

## Investigating the Impact of Task Demand and Duration on Passage of Time Judgements and Duration Estimates

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**Abstract :** There is a fundamental disconnect between the experience of time passing and the chronometric units by which time is quantified. Specifically, there appears to be no relationship between the passage of time judgments (PoTJs) and verbal duration estimates at short durations (e.g., < 2000 milliseconds). When a duration is longer than several minutes, however, evidence suggests that a slower feeling of time passing is predictive of overestimation. Might the length of a task moderate the relation between PoTJs and duration estimates? Similarly, the estimation paradigm (prospective vs. retrospective) and the mental effort demanded of a task (task demand) have both been found to influence duration estimates. However, only a handful of experiments have investigated these effects for tasks of long durations, and the results have been mixed. Thus, might the length of a task also moderate the effects of the estimation paradigm and task demand on duration estimates? To investigate these questions, 273 participants performed either an easy or difficult visual and memory search task for either eight or 58 minutes, under prospective or retrospective instructions. Afterward, participants provided a duration estimate in minutes, followed by a PoTJ on a Likert scale (1 = very slow, 7 = very fast). A 2 (prospective vs. retrospective)  $\times$  2 (eight minutes vs. 58 minutes)  $\times$  2 (high vs. low difficulty) between-subjects ANOVA revealed a two-way interaction between task demand and task duration on PoTJs,  $p = .02$ . Specifically, time felt faster in the more challenging task, but only in the eight-minute condition,  $p < .01$ . Duration estimates were transformed into RATIOS (estimate/actual duration) to standardize estimates across durations. An ANOVA revealed a two-way interaction between estimation paradigm and task duration,  $p = .03$ . Specifically, participants overestimated the task more if they were given prospective instructions, but only in the eight-minute task. Surprisingly, there was no effect of task difficulty on duration estimates. Thus, the demands of a task may influence 'feeling of time' and 'estimation time' differently, contributing to the existing theory that these two forms of time judgement rely on separate underlying cognitive mechanisms. Finally, a significant main effect of task duration was found for both PoTJs and duration estimates ( $ps < .001$ ). Participants underestimated the 58-minute task ( $m = 42.5$  minutes) and overestimated the eight-minute task ( $m = 10.7$  minutes). Yet, they reported the 58-minute task as passing significantly slower on a Likert scale ( $m = 2.5$ ) compared to the eight-minute task ( $m = 4.1$ ). In fact, a significant correlation was found between PoTJ and duration estimation ( $r = .27$ ,  $p < .001$ ). This experiment thus provides evidence for a compensatory effect at longer durations, in which people underestimate a 'slow feeling condition and overestimate a 'fast feeling condition. The results are discussed in relation to heuristics that might alter the relationship between these two variables when conditions range from several minutes up to almost an hour.

**Keywords :** duration estimates, long durations, passage of time judgements, task demands

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