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Rational inattention and information provision experiments

by Bartosz Maćkowiak[1]

Surveys with information provision experiments, a form of randomised control trials, have become popular in economics (for review articles, see Fuster and Zafar, 2023; and Haaland, Roth, and Wohlfart, 2023). A typical information provision experiment begins by eliciting participants' prior beliefs about some variable of interest. Next, a randomly selected subset of participants – the treatment group – is provided with some information about the variable of interest. Finally, the posterior after-the-treatment beliefs are compared with the beliefs of the control group that has not received the information treatment. In some surveys, respondents are also asked about their actions, in addition to their beliefs, or respondents' actions may be directly observed by researchers. For example, the variable of interest in a survey may be inflation, the relevant action may be consumption spending, and the research question may be about how much inflation expectations and consumption spending respond to information about inflation.

As evidence from information provision experiments accumulates, economists are asking if different models of behaviour under incomplete information or bounded rationality can explain the experimental findings. From the perspective of a model, one can also ask what the experimental findings imply about behaviour outside the survey, which researchers may not observe but may be ultimately interested in. In Maćkowiak and Wiederholt (2025), we take a step in this direction, focusing on the theory of rational inattention introduced by Sims (2003) and recently reviewed by Maćkowiak, Matějka and Wiederholt (2023).

Rational inattention

Rational inattention is the idea that information is in principle available but absorbing information requires paying attention, which is costly. Available information must be distinguished from *processed* information; it is the latter that moves beliefs and actions. Individuals are modelled as deciding which pieces of information to process more carefully than others. Beliefs and actions are then based on noisy signals, where the form of the signals – what the signals are about, and how much information they contain – depends on individuals' preferences and their environment.

In a standard dynamic model with rational inattention, agents track a state variable that is autocorrelated over time.[2] Agents want to be informed about realisations of the state, e.g. inflation, because their optimal action in each period depends on the current value of the state. The importance of being informed depends on the cost of a mistake in the action and on the sensitivity of the optimal action to the state. Taking inflation as an example of the state, the action may be consumption spending. Agents need to pay attention to be informed. The cost of attention is proportional to the

reduction in uncertainty about the current value of the state.[3] Agents decide how much attention they want to pay to the state; they choose an optimal signal.

An information provision experiment in a rational inattention model

In Maćkowiak and Wiederholt (2025), we introduce an information provision experiment into this kind of model. The environment is similar to the one described in the previous paragraph. The difference is that at some point, a subset of agents is unexpectedly called into a survey where they are provided with some information about the current value of the state. The agents decide how much attention to devote to the provided information. The cost of attention is assumed to be lower during the survey than outside the survey. The idea is that the opportunity cost of attention to a variable declines once one participates in a survey about that variable.

This set-up captures some basic features of real-world surveys. Survey participants have some prior beliefs about the variable of interest. The prior beliefs differ across agents because the importance of being informed and the opportunity cost of attention in daily life vary from person to person. Most individuals enter the survey imperfectly informed. They will update their views during the survey, but they will not absorb all information presented to them. Some participants will pay more attention than others because the incentives to pay attention during the survey, just like in daily life, are diverse. People will tend to "speed through the survey", i.e. pay limited attention, where the amount of attention during the survey will reflect people's environment and preferences.

The model explains how much people revise their beliefs and actions in response to information. In daily life, outside the survey, the response to information increases with the importance of being informed. Individuals who care more about being informed pay more attention, and their beliefs and actions track the state more closely. How much people respond to information *during the survey* is known as the *treatment effect*. In the model, the treatment effect *decreases* with the importance of being informed, as long as agents pay non-zero attention outside and during the survey. When being informed becomes more important, two counteracting effects arise: people want to pay more attention in daily life, which lowers the treatment effect; and people want to pay more attention during the survey, which raises the treatment effect. It turns out that the *attention-in-daily-life* effect dominates the *attention-during-the-survey* effect.

The model also allows for a situation where agents pay attention during the survey but do not pay attention outside of it. This happens when the cost of attention in daily life is much higher than during the survey or the relevant information is simply unavailable outside the survey. The treatment effect is then increasing in the importance of being informed. The reason is that the attention-in-daily-life effect is absent in this case; only the attention-during-the-survey effect is present. Hence, the nature of the information, i.e. whether the information was available to participants before the survey or not, affects the interpretation of the experimental findings.[4]

Interpreting experimental findings

The model can be used to interpret findings from information provision experiments. Cavallo, Cruces and Perez-Truglia (2017) and Weber et al. (2025) find that in surveys about inflation, the treatment

effect is smaller when inflation is high. The model-based interpretation is that the importance of being informed about inflation and/or the volatility of inflation rise with inflation. An increase in the importance of being informed and an increase in the volatility of the state reduce the treatment effect in the model because the attention-in-daily-life effect dominates the attention-during-the-survey effect. As another example, in a survey concerning inflation expectations and central bank interest rates, Knotek et al. (2024) find a stronger treatment effect for people who are poorly informed before the experiment and pay more attention during the experiment. The model-based interpretation is that these are individuals for whom monetary policy is relatively unimportant.

A recurrent finding is that the treatment effect on actions is smaller than on beliefs (see Yang, 2024, for a review). The model predicts this pattern. Think of the result that the treatment effect is decreasing with the importance of being informed, as long as agents pay non-zero attention outside and during the survey. A large treatment effect on beliefs then comes from individuals for whom the state is relatively unimportant; such individuals are also expected to show a small treatment effect on actions if their optimal actions are insensitive to the state.

Implications for behaviour outside the survey

The model can be used to derive implications from behaviour during the survey, which researchers observe, for behaviour outside the survey, which researchers may not observe but may be ultimately interested in. According to the model, two individuals who pay attention to the state outside and during the survey but show different treatment effects differ in terms of the importance of being informed or the opportunity cost of attention. The individual with the *lower* treatment effect is predicted to pay more attention in daily life but also to react less strongly to an unexpected, temporary reduction in the cost of attention. The reason is that the attention-in-daily-life effect dominates the attention-during-the-survey effect. By contrast, if information was unavailable before the survey, then the individual with the *higher* treatment effect is predicted to pay more attention outside the survey if information became available outside the survey. Only the attention-during-the-survey effect is present.

Implications for central bank communication

The model suggests that an analysis of central bank communication needs to distinguish between three *different types of communication*. The *first type* of communication occurs when the central bank is expanding the set of publicly available information. A policy rate change announcement may be an example. According to the model, this type of communication will be more effective among individuals who care more about being informed and at times when being informed is more important. The relevant case in the model is the one when only the attention-during-the-survey effect is present.

The remaining two types of communication do not expand the set of publicly available information; instead, they restate information that has already been publicly available. The *second type* resembles an information provision experiment, i.e. this type of communication is out-of-the-ordinary and salient so that it amounts to an unexpected reduction in the information-processing cost for individuals. An information campaign in the media may be an example. Communication of this kind may be *less* effective among people who care more about being informed and at times when being informed is more important. In the model, the relevant case is the one when the attention-in-daily-life effect

dominates the attention-during-the-survey effect. Furthermore, if the central bank runs an information campaign that is salient and targeted at the demographic groups who updated their beliefs strongly during a survey, the same demographic groups may not change their *actions* much in response to the campaign because their optimal actions may be insensitive to monetary policy.

The *third type* of communication also restates information that has already been publicly available but, in contrast to the second type, it does not amount to an unexpected reduction in the information-processing cost for individuals. A discussion of the economic outlook at a regular press conference may be an example. This last type of communication may act as one optimal signal about the state of the economy for some people. Individuals who show large treatment effects during a survey experiment may pay little attention to this kind of communication because these individuals tend to pay less attention in daily life.

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2.

Sims (2003); Maćkowiak, Matějka and Wiederholt (2018); Afrouzi and Yang (2021); Miao, Wu and Young (2022); Jurado (2023).

3.

In a standard model with rational inattention, uncertainty is measured as entropy.

4.

Two additional cases arise in the model: when agents pay no attention outside and during the survey, and when agents pay attention before, during and with some delay after the survey. See Maćkowiak and Wiederholt (2025), Section 3.