Analyzing Inspection Patterns in a Multidimensional Transposition Task for Studying Human Relational Behavior

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Introduction

- In the standard transposition task (STT), researchers have studied **relational behavior** (RB) by training subjects to respond to one stimulus based on a multidimensional relational criterion, such as "bigger and darker than" and the main evidence collected are response latencies and correct responses (Reese, 1968). This has led to assume that comparison occurs in mind and neglecting the role of behavioral active patterns (Andrade et al., 2020).
- However, **in a computerized task with mouse tracking**, León et al. (2021) found that in a **multidimensional arrangement** with irrelevant dimensions (e.g., form, color) and a relevant one (e.g., size), **mouse inspection over the screen was crucial to respond correctly**. This pointed out that active patterns are critical in RB and that its **spatial dynamics are sensitive to the stimuli arrangement**, which led us to consider the influence that other properties in the stimuli arrangement could have on RB.
- In this context, we aimed to explore the active patterns of relational behavior (RB) under a multidimensional stimuli arrangement where distance, as a spatial property, is relevant. This has ecological importance because, in our natural environment, space makes movement crucial by enabling contact with different objects.

Purpose

- Analyze the effect of two multidimensional relational criteria, size-distance versus saturation-distance, with or without an irrelevant dimension, on the number of required trials, latencies, and spatial dynamics of cursor movement in a relational behavior task among adult humans.

Method

Participants

- 28 human adults between 22 and 28 years old.

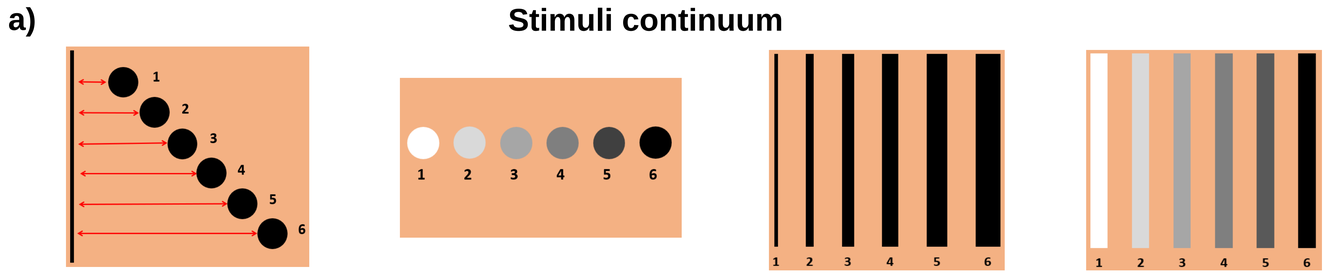
Experimental setting

- One session per day was performed via remote control (Chrome Desktop Remote).
- Experimental task was designed on Python and included mouse-tracking (5 fps).

Experimental design for experiments 1 and 2

Group*	Training/Test
Size-Distance (n = 7)	Farther and bigger than
Saturation-Distance (n = 7)	Farther and darker than

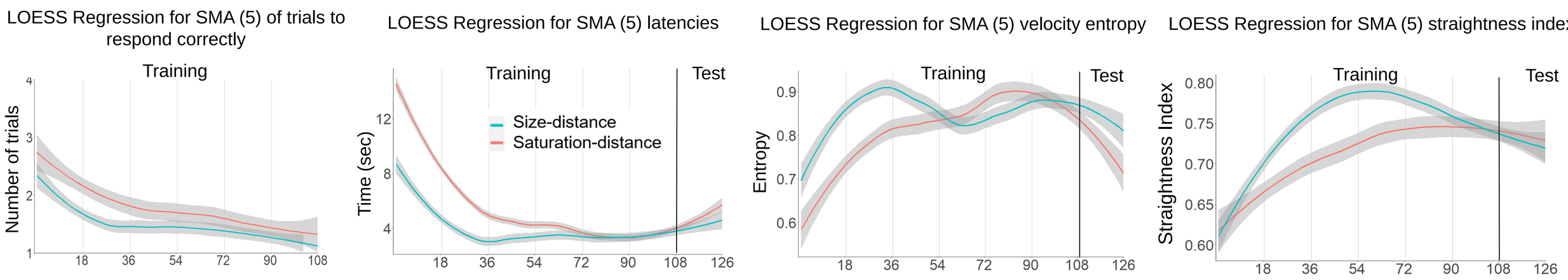
Note*. For both experiments, two groups of 7 subjects each were formed. Training consisted in 6 sessions of 18 corrective trials each (maximum of 5) with feedback and test consisted of a single session of 18 non-corrective trials without feedback.



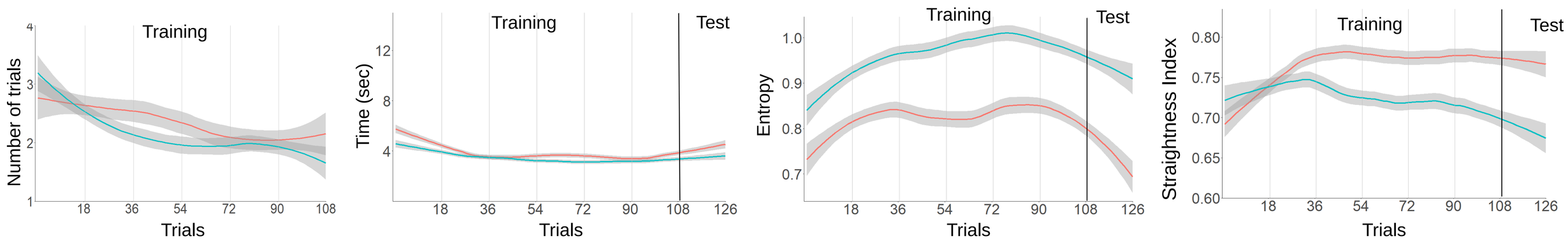
Note. **a)** Stimuli continuum employed, **b)** examples of trials for each group and for each experiment and **c)** sequence of events during training.

Results

Experiment 1



Experiment 2



Conclussions

- The proposed task allowed for the study of RB where distance was part of the comparison criterion as part of a multidimensional arrangement.
- The results of both experiments indicate that saturation makes it more difficult to establish relational behavior, regardless of whether it was relevant or irrelevant to responding correctly.
- Robust differences in active patterns were found particularly in spatial dynamics, rather than in temporal ones. In this sense, spatial dynamics measures fill “behavioral gaps” that temporal measures cannot capture.
- Present findings support the relevance that current technology has on the basic study of perception of stimulus relations and expand the scope of the dimensions of behavior to be studied, particularly, spatial dimension.

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