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Paying for confidence: An experimental study of the demand for non-instrumental information ☆

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ABSTRACT

This paper presents experimental evidence that when individuals are about to make a given decision under risk, they are willing to pay for information on the likelihood that this decision is ex-post optimal, *even if this information will not affect their decision*. Our findings suggest that this demand for non-instrumental information is caused by what we refer to as a "confidence effect": the desire to increase one's posterior belief by ruling out "bad news", even when such news would have no effect on one's decision. We conduct various treatments to show that our subjects' behavior is not likely to be caused by an intrinsic preference for information, failure of backward induction or an attempt to minimize thinking costs.

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1. Introduction

The standard view in Economics is that information is deemed valuable if, and only if, it is instrumental for decision-making. However, a growing number of studies in several fields – Economics, Psychology and Medicine – present evidence to the contrary. In Economics, for example, there are experimental studies of social learning in which a significant proportion of subjects purchase non-informative signals (e.g., Kübler and Weizsäcker, 2004; Çelen et al., 2005, and Goeree and Yariv, 2006).

The most notable evidence from the Psychology literature is provided in a series of studies by Eldar Shafir (Tversky and Shafir, 1992; Shafir and Tversky, 1992; Bastardi and Shafir, 1998, and Redelmeier et al., 2001), of which the most well-known is a joint experiment with Amos Tversky. In this experiment, students were offered a big discount on a holiday resort, provided it was paid for before the date of an important qualifying exam. A majority of students preferred to forgo the discount and delay their decision until information about the exam arrived. After the results of exam were known, however, a majority of students said they would have gone to the holiday resort regardless of whether they passed or failed. A similar effect was demonstrated in a related experiment where the majority of subjects playing the prisoner's dilemma asked to delay their decision until after they learned the action of their opponent, even though the majority of subjects chose to defect whether their opponent cooperated or defected.

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Several studies in Medicine have raised the concern that physicians have the tendency to order too many diagnostic tests beyond the point at which such tests are likely to provide new information (see Allman et al., 1985; Myers and Eisenberg, 1985, and Kassirer, 1989). This concern is best captured by the following quote from the New England Journal of Medicine:

> "We must stop ordering tests that have little chance of changing the scope of diagnostic possibilities. We must become increasingly comfortable with uncertainty; not every diagnosis must be nailed down with the final test…before we embark on a course of therapy." (Putterman and Ben-Chetrit, 1995, p. 1211)

These studies *seem* to suggest that individuals *may* assign a value to information, which is above and beyond the instrumental benefit it provides. However, it is difficult to asses this hypothesis on the basis of just these studies since there are several factors, not controlled for, which may have contributed towards the decision to acquire "useless" information. For example, subjects in the Economics experiments may not have thought that they were purchasing "useless" information because they either did not update their beliefs according to Bayes rule, or because they did not conform to the equilibrium behavior (and did not expect others to conform). In the Tversky–Shafir experiment subjects might have mistakenly thought that they would choose different actions depending on their grade because they were confused by the fact that there are different reasons to choose the same action – namely, to go on vacation – whether they passed or failed (in one case it's a reward, in another it's a consolation). Finally, there are a host of reasons why physicians may be inclined to subject a patient to more tests than are necessary.

The aim of this paper is, therefore, to investigate whether controlling for all these factors, individuals derive an intrinsic demand for non-instrumental information, and if so, what may be the possible sources of this demand. One possible explanation may be the failure to apply backward induction, or what Tversky and Shafir (1992) (henceforth, TS) refer to as a "disjunction effect". According to TS, this failure may be overcome by essentially forcing individuals to think what they would choose for each piece of information they might receive. A second possible reason for demanding "useless" information may be intrinsic preferences for information, as proposed by Grant et al. (1998, 2000) (henceforth, GKP). According to this theory, "information-loving" individuals strictly prefer more accurate signals regardless of whether they make their decision before or after observing the realization of their signal. Finally, individuals may demand information because they wish to simplify their decision and reduce the cost of finding the optimal decision (we adopt the framework proposed in Ortoleva, 2009).

We present experimental evidence on a demand for non-instrumental information for which the above theories do not provide a satisfactory explanation. We propose an alternative explanation, which is based on the notion that individuals may have an intrinsic preference for being "confident" in choosing the right decision. For example, suppose you were faced with a choice between action A and action B, where the outcome depends on an unobservable state of nature. To prefer A over B it is sufficient that, according to your current information, there is more than 50% chance that A is ex-post optimal. However, you may "feel more confident" taking action A if you knew that A is ex-post optimal with a probability much higher than 0.5 (say, 0.8). If this could be verified, then you may be willing to pay for such information in order to "raise your confidence" in choosing A.

To capture this intuition we propose a model of decision-making under risk in which individuals have an intrinsic preference over their posterior beliefs *only at the point of making a decision*. Once a decision is made, an individual's behavior is standard in the sense that he is indifferent among all signals about the outcome of his decision. We interpret this to mean that a decision-maker (DM) cares about *how* he makes a decision, i.e., with what level of confidence that his decision is ex-post optimal. In particular, we assume that decision-makers are mainly driven by a desire to rule out the worst state of nature before making a decision, even if conditional on knowing this state, they would choose the same decision.

In our experiment subjects were faced with the following simple decision-problem. A monetary prize X is hidden in one of two boxes, labeled A and B. The probability that each box contains the prize depends on the state of nature. There are two possible states: *high* and *low*. The probability that box A contains the prize is h in the high state and $l < h$ in the low state, where h and l are *both strictly above* $\frac{1}{2}$. The subject's task is to choose a box. If he chooses correctly, he wins the prize. Before he makes his choice, the subject can pay a fee to learn the state of nature. If he chooses not to pay, the subject then must choose a box *without* knowing the state of nature. Whether or not the subject pays the fee, he receives a payment immediately after he makes his choice.

Since a choice of A first-order stochastically dominates a choice of B, knowing the state of nature should not affect one's choice. This is true under any model of decision-making under risk that respects first-order stochastic dominance. It is also independent of the subject's attitude towards risk. Thus, a subject who pays the fee exhibits an intrinsic preferences for non-instrumental information. To determine which of the above three theories best explains these preferences, we ran four experiments, a baseline with two variants and an additional treatment (Treatment 4), to investigate more closely what information subjects are interested in when they pay a fee. We also ran a fifth treatment to investigate the impact of learning. The treatments are briefly described as follows:

Treatment 1 *(Baseline).* Subjects are first asked if they want to pay a fee to learn the state of nature before making their choice. If they answer yes, they are shown the true state and are then asked to choose a box. If they answer no, they are asked to choose a box without any further information.

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