Time-discounting and preference reversal of tasks:
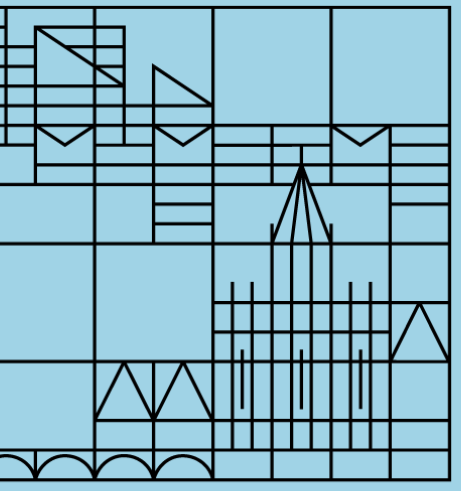# An experience sampling experiment on the subjective value of time

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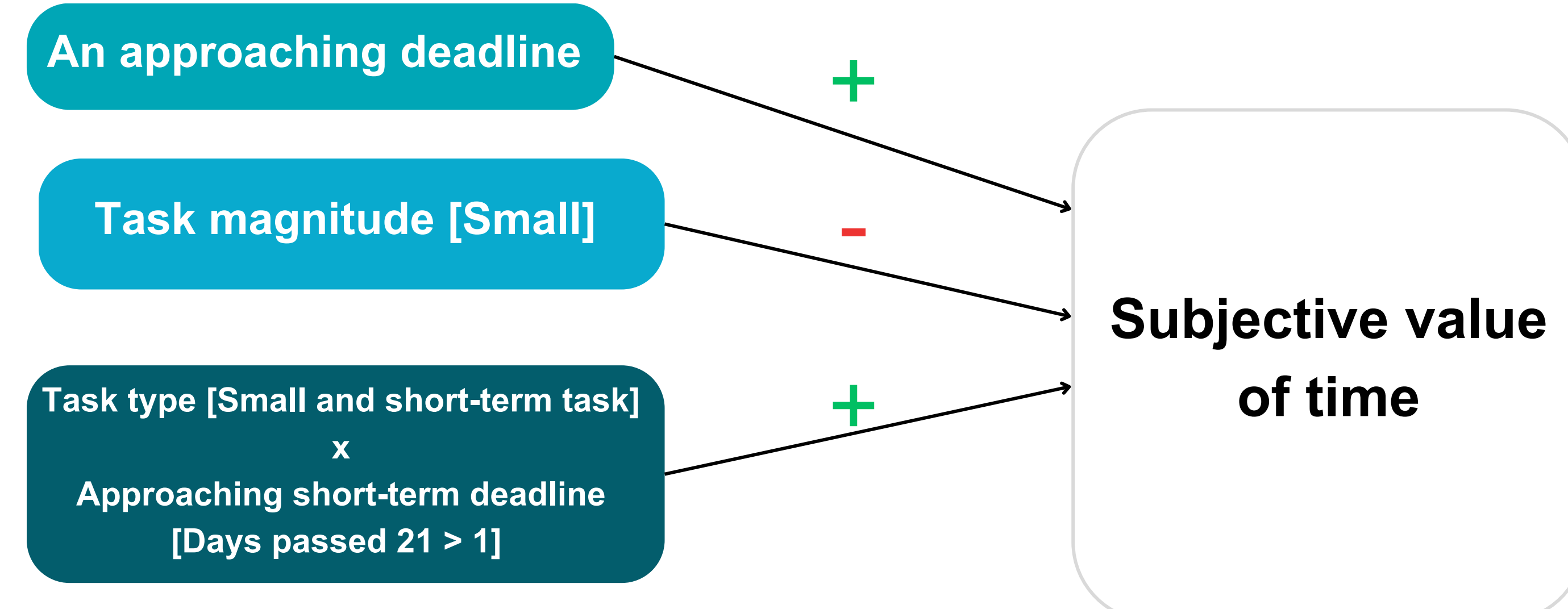
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Abstract

- Tasks, often characterized by set deadlines and magnitude (e.g., writing a one-page report vs. a twenty-page report), are examples of outcomes subject to temporal discounting.

- Are tasks characterized by temporal discounting and preference reversal? Yes!

- We experimentally investigate whether task magnitude and different deadlines impact the subjective value of time attributed to tasks over time.

- We combine an experimental approach with the experience sampling methodology (Shevchenko et al., 2023).

Introduction

Temporal discounting refers to the general tendency to devalue future outcomes (Frederick et al., 2002), while **preference reversal** describes the inconsistency in preferences for those outcomes over time (Green et al., 1994).

Previous research suggests that people discount future efforts more steeply than monetary rewards (Augenblick et al., 2015). While time management theories link temporal discounting and preference reversal to task prioritization issues (Koch & Kleinmann, 2002), little empirical work has examined how task magnitude and deadlines influence these phenomena.
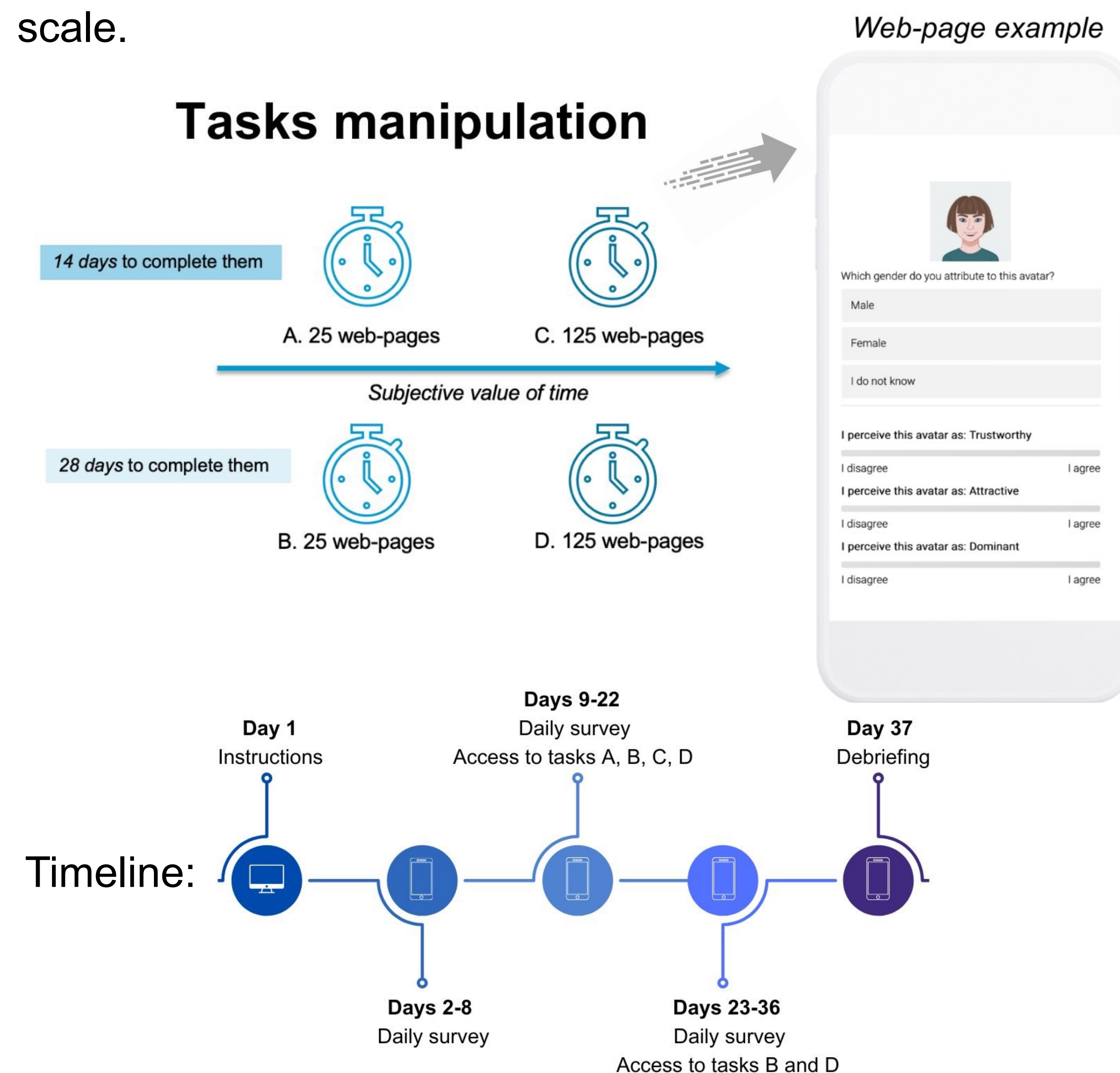
Hypotheses

An approaching deadline → + → Subjective value of time

Task magnitude [Small] → - → Subjective value of time

Task type [Small and short-term task] x Approaching short-term deadline [Days passed 21 > 1] → + → Subjective value of time

Method

Experiment design: In a 2x2 within-subjects design, tasks were manipulated in **magnitude** (small – 25 - vs. large - 125 web-pages with pictures evaluation) and **deadline** (short-term - 14 days - vs. long-term - 28 days).

Subjective value of time: In the daily survey, distributed via Samply (Shevchenko et al., 2021), the **subjective value of time** associated with the tasks was assessed in terms of importance, readiness, and urgency on a visual analogue scale.

Tasks manipulation

Web-page example

Which gender do you attribute to this avatar?
- Male
- Female
- I do not know

I perceive this avatar as: Trustworthy
I disagree — I agree
I perceive this avatar as: Attractive
I disagree — I agree
I perceive this avatar as: Dominant
I disagree — I agree

14 days to complete them
A. 25 web-pages   C. 125 web-pages

Subjective value of time

28 days to complete them
B. 25 web-pages   D. 125 web-pages

Timeline:

Day 1 Instructions
Days 9-22 Daily survey — Access to tasks A, B, C, D
Day 37 Debriefing

Days 2-8 Daily survey
Days 23-36 Daily survey — Access to tasks B and D

Results

Coefficients predicting subjective value of time

Predictor	Estimate	95% CI	p-value
Intercept	52.91	48.06 - 59.77	<.001
Task magnitude (Small)	-4.57	-6.70 - -2.44	<.001
Approaching deadline (Days to deadline)[a]	-0.44	-0.58 - -.0.29	<.001
Task completion[b]	4.13	1.14 - 7.12	0.01

Note. Results are based on a linear mixed model with a sample of N = 27 participants. The random effect of participants had a variance of 219.94, and the random effect of days passed had a variance of 34.09, with an ICC of 0.42. Model Fit: Marginal R²=0.03; Conditional R² = 0.43.

[a]Increase in the estimated subjective value of time as fewer days remain until the deadline. For example, 1 day to deadline results in a higher estimated value than 10 days to deadline (1 day x -0.44 > 10 days x -0.44).

[b]Task completion was included as a fixed effect as a control in the analysis, though it was not experimentally manipulated.

Task type x Days passed

Task type ▨ A: Small task with short-term deadline ▨ D: Large task with long-term deadline
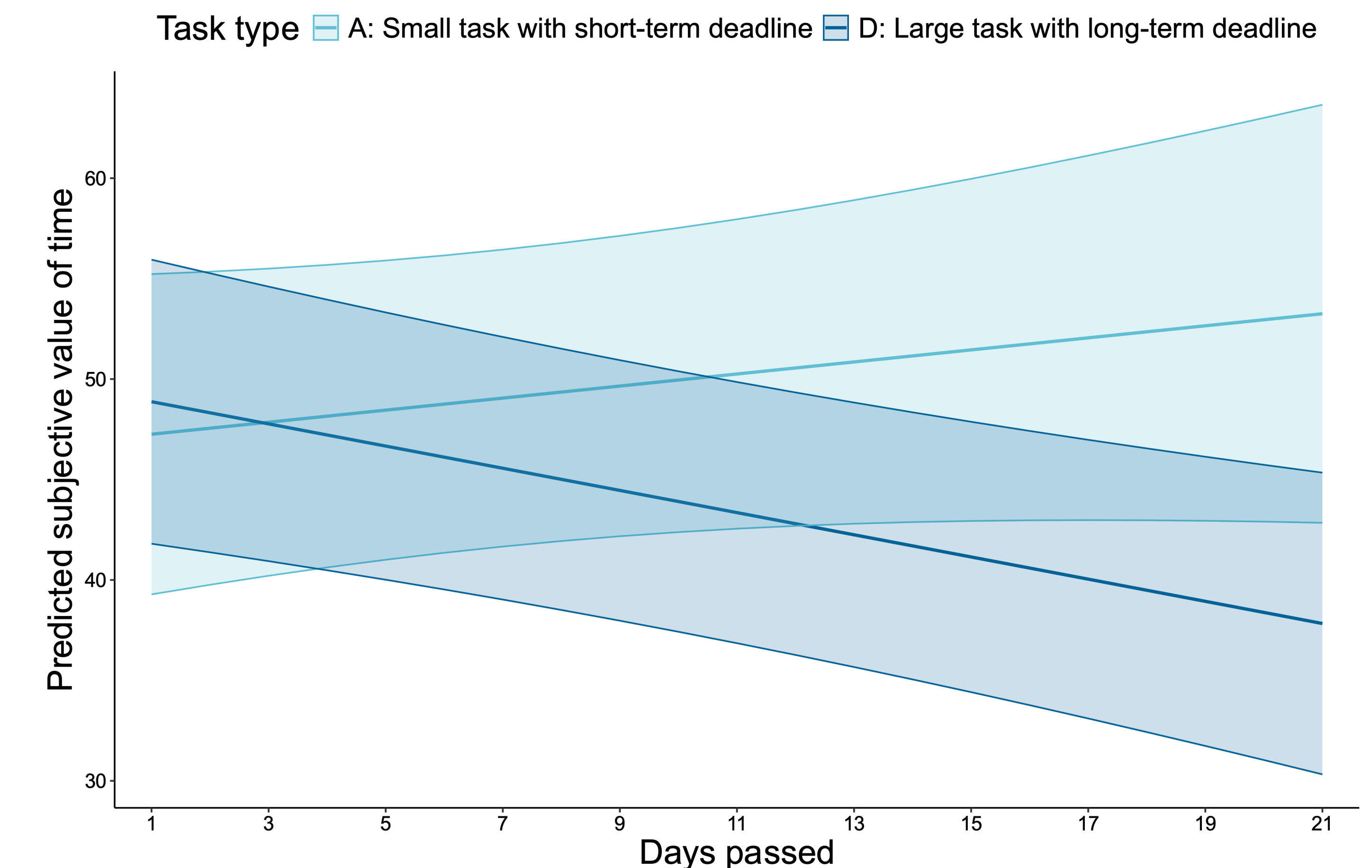
Note. This plot presents the predicted subjective value of time from a linear mixed-effects model (N = 27): Subjective value of time ~ Task type * Days passed + (1 | Participant) + Completion. ☑
The focus is on comparing tasks A and D to illustrate the original preference reversal phenomenon before the **short-term deadline (= 21 days passed)**. The shaded areas represent 95% confidence intervals around the predicted values.

Discussion

- In an experience sampling experiment, manipulating task magnitude and deadline demonstrated their impact on the subjective value of time.

- The results supported all hypotheses. An approaching deadline increases the subjective value of time, while a small task magnitude decreases it.

- The interaction between a smaller, short-term task and the approaching short-term deadline, along with the main effect of task magnitude, provides empirical support for the preference reversal of tasks phenomenon.

References

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