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Scheduling system delays for optimal user performance: Don't predict time; let time predict!

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Abstract: System delays affect user performance and experience when interacting with computers. We investigated the effects of different prediction relations between delay duration and response requirements on user performance. In one experiment, delay duration predicted, to different degrees (50 % vs. 75 % vs. 100 %), the following system response. Predictability substantially increased users' response speed, while adaptation was highly flexible, between different prediction regimes. In a second experiment, users' responses predicted system delay duration. Compared to the first experiment, users' response speed was moderately increased, while the adaptation was rather inflexible across different prediction regimes. In a third experiment, we directly compared both types of predictability. The results confirmed a stronger and more flexible adaptation effect when time predicted the system response, compared to when users' responses predicted time. These findings have important implications for scheduling data transmission rates across different users in internet-based parallel computing.