



# Direct Evidence that Judgments of Learning Mediate the Relationship Between Perceived Difficulty and Study Strategy Choice

Afton R. Kirk-Johnson, Brian M. Galla, & Scott H. Fraundorf

University of Pittsburgh - Learning Research and Development Center

UNIVERSITY OF PITTSBURGH

LRDC

Learning Research & Development Center



Contact: ark87@pitt.edu

## Target Inquiry

### Why do students make ineffective decisions about how to study?

## Literature

- **Self-regulated learning theory:** Effective learning requires good decisions about what, when, and how to study (Dunlosky & Metcalfe, 2009).
  - Learners often do not make effective self-regulated learning decisions.
- But why?**
- Learning strategies that produce long-term retention tend to require more difficult cognitive processing in the short-term (**desirable difficulties**; Schmidt & Bjork, 1992).
  - People judge their learning on the basis of current or initial ease of processing (**the ease-of-processing heuristic**; Kornell et al., 2011).
  - This suggests that initial difficulty leads individuals to *misjudge* their learning.

**Ease of initial processing ≠ Long-term learning**

→ Few studies have directly tested all hypothesized links simultaneously.

This study uses the contrast between **interleaved and blocked study** to examine these links within the same participants.

**Interleaved study:** Learning categories by intermixing examples of each

**Blocked study:** Learning categories by studying all of one category and then switching to another category

• **Interleaved study is normatively more effective for inductive learning of exemplar categories.** (Kornell & Bjork, 2008; Rohrer et al., 2014; Yan et al., 2016)

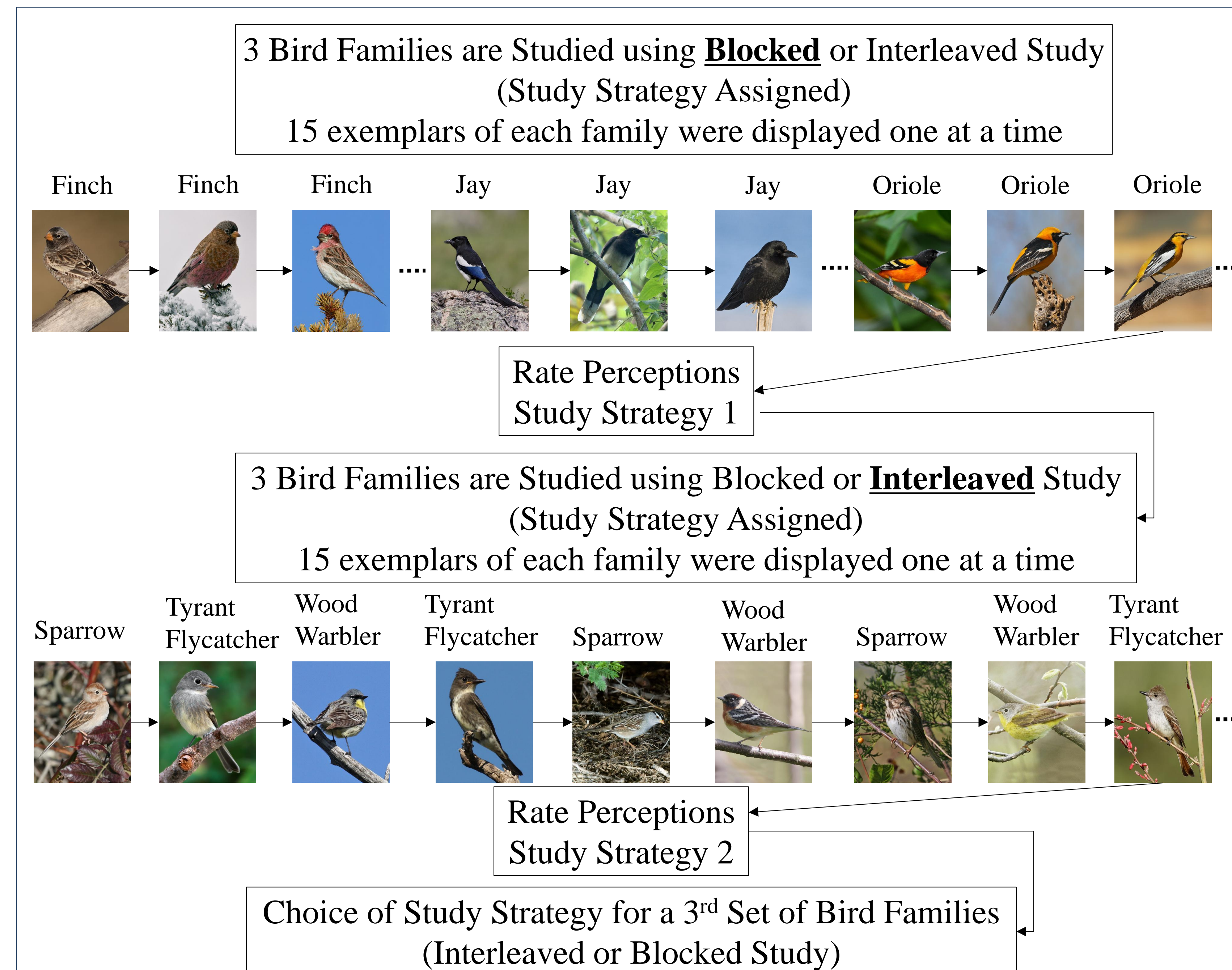
## Research Questions

- Are participants' **judgments of learning effectiveness** greater for the *interleaved* or the *blocked* study strategy?
- Are participants' **perceptions of mental effort** greater for the *interleaved* or the *blocked* study strategy?
- Can we predict participants' **choice of study strategy** based on their perceptions of the just experienced study strategies?

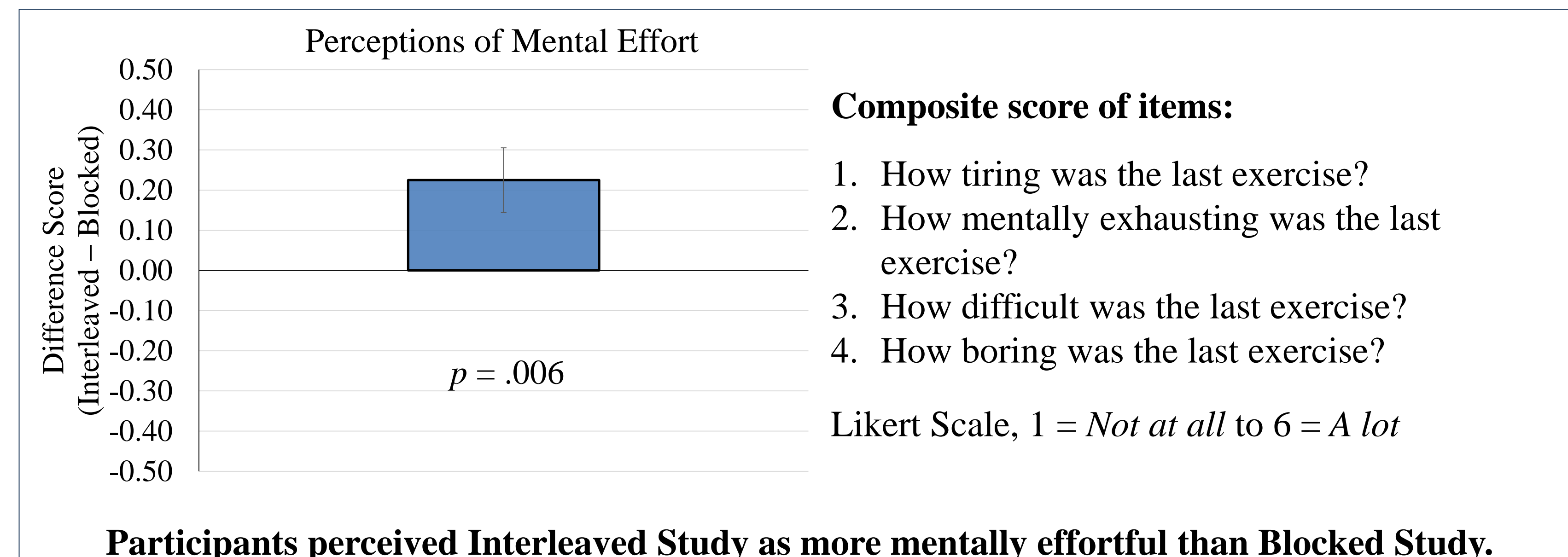
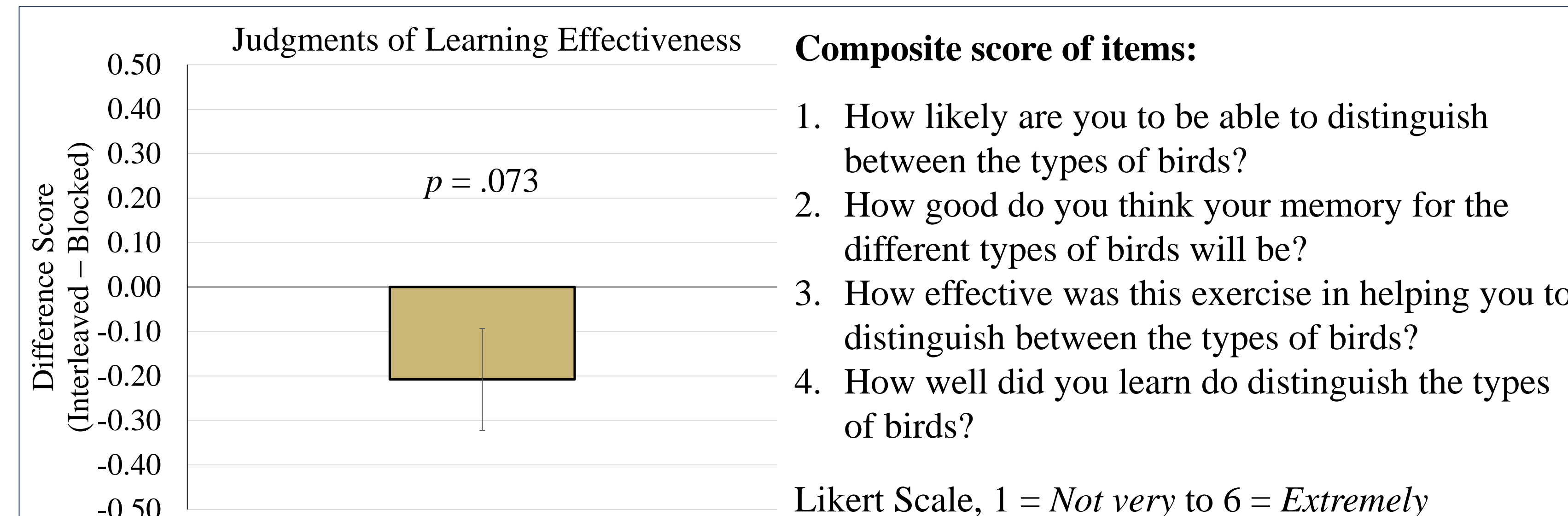
## Participants and Measure

- Participants:**
- N = 89 via Amazon Mechanical Turk
  - 18 years +, Fluent English speaker, Using a computer
- Measure:**
- Online task: Qualtrics Survey System, 2 lists counterbalanced

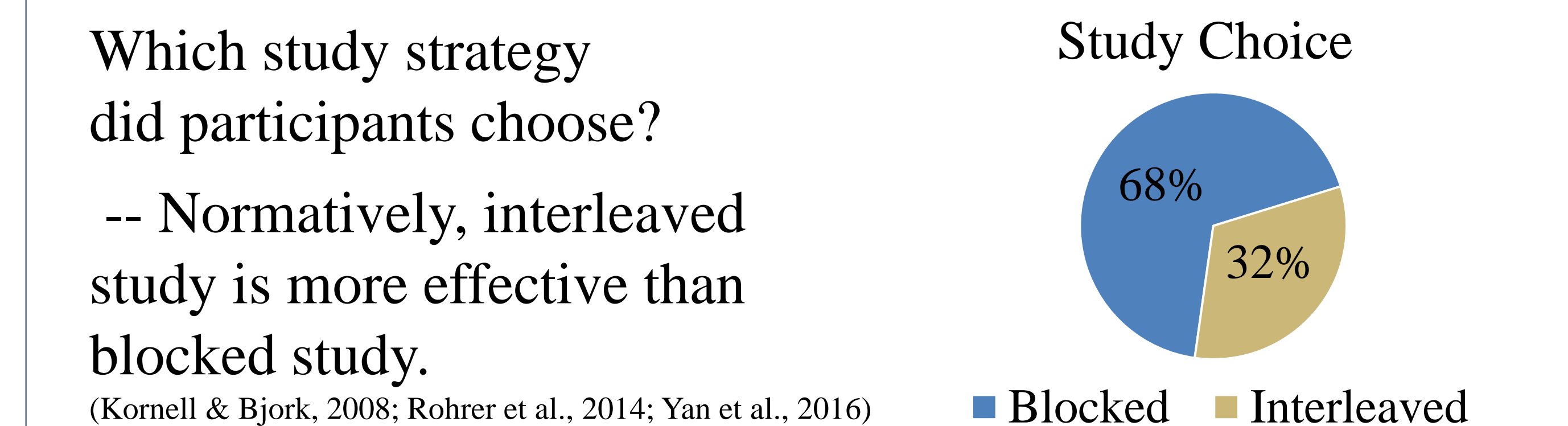
## Procedure



## Results – Perception of Study Strategies

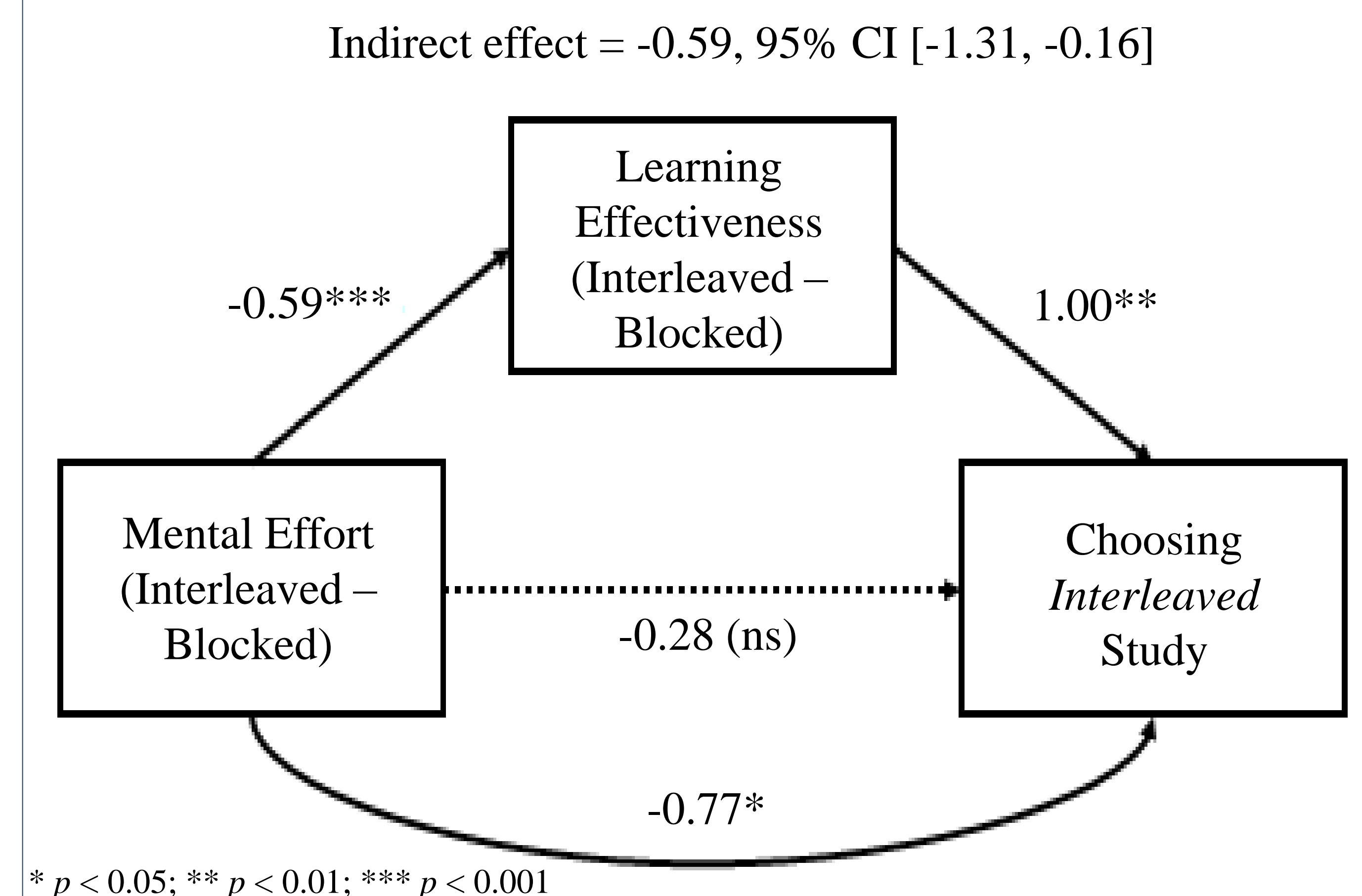


## Results – Behavioral Intentions



## What predicted participants' choice of study strategy?

Mediation analysis tested the hypothesis that differences in judgments of learning (interleaved minus blocked) mediate the association between differences in perceived difficulty and strategy choice.



## Conclusions

- Blocked Study was judged to be [marginally] more effective for learning.
- Interleaved Study was perceived to be more mentally effortful.
- **Perceived difficulty during study led learners to view a study strategy as less effective and, in turn, to choose it less for future study.**
- Perceived difficulty did *not* directly affect strategy choice. → Participants did not avoid strategies simply because they were difficult, but rather because they misinterpreted that difficulty.

## Implications

- Although difficulty may be desirable insofar as it characterizes study strategies normatively more effective for learning, difficulty is often not perceived as desirable by learners. → It contributes to flawed judgments of learning that in turn lead to suboptimal study choices.
- Prompting learners to reframe difficulty (**to acknowledge its counterintuitive benefit**) may help learners correct their judgments of learning and in turn choose better learning strategies.