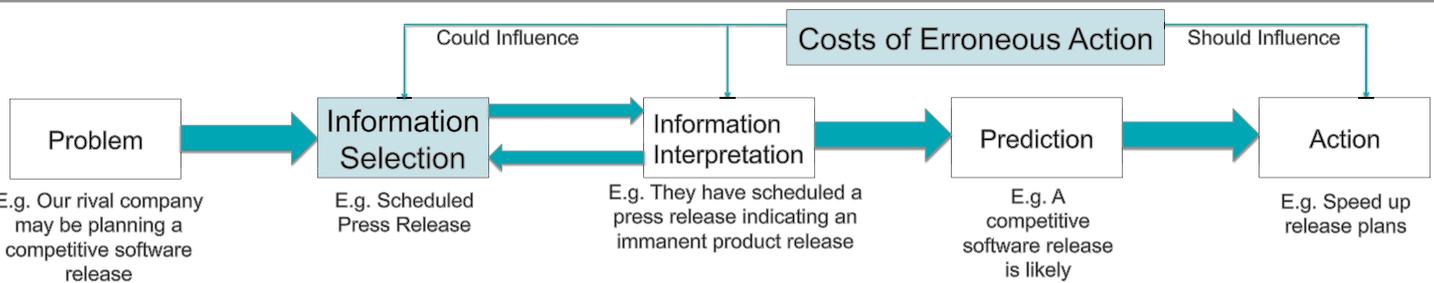# Aversion to Costly Errors directs Information Search in Complex Information Environments

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Introduction

Could Influence — Costs of Erroneous Action — Should Influence

| Problem | Information Selection | Information Interpretation | Prediction | Action |

E.g. Our rival company may be planning a competitive software release | E.g. Scheduled Press Release | E.g. They have scheduled a press release indicating an immanent product release | E.g. A competitive software release is likely | E.g. Speed up release plans

People tend to choose **consistent** queries over **inconsistent** queries in information-poor hypothesis testing scenarios (See Poletiek 2001 for a review). This phenomena is labelled positive test strategy (PTS; Klayman & Ha 1989). Theoretically, positive test strategy should be reduced when people are concerned about the costs of mistakenly accepting the hypothesis (Friedrich 1993). If the costs of erroneous action influence information selection, this may have flow on effects for situational prediction and amplify effects of errors on choice of action.
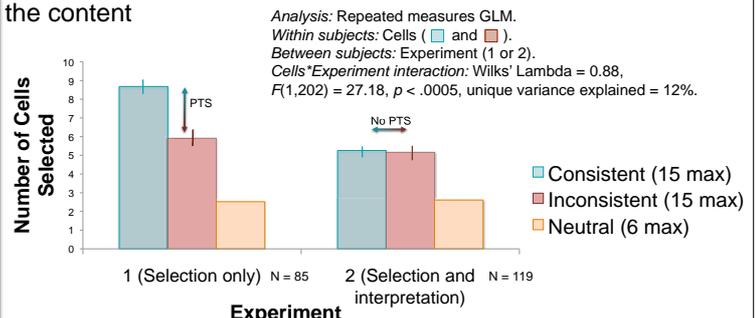
Methods

• *Participants* (Paid university students from a range of faculties) were presented with a scenario like the "Problem" above
• *Task:* Investigate whether your rival company (DCC) is planning a competitive real-time translation software release and decide what action to take:
  1. Maintain current plans
  2. Monitor DCC's research and development activity
  3. Speed up development and release sooner than intended
  4. Speed up development and release as soon as possible
• *Measure:* Participants rated their attraction and feelings towards different actions. Responses for actions 3 and 4 were averaged to form an Acceptance Aversion score

The 6 by 6 Information Grid

Coding based on responses from 45 pilot study participants

• 15 Consistent Cells (If present, a competitive release is more likely)
• 15 Inconsistent Cells (If present, a competitive release is less likely)
• 6 Neutral Cells (If present, could indicate either way)

• *Information space instructions:* Participants were told that:
  • Each cell contains information on the behaviour or characteristic named in the heading
  • Information may reveal that the behaviour or characteristic is present or absent
    EXPERIMENT 1: Participants were asked to select the headings they would like to investigate (Untimed)
      EXPERIMENT 2: Participants were able to click headings to reveal the content (5 minutes).
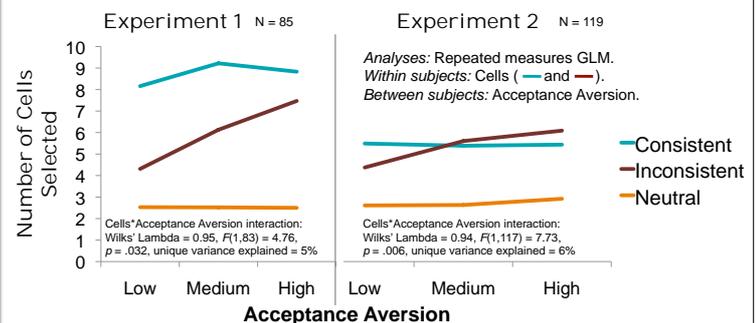
Results

Question 1: Do participants display Positive Test Strategy (select more **consistent** than **inconsistent** cells) in this information-rich environment?
Answer 1: Yes but only when selecting headings *without* viewing the content

Analysis: Repeated measures GLM.
Within subjects: Cells (☐ and ☐).
Between subjects: Experiment (1 or 2).
Cells*Experiment interaction: Wilks' Lambda = 0.88, $F_{(1,202)} = 27.18$, $p < .0005$, unique variance explained = 12%.

- Consistent (15 max)
- Inconsistent (15 max)
- Neutral (6 max)

1 (Selection only) N = 85   2 (Selection and interpretation) N = 119
Experiment

Question 2: Does higher aversion to acceptance reduce positive test strategy?
Answer 2: Yes in both experiments as acceptance aversion increased, so did the number of **inconsistent cells** opened.

Experiment 1 N = 85
Experiment 2 N = 119

Analyses: Repeated measures GLM.
Within subjects: Cells (— and —).
Between subjects: Acceptance Aversion.

- Consistent
- Inconsistent
- Neutral

Cells*Acceptance Aversion interaction: Wilks' Lambda = 0.95, $F_{(1,83)} = 4.76$, $p = .032$, unique variance explained = 5%

Cells*Acceptance Aversion interaction: Wilks' Lambda = 0.94, $F_{(1,117)} = 7.73$, $p = .006$, unique variance explained = 6%

Low   Medium   High
Acceptance Aversion

Conclusion

If error aversion influences the type of information selected (as demonstrated), information interpretation and how much information is examined (e.g. Trope and Liberman 1996), and action selection (e.g. Prospect Theory, Signal Detection Theory), processes may interact to create extreme error aversion and potentially inaccurate situational understanding.

References

Friedrich, J. (1993). Primary error detection and minimization (PEDMIN) strategies in social cognition: A reinterpretation of confirmation bias phenomena. *Psychological Review, 100(2), 298-319.*
Klayman, J., & Ha, Y.-W. (1989). Hypothesis testing in rule discovery: Strategy, structure, and content. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 15(4), 596-604.*
Poletiek, F. H. (2001). Wason's selection task. In *Hypothesis-testing behavior (pp. 73-115). East Sussex: Psychology Press.*
Trope, Y., & Liberman, A. (1996). Social hypothesis testing: Cognitive and motivational mechanisms. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles (pp. 239-270). New York: The Guilford Press.*

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