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Retrospective time perception of a long task: Using music to distinguish between attention-based and memory-based models [presentation]

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Retrospective Time Perception of a Long Task:
Using Music to Distinguish Between Attention-based and Memory-based Models

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Attention-based Models

- Attention-based models propose that there are limited attentional resources.
- When two concurrent tasks are performed, attention is divided and performance on each task decreases.
- Attentional resources are split between temporal and non-temporal processing.
- When more attentional resources are provided to non-temporal processing, fewer attentional resources are provided to temporal processing.
- As fewer attentional resources are provided to temporal processing, less temporal information is encoded and the time period is perceived as shorter.
- Alternatively, when attentional resources are directed towards temporal processing, more temporal information is encoded, and the duration is perceived as longer.

Memory-based Models

- Perceived time duration is a reconstruction of events and contextual changes that are experienced and remembered, during an elapsed time period.
- During a time period, events are encoded into memory along with contextual changes associated with each event.
- When the judgement of the duration is to be made, the availability of events tagged with the relevant context are assessed and retrieved.
- When more events and contextual changes are available and retrieved, the duration of the event is perceived as longer.
- Alternatively, when fewer events and contextual changes are available and/or retrieved, the duration is perceived as shorter.

Previous Research

- Attention-based models are supported by studies using a prospective paradigm and short durations (0.1s to a few seconds).

- Memory-based models are supported by studies using a retrospective paradigm and longer durations (more than 60s is considered long).

- However, attention-based models become relevant to explaining retrospective time perception when the task is long and monotonous.

Method

- Duration: 1390s (23min 10sec)
- Music: 62 simple one-line melodies
- Sustained Attention to Response Task (SART): Press a button when a number appears, except if the number is 4

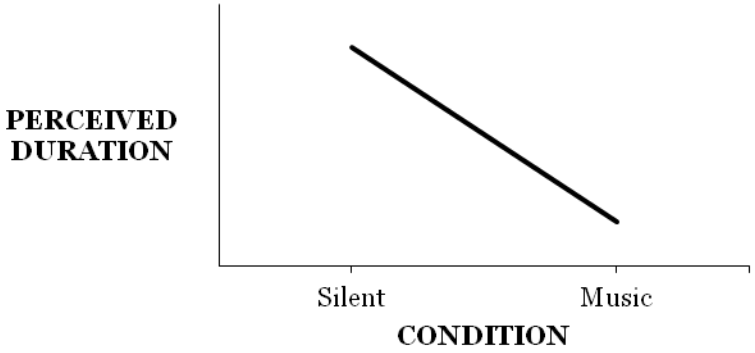
Conditions:

- Silent: SART only
- 1: 100% familiar songs on piano
- 2: 100% familiar songs on different instruments
- 3: 50% familiar songs on different instruments

Hypothesis 1

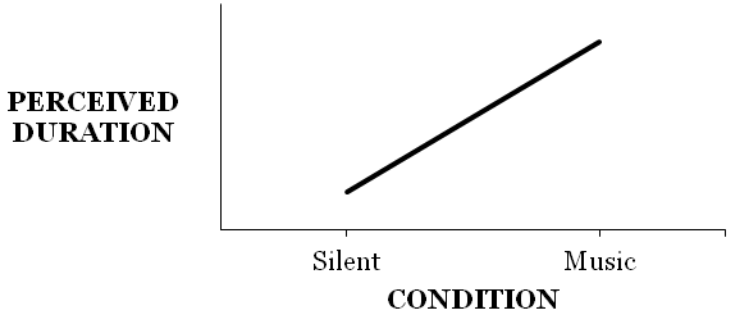
Attention-based:

- The time duration of the music conditions will be perceived as SHORTER than that of the silent condition.



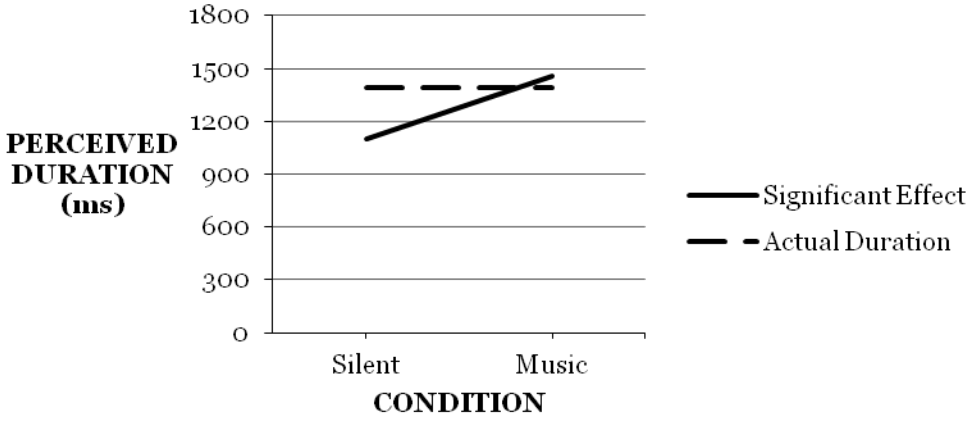
Memory-based:

- The time duration of the music conditions will be perceived as LONGER than that of the silent condition.



Result:

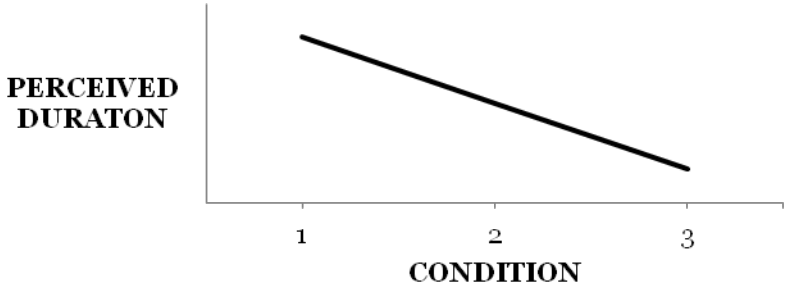
The time duration of the music conditions was perceived as LONGER than that of the silent condition.



Hypothesis 2

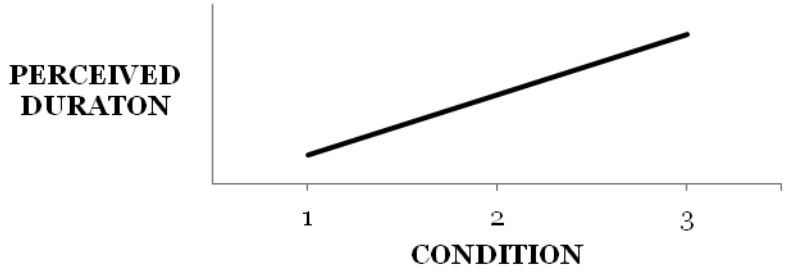
Attention-based:

- Condition 1 will be perceived as LONGER than Condition 2 & 3 and Condition 2 will be perceived as LONGER than Condition 3



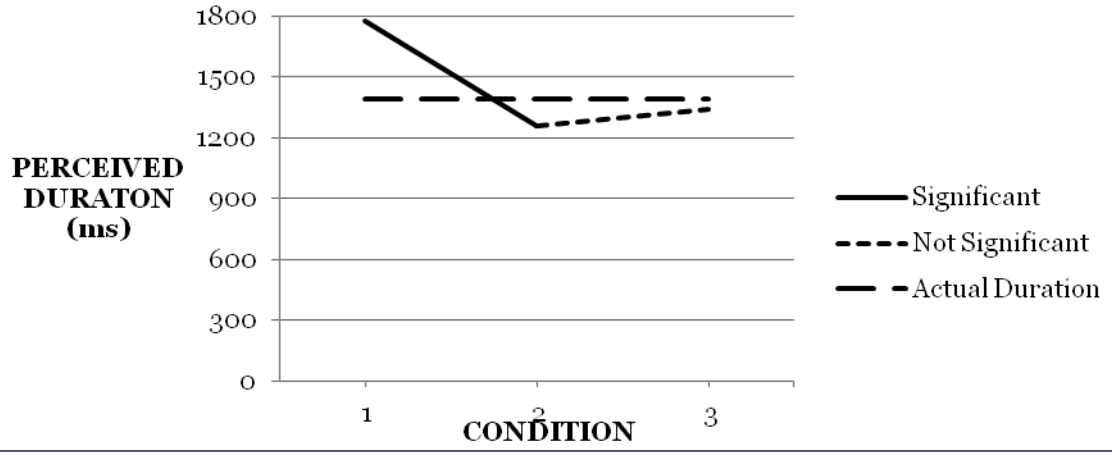
Memory-based:

- Condition 1 will be perceived as SHORTER than Condition 2 & 3, and Condition 2 will be perceived as SHORTER than Condition 3



Result:

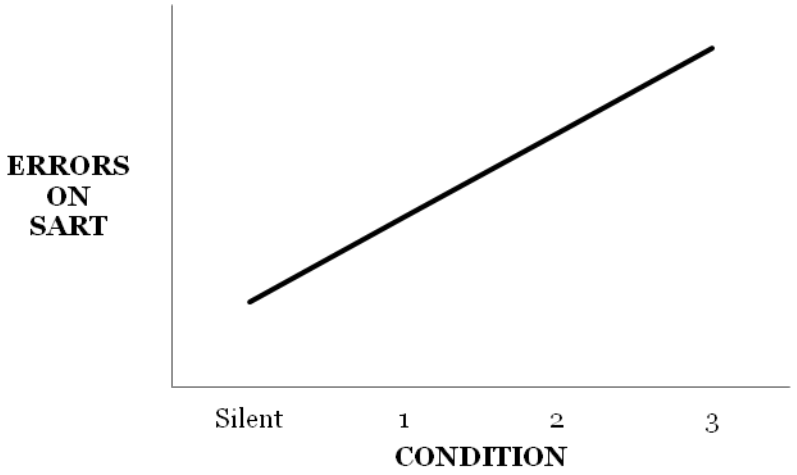
Condition 1 was perceived as LONGER than Condition 2. There were no other significant differences



Hypothesis 3

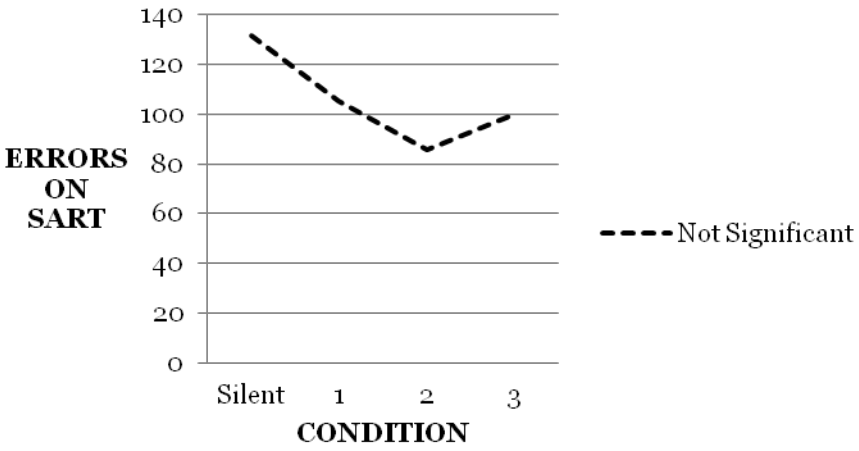
Attention-based:

- The number of errors on the SART will be the smallest in the silent condition, followed by 1, 2, & 3.



Result:

There was no significant difference in the number of errors on the SART between the conditions.

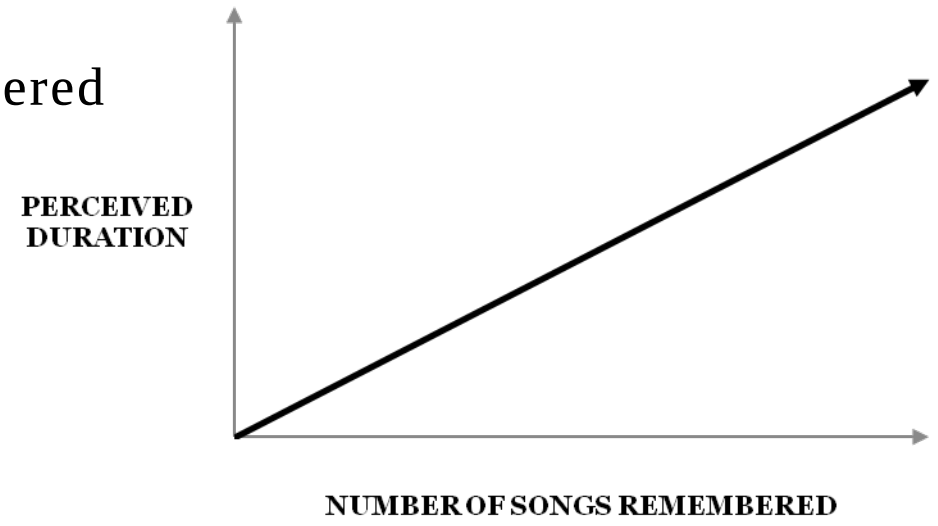


Hypothesis 4

Memory-based:

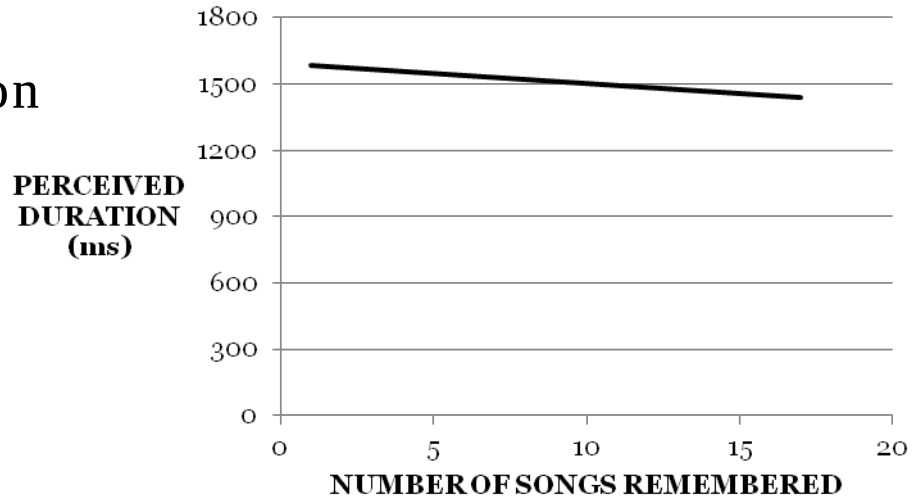
- The number of songs remembered

will be positively correlated to perceived time duration.



Result:

There was no significant correlation between the number of songs remembered and perceived time duration.



Discussion

- Overall, support was provided for memory-based models.
- However, there was no correlation between number of songs remembered and perceived duration.
- The average number of songs remembered was 6.83 (*SD* = 3.81), which suggests memory-based models are limited by short-term memory capacity.
- Perceived duration may therefore be based on implicit memory.
- Within the music conditions, some support is provided for attention-based models.
- However, there was no difference between the number of errors on the SART.
- Interestingly, perceived durations of Condition 2 & 3 were the most accurate.
- Perceived duration was limited by a ceiling effect.

Key References

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