The Effect of Perceived Difficulty on Perceptual Learning

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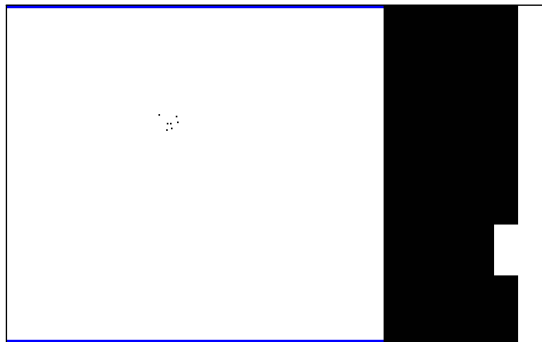
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How can vague high-level beliefs influence performance and learning on straightforward, concrete perceptual tasks?

Motivation

Schrater and Powell had participants try to catch clouds of dots in a bucket.

Surprisingly, the noisier the cloud of dots was, the better subjects did.

Follow-up question

One can imagine two (not necessarily mutually exclusive) causes:

1. An entirely involuntary adaptive mechanism specific to perceptual learning.
2. The general phenomenon of increased perceived difficulty causing increased effort.

Can we explain the difference in learning using just the latter?

Design

There were two trajectory types. All subjects saw both, but in a random order.

Upon switching trajectory types, some subjects (selected at random) received a warning of increased difficulty: "Note that this task is more difficult than the first."

	Warning	
Trajectory order	1. 145 **sinusoidal** trials 2. **No** warning 3. 145 **parabolic** trials	1. 145 **sinusoidal** trials 2. Warning 3. 145 **parabolic** trials
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Results

Participants ($N = 9$, 1 male) were employees and students at the University of Minnesota.

Splitting each 145-trial block in half and comparing errors between halves showed that performance improved with practice, $t(17) = 2.14$, $p = 0.023$ (one-tailed).

Learning in the second block
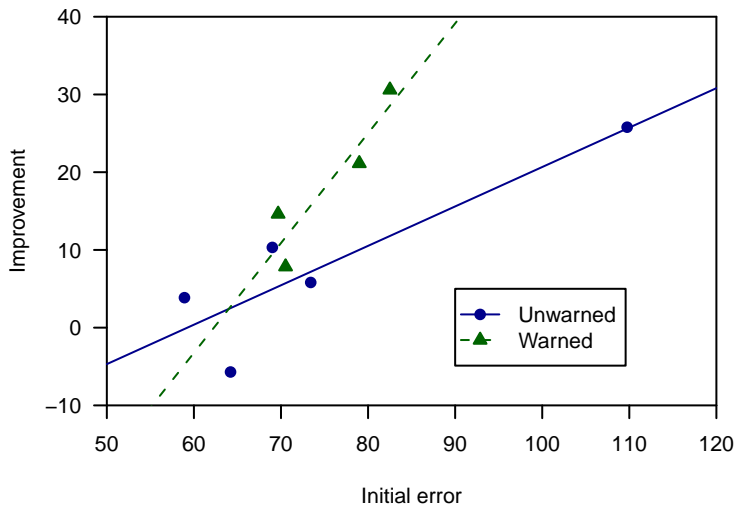
Questionnaire answers

- "How difficult did you find the task?"
  (1 = very easy, 7 = very difficult)
- "How much effort did you put into the task?"
  (1 = no effort, 7 = great effort)

Question	Mean difference between blocks		p (one-tailed t-test)
	Unwarned	Warned	
Difficulty	–0.20	+1.00	0.14
Effort	+0.40	+0.50	0.45

New questions

- What motivated subjects to learn more?
- What did subjects do in order to learn more?
- How consciously did subjects change their behavior according to the warning?
- Can we explain other features of seemingly simple behavior with reference to high-level beliefs and attitudes?

Acknowledgments

Thanks to Jackie Fulvio, Celia Gershenson, C. Shawn Green, Herb Pick, Nate Powell, Paul Schrater, and Max Siegel.