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# THE INFLUENCE OF SYNCHRONY/ASYNCHRONY EFFECT ON EYEWITNESS MEMORY PERFORMANCE

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## INTRODUCTION

- Three main types of chronotype can be identified: **morning-type** (individuals who reach their peak of physical and mental activity in the morning), **evening-type** (individuals who reach their peak of physical and mental activity at the end of the day) and **neither-type** (individuals who present more flexibility of schedules).<sup>1</sup>
- The synchronization between the circadian peak and the moment when the individual performs certain tasks (e.g., cognitive tasks) is defined as “synchrony effect”. It is expected that morning-types have a better performance in the morning and the evening-types have a better performance later in the day.<sup>2</sup>
- Different types of memory are affected differently by the chronotype.<sup>3</sup>
- Memory for high negative emotional load events (e.g. crime) have some particularities. Depending on the intensity of its activation and how individuals experience that event, memory can be positively or negatively affected by emotions.<sup>4</sup>

**OBJECTIVES:** to analyse a possible interaction between chronotype (morning-type/evening-type) and time-of-day (morning/end of day) and how this interaction could influence the eyewitnesses memory performance

## METHODS

### SCREENING:

- Through the scores obtained in the Morningness-Eveningness Questionnaire (Portuguese version),<sup>5</sup> 24 evening-types and 20 morning-types were selected to perform the memory task.

### MATERIALS:

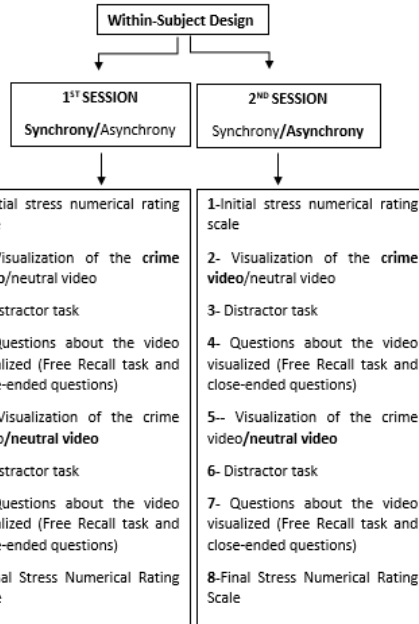
- 2 crime videos and 2 neutral videos;
- Stress numerical rating scale (from 0 "not stressed at all" to 6 "extremely stressed")
- Questions related to details of each video (Free Recall Task and close-ended questions);
- Depression, Anxiety and Stress Scale (DASS-21).<sup>6</sup>

### PROCEDURE:

- Two pilot studies were conducted (one to select the videos and another to test, before applying, the entire experimental procedure);

- Participants performed two memory tasks that took place in two online sessions, at different times of the day: one in the morning and another at the end of the day\*;

- The order of the sessions (synchrony/asynchrony) and the presentation of the videos were counterbalanced across participants.



\*Morning: synchrony moment for the morning-types and asynchrony moment for the evening-types  
End of the day: synchrony moment for the evening-types and asynchrony moment for the morning-types

## RESULTS

STATISTICAL SIGNIFICANCE (P VALUE) BETWEEN SYNCHRONY AND ASYNCHRONY MOMENTS AND INFLUENCE OF THE CO-VARIABLES DEPRESSION, ANXIETY AND STRESS IN THE RESULTS OBTAINED.

	p value	Depression	Anxiety	Stress
<b>CRIME VIDEOS</b>				
Central details (correct recalls)	<b>p=.006</b>	-	-	-
Central details (memory errors)	<b>p=.033</b>	✓	-	✓
Peripheral details (correct recalls)	p=.276	-	-	-
Peripheral details (correct recalls)	p=.767	-	-	-
<b>NEUTRAL VIDEOS</b>				
Central details (correct recalls)	p=.233	-	-	✓✓
Central details (memory errors)	p=.118	-	-	-
Peripheral details (correct recalls)	<b>p=.003</b>	✓	✓	✓
Peripheral details (correct recalls)	p=.224	-	-	-

\*Legend:

- ✓: there was influence of this variable on the results obtained, making the results not statistically significant;
- ✓✓: the co-variable influenced the results obtained, making the results statistically significant;
- : there was no influence of the variable on the results obtained.

- The results obtained in both types of video were independent of the type of chronotype. This means that the differences verified are not explained by a specific type of chronotype, but only by the synchrony/asynchrony effect.
- In general, the co-variables stress, anxiety and depression had little influence on the results obtained. This interaction was more prominent in the neutral videos.
- Regardless of the eventual presence of a negative affective dimension, the results in crime videos remain more robust and more independent of stress, anxiety and depression.

## DISCUSSION AND CONCLUSIONS

- The results, in general, corroborate the existence of a synchrony effect. The participants had a better memory performance at the time of the day in synchrony with their chronotype, when compared to the asynchrony moment.
- Our results confirm the existence of differences between the two types of videos, since the influence of the synchrony effect on the participants memory performance showed differences between the neutral videos and the crime videos in the recall of central and peripheral details.
- This investigation allowed to improve knowledge about the influence that the synchronization between the time of day and the chronobiological rhythm can have on eyewitness memory performance. This study also could have important implications to research and to interrogation practices.

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