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**CINEMA AS A TIME LAB:**

**A THEORETICAL, METHODOLOGICAL, AND EMPIRICAL  
EXPLORATION OF TIME PERCEPTION IN CINEMA**

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If in activity, unfolding in the empty surroundings, I am almost a whole,  
if in expectation I am reduced to my most simple expression and under the threat  
of being swallowed up by ambient becoming an almost nothing,  
it is probably thanks to the combined action of activity and expectation that I am what I am,  
that is to say, a limited being living in the world and capable of acting  
and standing the blows coming from outside.

(E. Minkowski, *Lived time*)

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## Abstract

This dissertation presents the theoretical, methodological and experimental results of a doctoral research concerning how time perception is modulated in the context of the experience of cinema, and of audiovisual media more broadly.

The research dealt with the need to strike a balance between the broad scope of the field of time perception in its manifold facets and the necessarily more restricted scope of investigation defined by the empirical approach mostly adopted. The first part of the research accounted for the former; the second one focused on the latter; the third one set to bridge them again. The contents of the corresponding three parts of the present dissertation will be now illustrated synthetically.

The first part of this work [*Part 1 - Framework and issues in the field*] provides a fundamental theoretical introduction to the topic of time perception, as it has been investigated both in natural settings and in the specific mediated setting of cinema.

Chapter 1 [*Time perception: navigating the literature*] carves out the precise angle and object of this work: namely, a phenomenological and psychological inquiry into the topic of time perception as a subjective construct. Furthermore, it introduces the necessary tools to allow a smooth navigation of the literature on the topic. Most crucially, it underlines the distinction – within the domain of time perception – between the two aspects of duration estimation and time passage perception.

Chapter 2 [*Time perception: theoretical models*] presents the main theoretical models of subjective time perception. With regard to duration estimation, it reviews theories that have connected time perception to several factors: a dedicated internal clock; cognitive dimensions like attention, information processing and memory; emotions; bodily states and movements; and expectancies. Among these factors, the chapter devotes particular attention to movement. Lastly, in the absence of a structured dedicated literature, the chapter provides some notes about time passage perception.

Chapter 3 [*Time perception in cinema and audiovisual media*] narrows down the scope of investigation to time perception in the specific context cinema and of audiovisual media. The chapter first explains how cinematic time perception can be conceived as a shared and social phenomenon. Then, it goes back to cinematic time perception as an individual phenomenon, and it explores how it has been tackled both in theory and by means of experiments. With regard to the latter aspect, it comes to remark the lack of empirical studies addressing cinematic time perception in a strict sense: namely, in terms of how it can be influenced by the cinematic language and its stylistic solutions. By doing so, it paves the way to the second part of this work.

This second part [*Part 2 – Experiments*] reports about and discusses the three experiments conducted during the course of the doctoral research as a whole. More precisely, it comprises a first opening experiment, and two more experiments that were conceived as follow-ups of the former. The common thread connecting the three studies was cinematic time perception in the strict sense outlined above. Some of them, however, also proved insightful with regard to time perception in a broader sense.

Chapter 4 [*Milan experiment (1)*] introduces our first experiment on what we called SEEM\_IT (Subjective Experience and Estimation of Moving-Image Time). In this behavioural experiment, we studied the effects on duration estimation and time passage perception of two medium-specific cinematic variables: namely, the type of represented action and the style of editing adopted.

The experiment straightforwardly pointed at the role of the style of editing, and most notably of a fast-paced style editing, in affecting both aspects of time perception: a faster pace of editing was associated with longer duration estimates and with the impression of time “flying”.

By taking into account the role of the represented action as well, the experiment also allowed to put forward a working “readability” hypothesis that crucially connects time perception (and duration estimation particularly) to movement. The hypothesis extends the embodied simulation account to timing processes and it relates their effectiveness to the degree of readability of the events to be timed. At the same time, the experiment pointed at two open issues: a) the empirical validation of the hypothesis just sketched; and b) the precise nature of duration estimation and time passage perception.

Chapter 5 [*Aarhus experiment*] presents the first follow-up of the first Milan experiment. This study took on the issue b) above. By adopting a method called micro-phenomenology in a meta-methodological key, it explored the processes underlying duration estimation and time passage perception as they are elicited by the respective tasks.

These processes proved to be radically different from each other. Duration estimation was revealed as a cognitively effortful, multi-faceted and articulated process requiring the adoption of several complementary strategies of assessment. On the contrary, time passage perception was described as a less cognitively effortful and more straightforward process, mostly leading to satisfactory final judgements by means of one single strategy of assessment.

Furthermore, the experiment provided some methodological insights concerning the strength and biases of the duration estimation and time passage perception tasks respectively.

Chapter 6 [*Milan experiment (2)*] presents the second follow-up of the first Milan experiment. This study took on the issue a) above. By using a neurostimulation technique (i.e. tDCS), it tested the involvement of a specific brain area (i.e. the Supplementary Motor Area, or SMA) in timing – as this is one of the points which the “readability” hypothesis expressed above hinges on.

The experiment confirmed unambiguously the role of the SMA in timing. By doing so, it indirectly provided empirical support to the “readability” hypothesis as well, and it contributed to refine it.

The third part of this work [*Part 3 – Conclusions and further directions*] summarizes the most prominent findings of the experimental research conducted and re-opens the dissertation to some of its possible future developments beyond cinematic time perception in the strict sense specified above.

Chapter 7 [*Conclusions of the experimental research*] shows how the main findings of the overall experimental research conducted form a coherent web of theoretical and methodological outcomes. The main theoretical contributions of the research concerned: 1. The cinematic inflections of time perception (first Milan experiment); 2. The nature of duration estimation and time passage perception (Aarhus experiment); and 3. The motor components of time perception, highlighted by means of the “readability” hypothesis (first and second Milan experiment).



On their side, the main methodological contributions of the research consisted in: 1. The analysis and improvement of the duration estimation and time passage perception tasks (Aarhus experiment); and 2. A lesson in how a neurophenomenological approach can actually be put into practice (Aarhus experiment and second Milan experiment, in light of the interaction of their respective findings).

Lastly, Chapter 8 [*Appendix: subjective time in depression*] discusses the heuristic potential of a specific object within the broad field of time perception: namely, depressive time.

After providing a fundamental introduction to this complex construct, the chapter addresses depressive time: as a methodological riddle; as the object of cinematic representations; and as a peculiar case of (un)shared time. By doing so, it links back and proposes possible interpretive keys to some of the issues raised in the first part of the dissertation that could not be explored by means of the experimental methods adopted in the second part of it.

The chapter ends with an integrated final picture comprising both the general conclusions of the present dissertation, and its possible further directions.