Individual Differences in Attention Microstrategies

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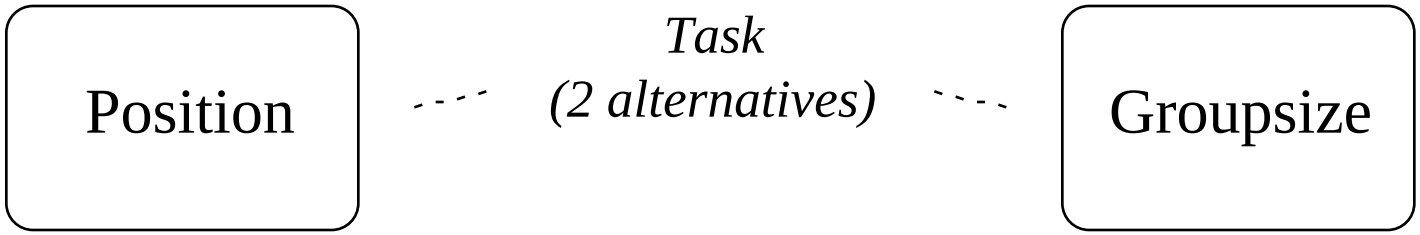
Research questions

- Context: Situation assessment
  - Immediate behavior
  - Multiple inputs, multiple tasks, real time
  - Eg, fighter pilot (Gopher et al.)

- What's the cost of an interrupt?
- What's the cost of a task switch?

Judging letter strings



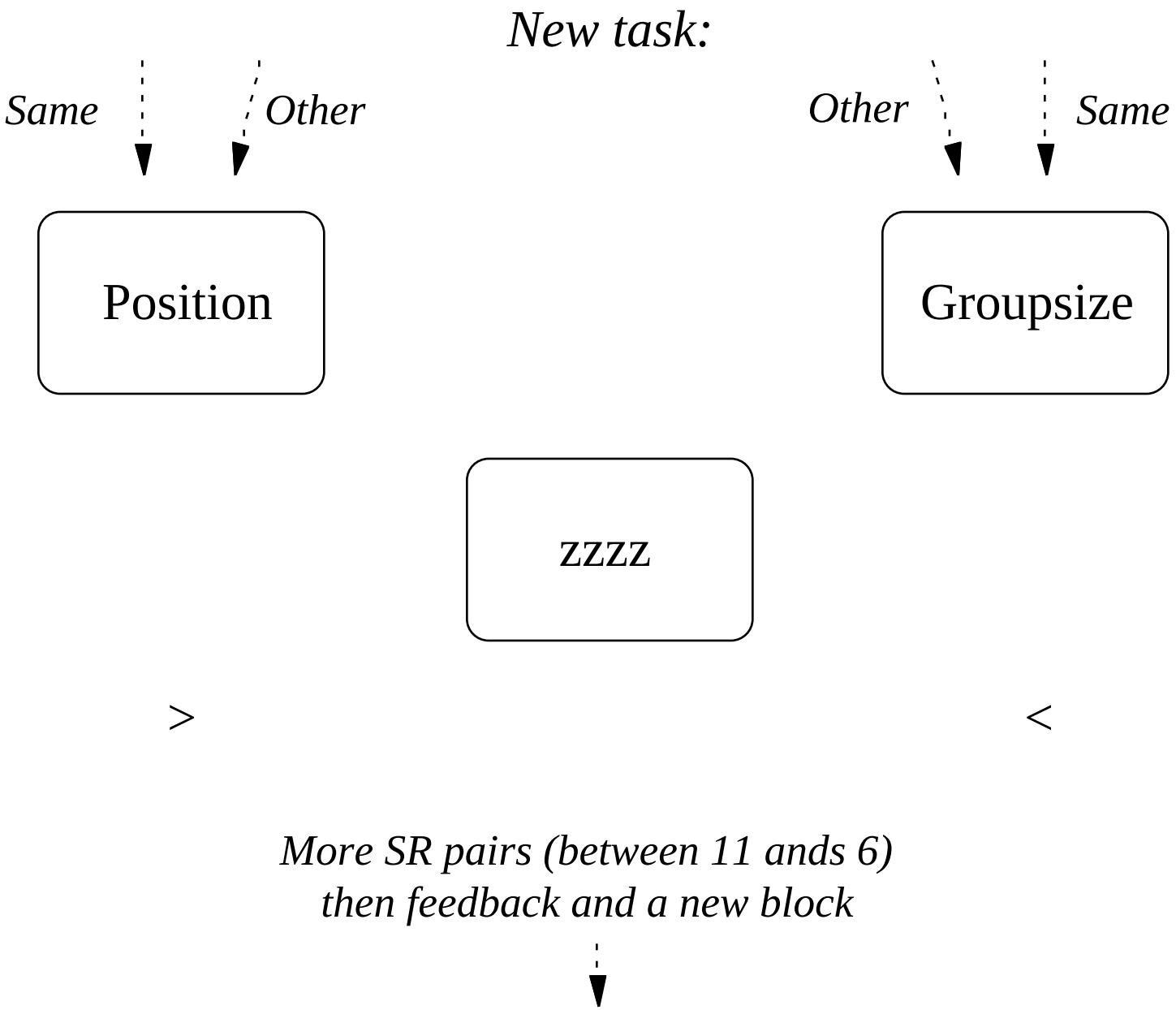
Stimulus:

aaaaaaaa

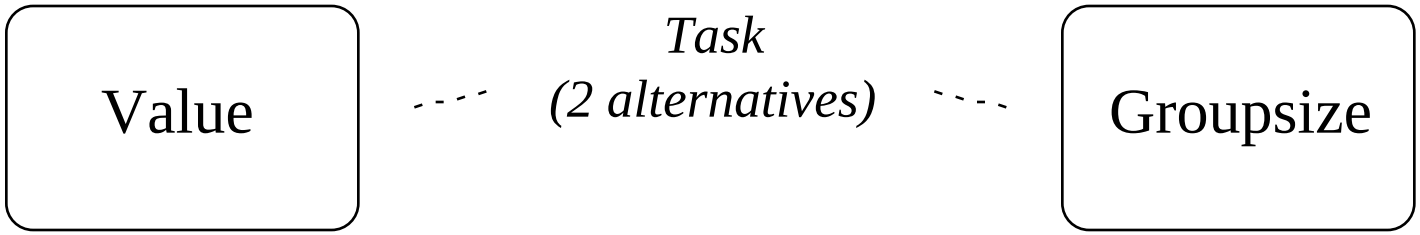
Response: <
(“near start of alphabet”)

Response: >
(“more than 5 elements”)

More SR pairs
(between 6 and 11)


New task:
Same
Other
Other
Same
Position
Groupsize
zzzz
>
<
More SR pairs (between 11 ands 6)
then feedback and a new block

Judging digit strings*



Stimulus:

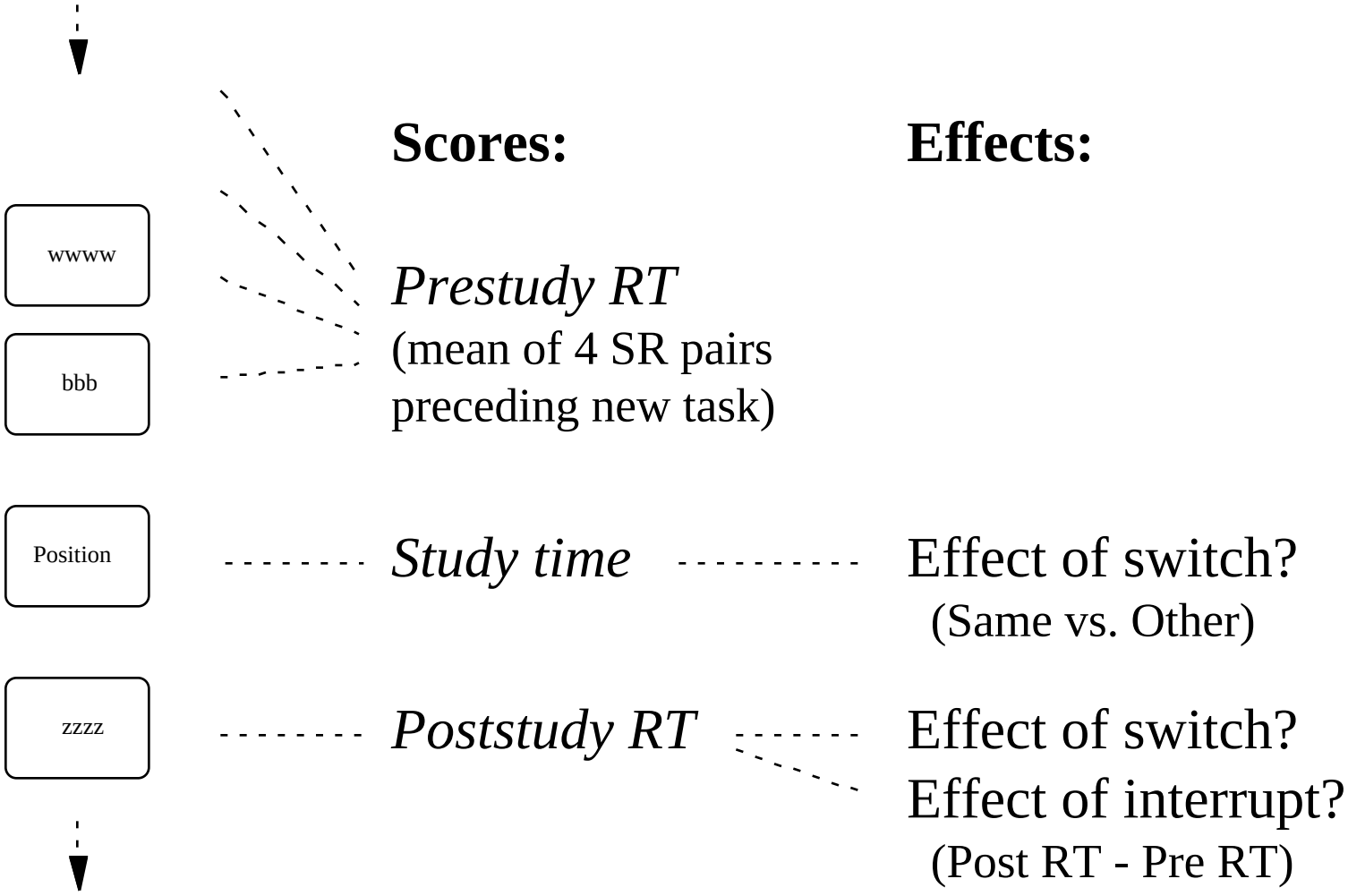
3333333

Response: <
(“digit value less than 5”)

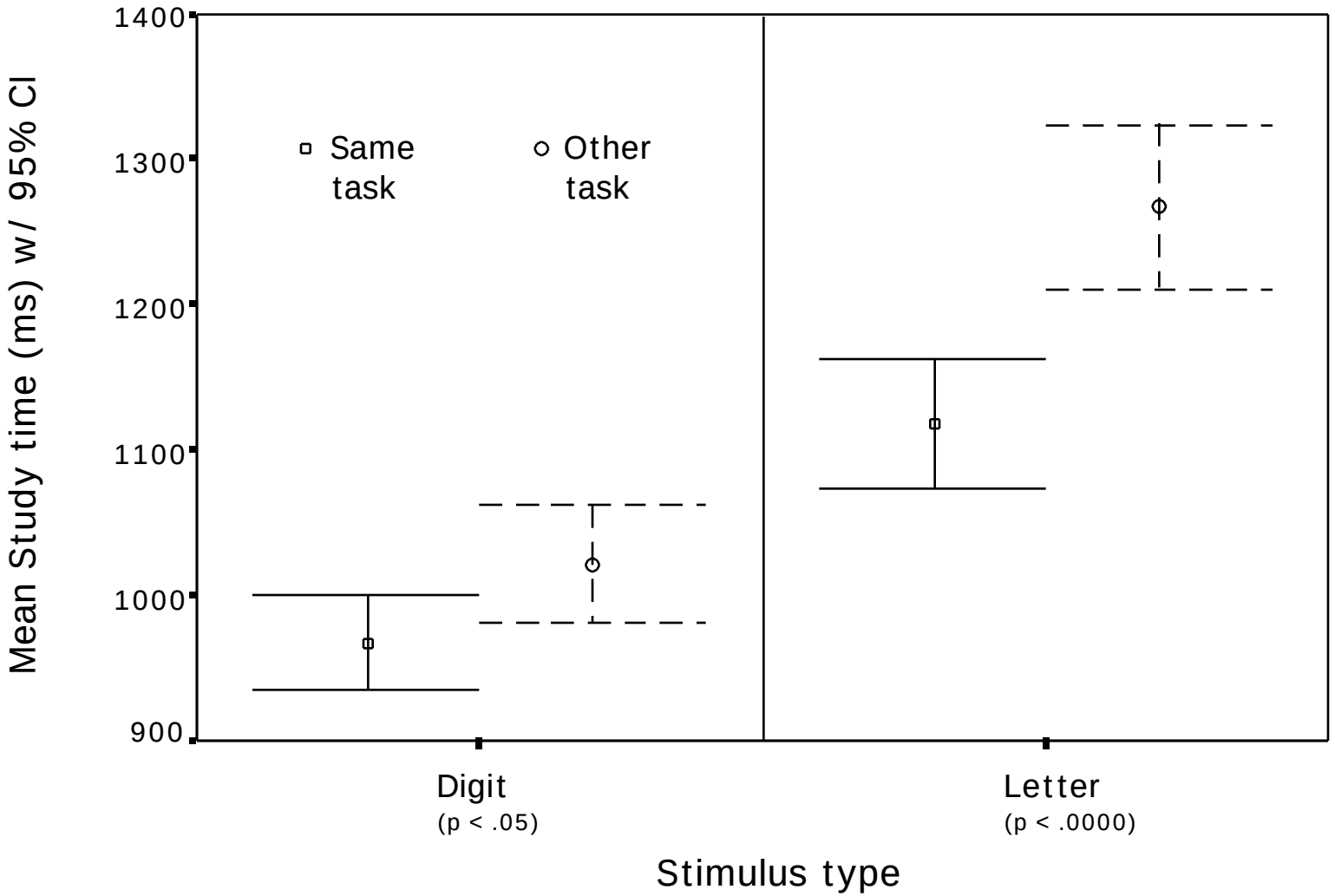
Response: >
(“more than 5 elements”)

* - Different subjects

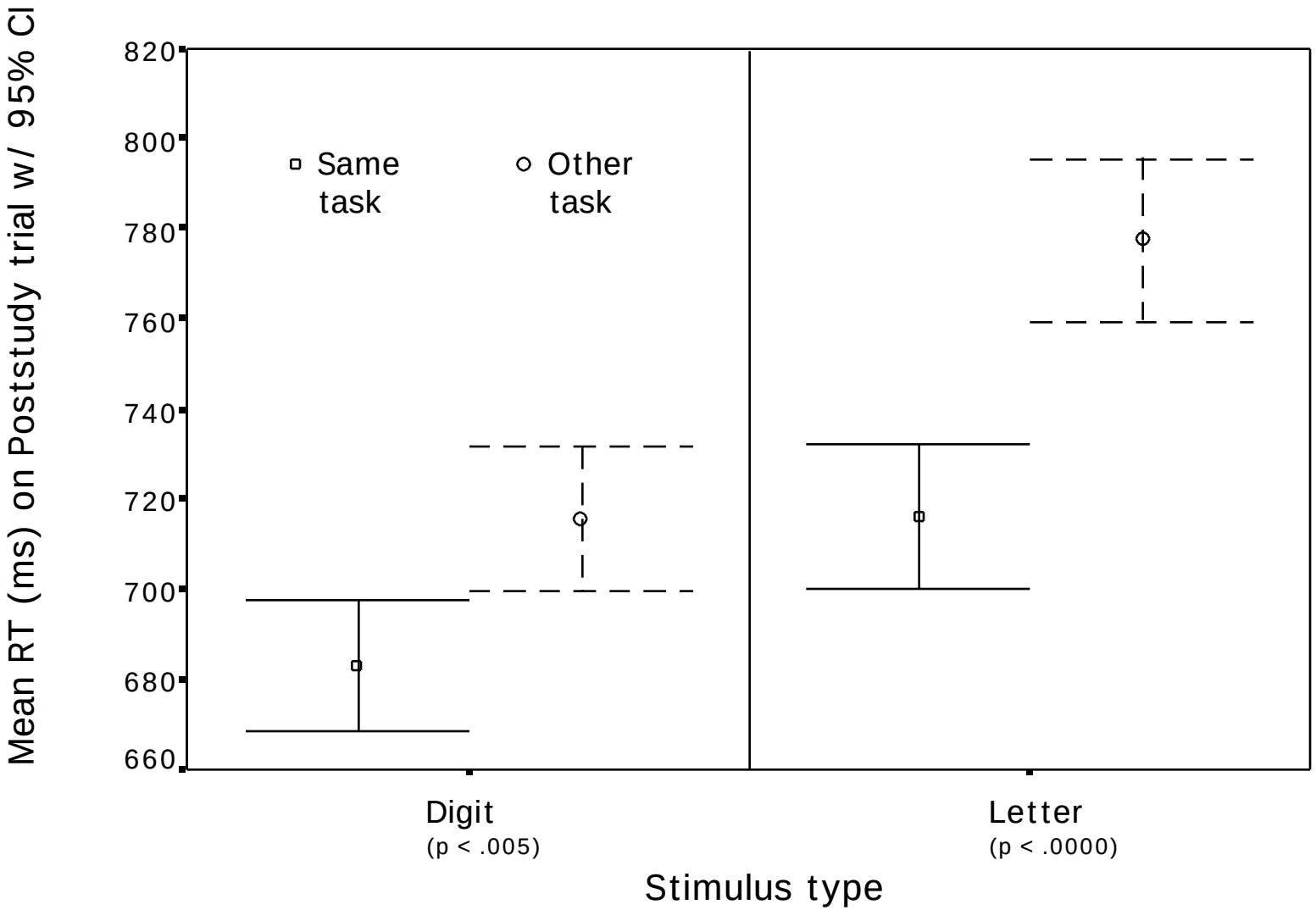
Scores for each block



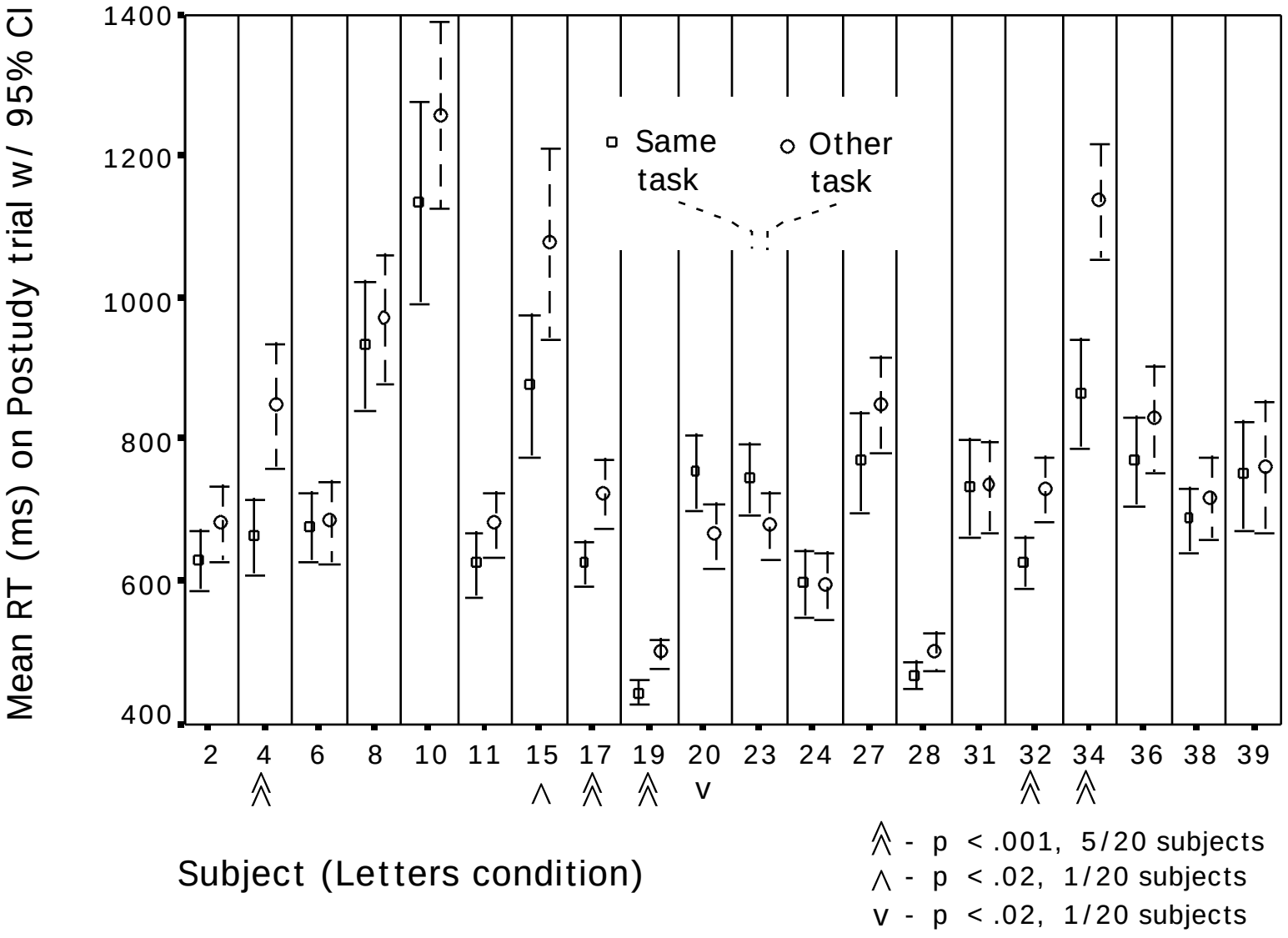
Effect of switch on Study time



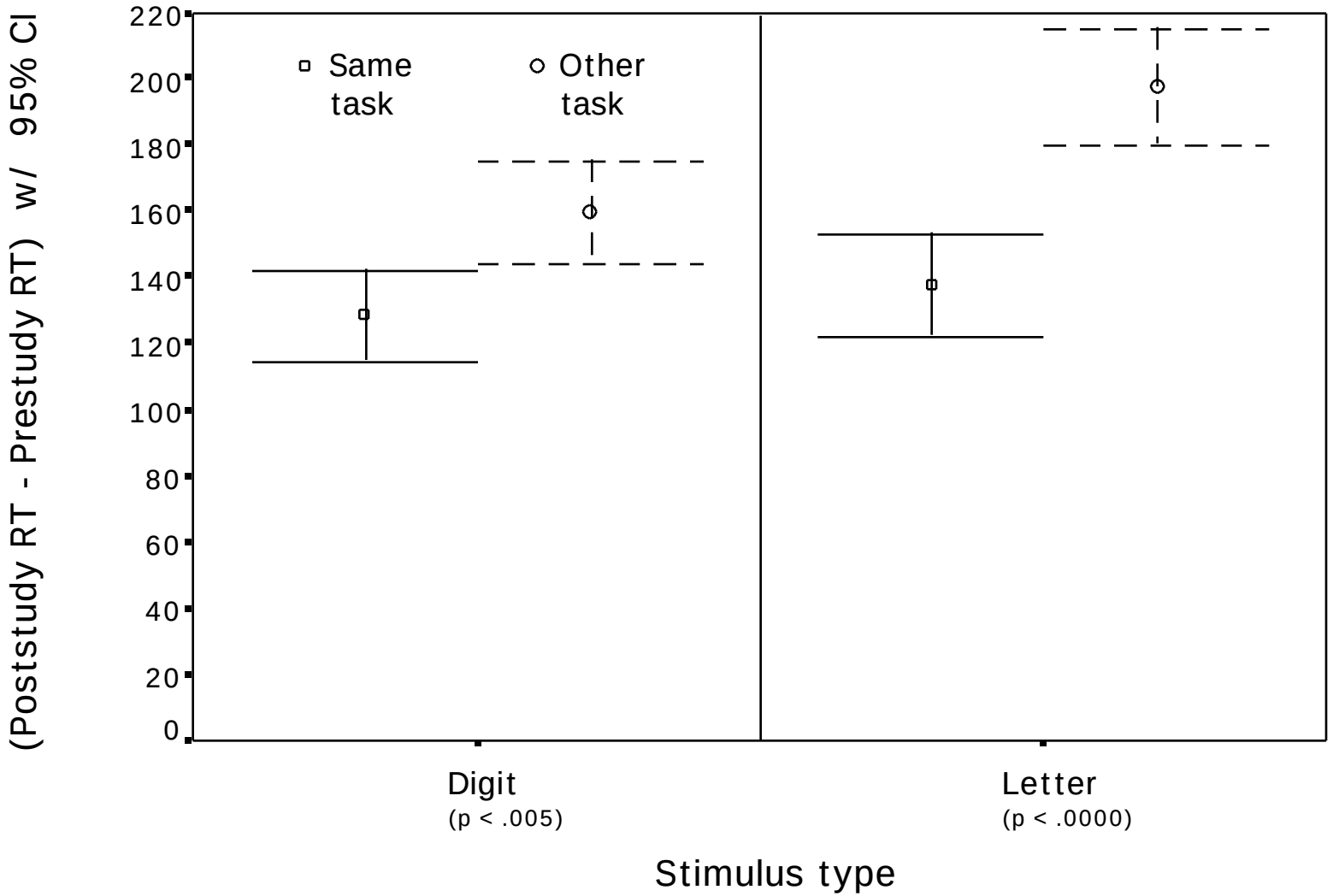
Effect of switch on Poststudy RT



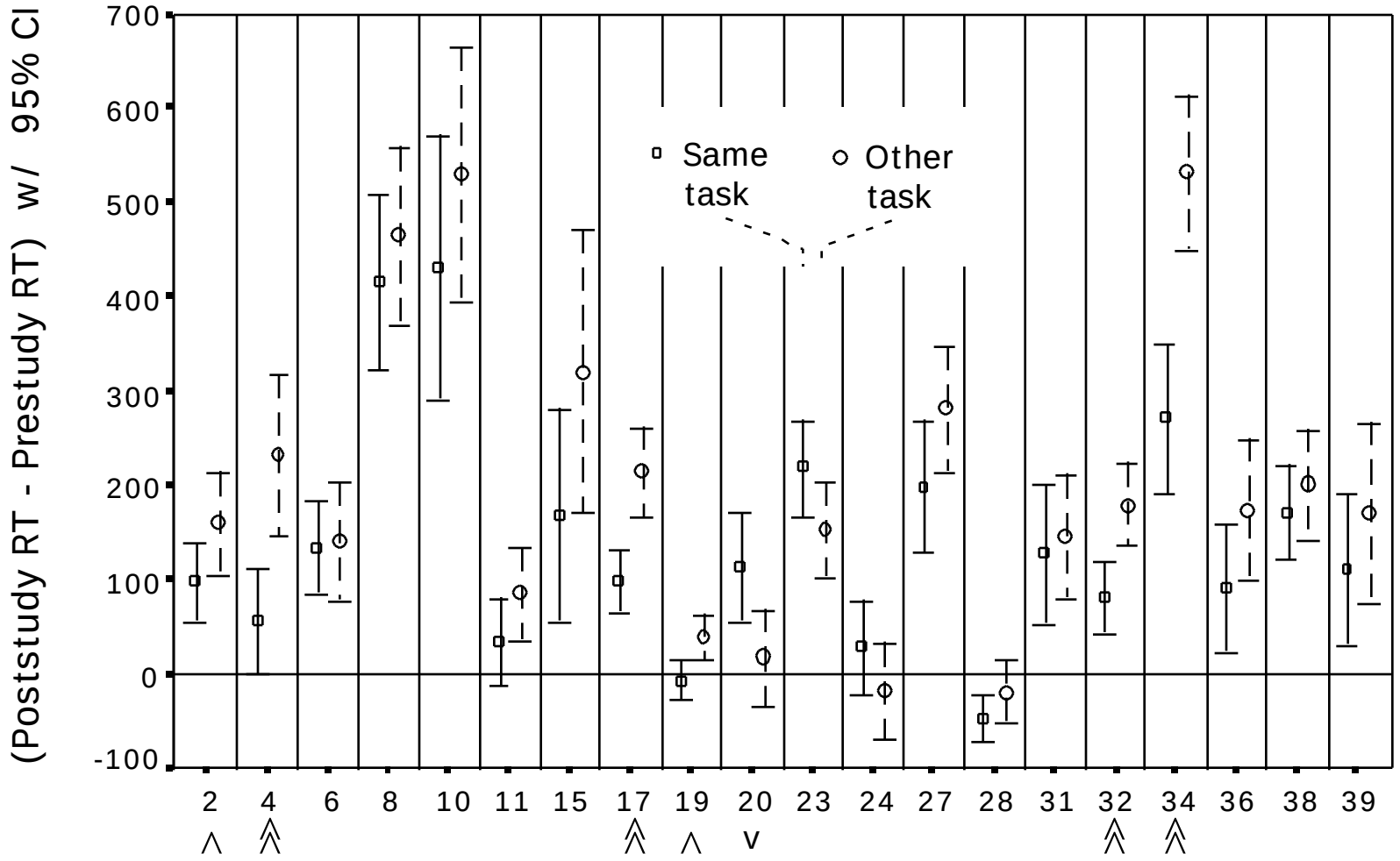
Effect of switch on Poststudy RT, by subject



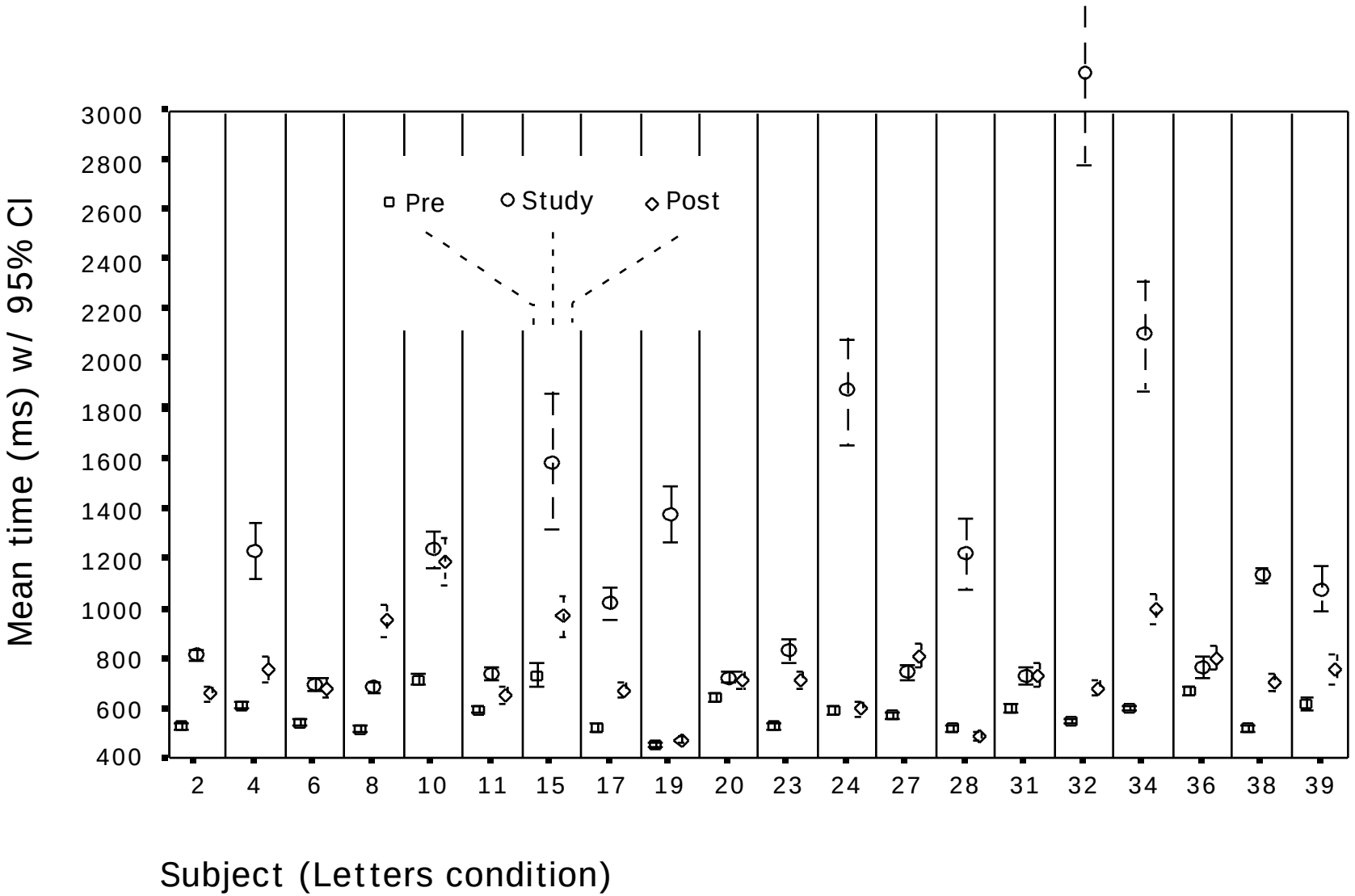
Effect of interrupt on delta RT



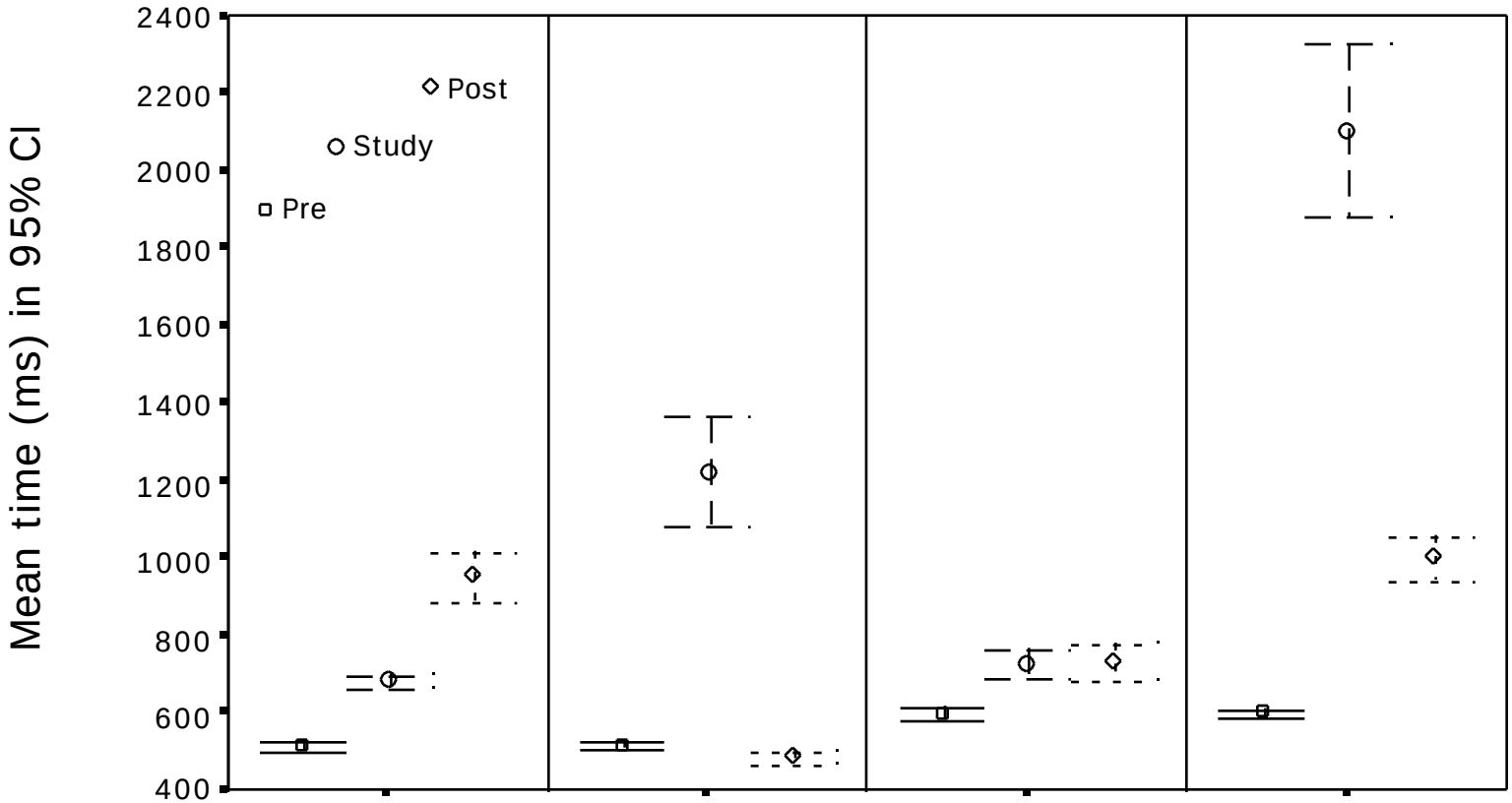
Effect of interrupt on delta RT, by subject



Interrupt processing, by subject



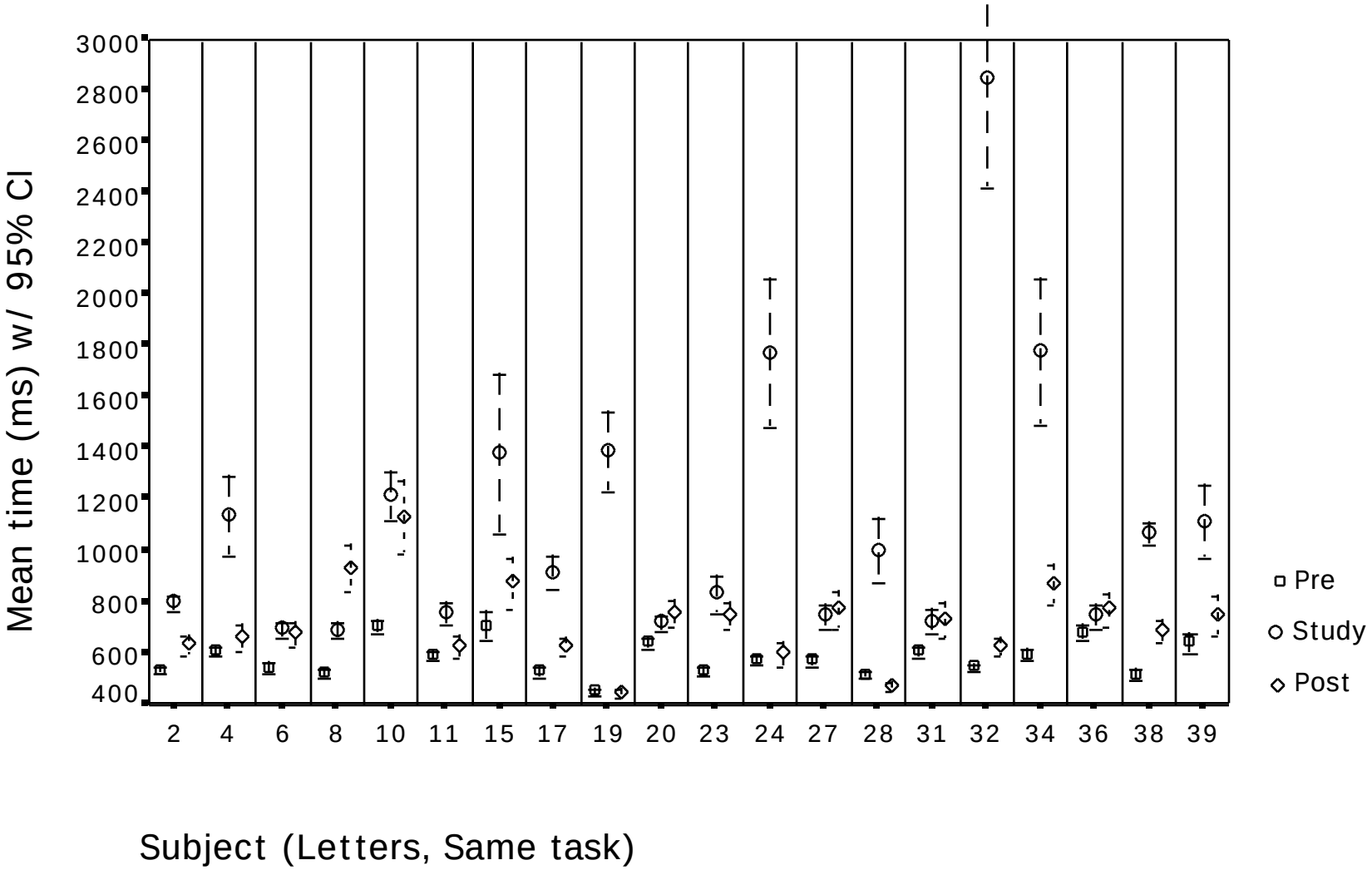
Interrupt processing, by category



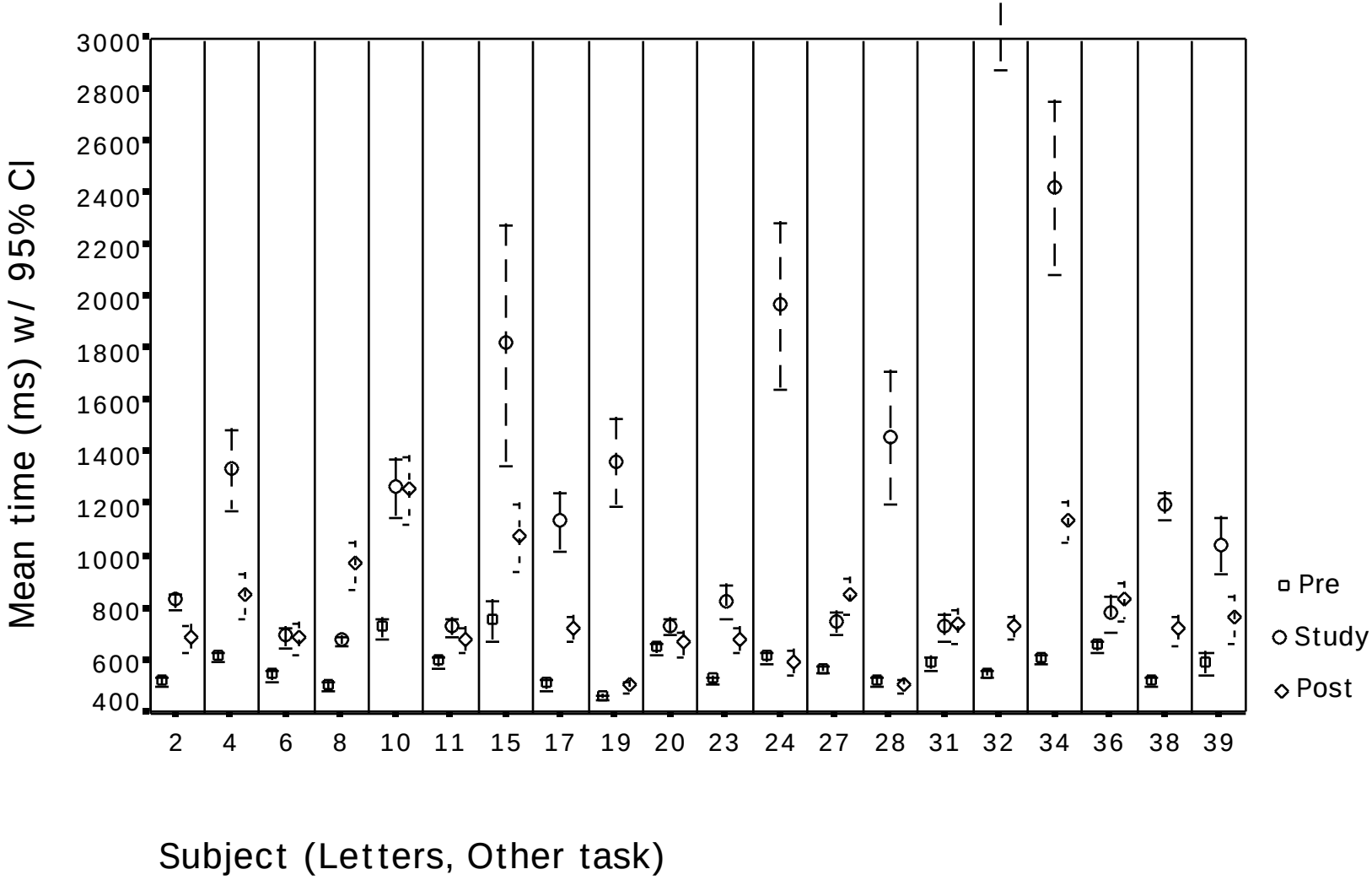
Representative subject:	8	28	31	34
Category test:	Pr < S < Po	Pr >= Po, Pr < S	Pr < S = Po	Pr < S, Pr < Po, S > Po
Proportion of subjects:	1/20	3/20	6/20	10/20

Letters condition; category tests significnt at p < .001

Interrupt processing, by subject, Same task



Interrupt processing, by subject, Other task



Nuggets and lumps

- Replicated aggregate effects of switch and interrupt
- Finding big individual differences
  - Reports often generalize from effects to architecture
  - Only a few of our subjects showed switch costs
  - Found distinct categories of interrupt processing
- Between-subject differences are hard to characterize
  - Evaluated interrupt processing using CIs only
  - How to factor in magnitude?
- Within-subject differences are hard to find
  - What do people trade off at this level, if anything?

New questions

- If people use different *microstrategies*,
  - Can we manipulate them?
    - Implications for screening and training
  - How do they affect macrostrategies?
    - Eg, people use different decision-making strategies, depending on cost of acquiring units of information (Lohse & Johnson)
- Need constraints for a model:
  - Architecture: Timing commitments? Learning?
  - Individual differences? How to represent them?

References

- Gopher, Greenspahn, & Armony (1996). "Switching attention between tasks: Exploration of the components of executive control and their development with training". *Proc. Human Factors and Ergonomics Society 40th Annual Meeting*, pp. 1060-1064.
- Lohse & Johnson (1997). "A comparison of two process tracing methods for choice tasks". *Proc. 29th Hawaii Int'l Conference on System Sciences*.
- Rogers & Monsell (1995). "Costs of a predictable switch between simple cognitive tasks". *Journal of Experimental Psychology: General*, vol. 124, pp. 207-231.