# Intro, mouse tracking and motivation

“How Mouse-tracking Can Advance Social Cognitive Theory”

<https://www-sciencedirect-com.ez.statsbiblioteket.dk:12048/science/article/pii/S1364661318300731#bib0015>

Mouse-tracking investigates a decision conflict and how this is resolved. Dual-system theories (i.e. Kahnemann) suggests that an automatic process (system I) controls the first part, while a rational controlled process (system II) inhibit the response of system I if needed. This could possibly also be part of the explanation in Spivey experiment. The dual system approach do not always expect a conflict, it is more seen as the system II either affirms or corrects the response of system I. “In the context of mousetracking,

such systems might predict either (i) trajectories that are direct towards one option,

and then perform a sizable mid-flight correction (system II corrects), or (ii) relatively direct

trajectories towards the chosen option (system II affirms)”. The article actually mentions the Dale and Duran experiment as a dual-system one.

Another type of explanation could be models collectively referred to as dynamical frameworks, referring to many conscious and unconscious processes competing when making a judgment or decision. This would be seen as more of a curved mouse-trajectory, and not so much a straight one. Mouse-tracking has proved more support of dynamical than dual-system, supporting that the dynamical frameworks is a better description of how decisions actually unfold.

Before mouse-tracking researchers tried to infer decision conflicts from self-report or behaviour rather than measuring it. Measures like eye-tracking, EEG and reaction times often complicates directly measuring the unfolding of decisions.

Mouse-tracking can be used to measure decision processes in real time, because research indicate that motor movements are being corrected and changed while cognitive processes progress and change, creating a continuous update of the movement according to the internal processes.

The often-used experimental setting in a mouse-tracking experiment involves a repeated binary choice selection task, where the participant has to move their mouse from the bottom of the screen at a designated start location to one of the two options. Often this involves either the task of categorising a stimulus (you could possibly say that this is done in Spivey?) or choosing what option a participant prefer.

Nature of trajectory evolution: this section talks about how a trajectory “should” look like, if the dual system theories are “right”. The mouse should be moving towards the wrong category and then have an abrupt change of direction (“large mid-flight correction”). This could also be seen by whether trajectories have relatively small or large AUC values compared to an optimal straight line.

Integration times: note necessarily interesting for us, but it could be included in explanation of why certain stimuli do not show the expected cohort effect, while others do.

An interesting study investigated gender-typical appearance and politicians. They found that politicians who were less stereotypical male/female was associated with fewer votes.

The article also has a section on why mouse-tracking is even necessary, when eye-tracking, EEG, fMRI and reaction times exist. The argument basically come down to being: mouse-tracking is much cheaper and also much simpler to interpret, and does not rely on complex modelling or previous research. They move on to closely relate mouse-tracking to reaction times (but maybe it would have been more interesting to compare it to eye-tracking?).

The article ends with evaluating mouse-tracking and stating the limitations of the method, such as only being valid for multi-trial experiments, having to include a rather simple decision (i.e. complex decisions for example involving reading would interfere too much with the measure), the choices have to be made explicitly and the method works the best with only two options (binary choice selection tasks).