented, participants were instructed to reproduce the visual or the auditory and the stimuli presented with the other modality functioned as background distractor. In all conditions we used 5 range of durations (500, 600, 700, 800, 900 ms). Results showed a better performance when the stimuli were only auditory compare to visual stimuli. In the condition where both visual and auditory stimuli were presented simultaneously, visual background affected temporal performance more than auditory distractor. At the present time a new study is running at the lab to further investigate and confirm these results.

Study 2

Twenty university students took part in the symbolic meaning study. Participants undertake a time reproduction task in which they were required to reproduce three durations: 11, 21 and 36 s. The stimuli were a bicycle (slowness) and a motorbike (fastness) and were presented at the centre of the computer screen (static condition) or moving from the left up corner to the right lower corner (moving condition). We analyzed temporal performance in term of relative errors (scores above 1 mean over-reproduction and score below 1 mean under-reproduction) with duration (11, 21, and 36 s), symbolic meaning (bicycle, motorbike) and movement (static, moving) as within factors. Significant effect of duration and movement were found indicating that participants under-

reproduced longer durations and under-reproduced moving stimuli. No effect of symbolic meaning was found. We have hypothesized that participants might have used counting strategies that have covered the effect of symbolic meaning observed in young children. To test this hypothesis, we have programmed a time discrimination task in which participants are required to discriminate brief intervals between 400 to 1600 ms. Preliminary analysis seems to confirm the effect of symbolic meaning in adults.

4 Future collaboration with host institution.

Future collaborations have been planned with the host institution. In particular, data from Study 1 are considered preliminary and a new study is planned in collaboration with Prof. Grondin and Prof. Gamache. Regarding Study 2, new studies are planned to further investigate the effect of movement on time perception.

5. Projected publications/articles resulting or to result from the STSM.

Data from study 2 will be presented in September at the 29th International Society for Psychophysics in a form of oral presentation. We also are working to prepare a paper to submit in a scientific journals in the field.