# Investigating the Influence of System Delays on User Behavior

Thema:
Investigating the Influence of System Delays on User Behavior
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**Hintergrund**

Latency in interactive systems impacts user experience [1], leading to higher error rates and longer task completion times [2,3]. Recent studies question whether prolonged user responses derive only from additional input corrections and waiting time or if a behavioral adaptation also contributes to the slowdown.

According to ideomotor theory [4], repeated experiences of an action and its corresponding effect lead to bidirectional action-effect associations, meaning that the action, its outcome, and the required motor programs are stored in action plans [5,6]. Thinking about a desired goal can trigger the execution of the stored, corresponding action, and vice versa. Moreover, research has shown that temporal aspects such as the duration of the effect [7] and the time between action and effect [8] are stored in these action plans. These results propose that delays can become embedded in user's behavior with interactive systems.

Bogon et al. [9] further support these findings, showing that users adapted to system delays in a game-like environment, leading to increasingly slower interactions with delayed input elements even before the actual delay than with input elements with immediate effect.

However, key questions remain on the robustness of this slowdown effect, to what extent it shapes user behavior, and how long it persists once the system responds without delay.

### Zielsetzung der Arbeit

This thesis aims to replicate the findings of Bogon et al. [9] and investigate the robustness and the influence of the slowdown effect. Therefore, we will conduct three studies:

- Study A tests the replicability and robustness of the slowdown effect found in [9] by comparing response times for delayed versus non-delayed targets in a game-like online environment
- Study B extends the study duration to analyze whether the effect further increases, plateaus, or even diminishes over time
- Study C removes the system delay halfway to analyze whether and how quickly users readjust their action plans

### Konkrete Aufgaben

- Researching related work
- Implementing an online game-like environment
- Planning and conducting the studies
- Analyzing the data
- Writing the thesis

### Erwartete Vorkenntnisse

- Game development in Unity
- Statistical analysis in R
- Empirical study design

### Weiterführende Quellen

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