More Effort with Less Pay:
On Information Avoidance, Belief Design and Performance

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joint with

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CMU, June 2017

Cate Campbell after the Olympic finals

- "It's always hard, when you're in form coming into an event, it's hard not to think about outcomes."

- "I let my head get ahead of me and it's not something I should do and something that I've been working on hard to not do…"

Medical Testing

Motivation

- Standard economic theory posits that agents have no reason to refuse private information that comes for free.

- Agents should clearly opt for receiving such information if it bears the potential to be instrumental.

- This view has been challenged!

- For example, if anticipations matter, or if agents want to control their beliefs in order to stay motivated, they may prefer to avoid information.

- Some empirical evidence...

Existing Evidence for Information Avoidance

- Health: people prefer not to get medical tests
    - Oster et al. (2013), Ganguly and Tasoff (2015)
- Self-image: avoid ego threatening information
    - Eil and Rao (2011), Dana et al. (2007)
- Investment decisions: avoid portfolio look-ups if market down
    - Karlsson et al. (2009), Sicherman et al. (2016)
- Literature surveyed by Engel and Hertwig (2016) and Golman et al. (2017)

Theories

- Theoretical approaches either assume a behavioral digestion of information, e.g.,
    - Brunnermeier and Parker (2005)
    - Gollier and Mürmann (2010)

  Or they assume Bayesian rationality, e.g.,
    - Bénabou and Tirole (2002)
    - Caplin and Leahy (2001, 2004)
    - Caplin and Eliaz (2003)
    - Carillo and Mariotti (2000)
    - Kőszegi (2003, 2006)
    - Schweizer and Szech (2017)
    - Mariotti, Schweizer, Szech (in preparation)

Motivation

- We focus on an important economic setting: the workplace.

- Real-effort experiment in which the piece rate is either low (0.1 euro) or ten times higher (1 euro)

- Information about this piece rate should be instrumental – and it is costless.

- Are there preferences for information avoidance?

- Does information avoidance affect performance?

- What about the role of self-selection?

- What expected piece-rate may information avoiders have in mind?

Design

- Three main treatments: **Full Info, Info Choice, and No Info**

- Identical except that information about piece rates varies, exogenously or endogenously

- Subjects know they have 60 minutes to enter strings backwards into the computer interface.

- Each string consists of 60 characters.

- 329 subjects; 5 euros show-up; TU Berlin

- z-tree (Fischbacher, 2007); ORSEE (Greiner, 2003)

The Task

NXgCX7JHxYZj2cfBSd8JtkYp3LPcyDX8y8NNQhrzJfg22S2ACjC85EQ43B7L

- Each task consists of one of these randomly generated strings and all tasks are identical for all subjects.

- After each string that subjects enter, they learn whether they entered it correctly and they can then move to the next string.

- In each cubicle, there is also a copy of a well-known German weekly (DER SPIEGEL).

- Subjects are explicitly told that they can make use of the magazine "...whenever, during the experiment, [they] would like to take a break or pass time".

Main Treatments

- In all main treatments, subjects know that piece-rates are either 0.1 or 1 euro with a mean of 0.55.

- In **Full Info**, subjects get to know their piece-rates before starting to work on the task.

- In **Info Choice**, subjects choose before starting to work whether they want to know their piece rate or not. They know that if they avoid information, they will receive it at the end of the experiment.

- In **No Info**, subjects get to know their piece-rates at the end of the experiment.

Hypotheses

- We hypothesized that information would be instrumental in the sense that subjects solve more tasks in **Full Info** if the piece rate is 1 euro than if it is 0.1 euro.

- Furthermore, we expected that a significant fraction of subjects would decide to avoid information in **Info Choice**.

- We further hypothesized that performance results of these information avoiders may be not so bad.

- Treatment **No Info** contributes to identifying potential effects of self-selection.

- Furthermore, findings will help us to disentangle if subjects follow a Bayesian or a Non-Bayesian approach.

Results

Full Info Treatment

- In **Full Info**, subjects all know their piece-rates before starting to work on the task.

- Subjects working for the low piece rate of **0.1 euro** solve **20.67** tasks on average.

- Subjects working for the high piece rate of **1 euro** solve **26.21** tasks on average.

- This difference is significant (p=0.043, Wilcoxon Rank Sum).

- Thus information about the piece-rate is instrumental.

Preference for Information Avoidance

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    - demotivation from a low piece rate
    - choking under pressure

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- Information avoiders solved 30 tasks correctly on average.

- **They highly significantly outperformed the subgroup of information receivers in Info Choice.**

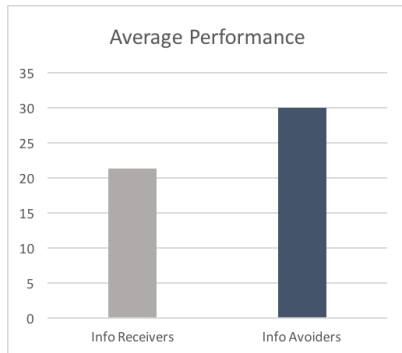# Info Choice: Receivers vs. Avoiders

Figure 1: Information avoiders outperform information receivers (average performance: 21.31 vs. 30, p=0.0002).

No Info Treatment

- Subjects' knowledge in No Info was exactly as the knowledge that information avoiders had in Info Choice.

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- Performance results between these two groups of subjects are remarkably similar (28.02 versus 30, p=0.3710).

- Self-selection seems to play a non-significant role.

- This will allow us to pool data for the different piece rates.

- Comparing average performances between No Info and Full Info reveals that not receiving information significantly enhances performance.
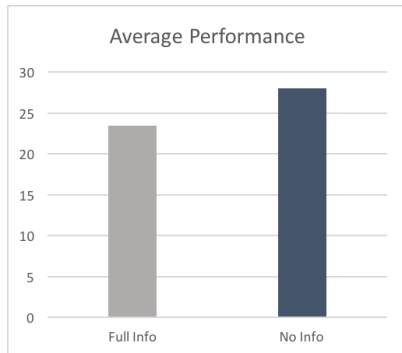
Full Info vs. No Info

Figure 2: Comparing No Info with Full Info reveals that not receiving information enhances performance (23.44 vs. 28.02, p=0.0274).

Bayesian or Behaviorally Distorted Beliefs?

- We run an explorative treatment, **Medium Wage**, in which subjects know their piece rate of 0.55 euros before working.

- Subjects also know that other subjects participated in the task for 0.1 and 1 euros, with equal probabilities.

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- **Subjects solve 24.66 tasks on average.**

Overview: Mean Performance

piece rate	FULL INFO	INFO CHOICE	NO INFO	MEDIUM WAGE
0.1	20.67 (10.49) N=24	17.69 (11.37) N=35		
0.55				24.66 (9.58) N=47
1	26.21 (8.75) N=24	25.53 (9.86) N=30		
unknown		30 (9.35) N=30	28.02 (8.41) N=48	
aggregate	23.43 (9.17) N=48	24.05 (11.44) N=95	28.02 (8.41) N=48	24.66 (9.58) N=47

Table 1: Mean performance across treatments

Pairwise Comparisons

piece rate	POOLED	Pairwise test with (p-value)			
	mean (s.d.)	$w = 0.1$	$w = 0.55$	$w = 1$	w unknown
0.1	18.90 (11.03)				
0.55	24.66 (9.58)	0.0091			
1	25.83 (8.56)	0.0003	0.2073		
unknown	28.78 (8.78)	0.0000	0.0015	0.0645	

Table 2: Pairwise comparisons of performance results, by piece-rate.
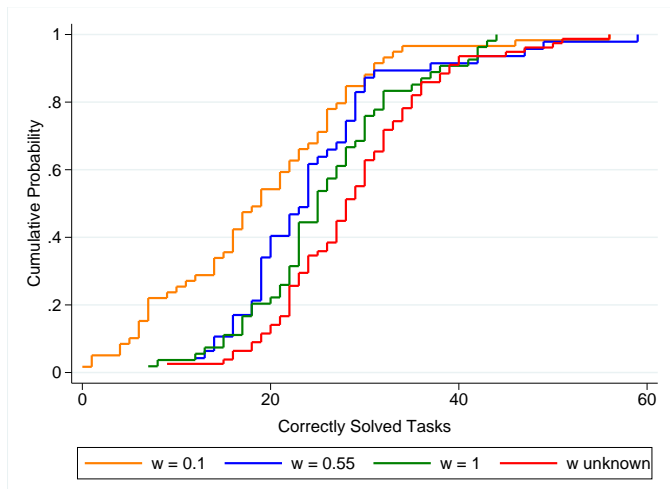
Cumulative Distributions

Figure 3: CDFs of performances, by piece-rate.

Optimally Distorted Beliefs?

- Potentially, agents like to believe in a higher than Bayesian expected piece-rate...

- and prefer a more moderate expectation than 1 to avoid pressure.

- Therefore, we run a variant of the **Fixed Wage** treatment in which every subject receives a piece-rate of **0.80 EUR** with certainty.

- Calibration of Brunnermeier and Parker (2005), incorporating the desire to avoid feeling stressed from a high piece rate.

- Average performance is **27.87** (s.d.=8.57 , N=47), distribution very similar to case without information.

- Corroborates the distorted beliefs explanation.
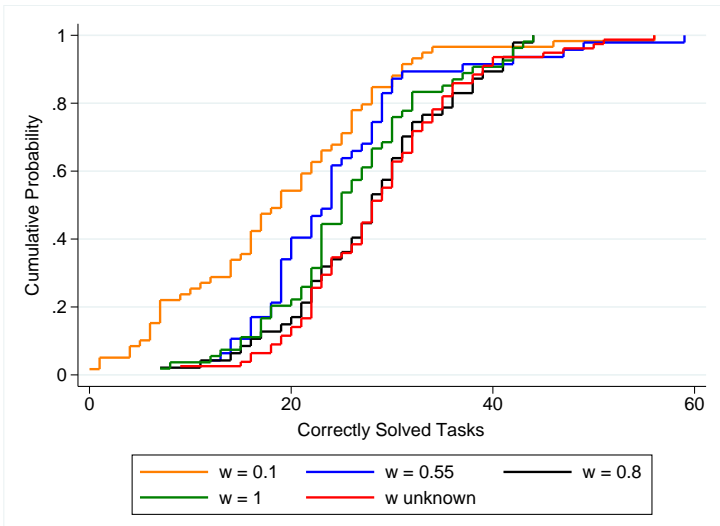
Cumulative Distributions

Figure 4: CDFs of performance, by piece rate.

Modeling Approach

- Model in the spirit of Brunnermeier and Parker's Optimal Expectations, incorprating a choking effect if piece rates are very high:
  - Actions maximize anticipatory utility under distorted beliefs.
  - Optimal distorted beliefs are chosen to maximize overall utility.
  - Overall utility consists of anticipatory utility and actual realized utility.
  - Please see the working paper for all details!

Conclusion

- A substantial part of agents freely opts against receiving information.

- These agents perform specifically well on average, compared to the agents who opt for information.

- Our results suggest that self-selection plays a minor (non-significant) role. Even if agents are forced into blindness, performance results are comparably stunning.

- In contrast, the information structure turns out to have significant and causal impact on performance results. Having no information on the piece rate realization causally increases performance.

- Only a Non-Bayesian modeling approach to belief design can explain our findings.

- Specifically in populations with heterogeneous agents, uncertain incentives may prove superior to any fixed reward system (see working paper!).