Why Do People Who Think They Have Failed Want to See the Results More? An Investigation Based on the Ego Utility Model.*

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Abstract

This paper examines how ego utility influences decision making and shows that the desire to maintain or enhance one's self-image can lead to the avoidance of useful information if it conflicts with existing beliefs. It challenges the traditional economic view of purely rational decision making focused on economic gain by incorporating ego utility into expected utility theory. The study provides theoretical evidence on how ego utility affects information processing and decision-making, suggesting that self-esteem plays a significant role. This work enriches the field of behavioral economics by shedding light on the reasons behind individuals' reluctance to seek relevant information, highlighting the complex relationship between ego utility and information-seeking behavior.

Keywords: ego utility, Bayesian updating, beta distribution, information avoidance
JEL classification: C11, C65, D91

*No conflict of interest: This paper has no conflicts of interest to disclose.

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1. Introduction

1.1. Information avoidance and existed ego utility model

Information avoidance refers to the phenomenon where decision makers often fail to seek relevant information, even when it is widely available, despite numerous studies proving that additional information plays a crucial role in making optimal decisions (Juslin et al. 2000; Grieco and Hogarth 2009; Ryvkin et al. 2012). And Köszegi (2006) modeled such concept by incorporating ego utility into expected utility theory.

Ego utility refers to the satisfaction or pleasure individuals derive from enhancing their self-esteem or ego. In Köszegi's (2006) model, the utility function consists of two components: ego utility and the economic transactions of investments. Köszegi's (2006) model theoretically demonstrates that the presence of ego utility can lead individuals to become overconfident, avoid seeking information, and make sub-optimal investments. The theoretical predictions of the model were empirically examined by Möbius et al. (2022) under the assumption of biased Bayesian updating, which is engaged in biased information processing.

1.2. Ego utility without economic transactions

Köszegi (2006) and Möbius et al. (2022) assume situations where collecting information has instrumental value in economic transactions. However, people often do not seek accurate information or fully understand their situation when no transactions are involved. Moreover, their information processing is influenced by how well they perform. For example, a confident chef may wait for praise, while someone lacking culinary skills might seek immediate feedback.

This situation cannot be explained other by other information avoidance related phenomenon like confirmation bias or cognitive dissonance. Confirmation bias suggests that agents underweight disconfirming evidence and overweight confirming evidence, while cognitive dissonance refers to the natural drive to maintain consistency in thoughts, beliefs, and actions. These explain why people prefer information that justifies their actions and beliefs, but they do not account for the situation where people who believe their performance or abilities are poor are more likely to seek information.

This paper theoretically shows that the situation can be explained by a simple ego utility model. It demonstrates that agents who derive utility from their self-image exhibit measurable biases in information processing, with the extent of bias influenced by the magnitude of their ego utility. Furthermore, although the Bayesian framework (combined with the assumption of a correct prior distribution of beliefs) implies that agents are always unbiased in their beliefs about the underlying parameters determining performance, a rational agent capable of Bayesian updating might not always pursue the optimal set of information, depending on the magnitude of their ego utility.

2. Model

2.1. Model setting

Consider the situation that decision makers first answer questions with objectively clear truth values, like mathematics questions, and then face an option whether to see the results are correct. The whole process is without economic cost or earning. We can see between the first step and the second step, decision makers have anticipatory ego utility (Köszegi 2006) in the form of an increasing function of their subjective expectation of performance. They can gain accurate information about their answering abilities if seeing the results, but correctness can either damage or improve their ego if the correctness is beyond the expectation or not, respectively.

We consider ego utility and assume that decision makers perform Bayesian updating. They form beliefs about the probability of answering correctly by attempting to solve the question. Here, we assume that the prior probability density function of the correct answer, varying with the question's difficulty, is known to the decision makers and follows a unimodal beta distribution. The unimodal distribution is used for two reasons. First, it is considered natural from the widely accepted phenomenon in education and statistics that performance on problems with objectively determined right or wrong answers. Second, the implications of our model generally hold for problems where the prior probability density function of the correct answer is unimodal. Thus, the distribution is defined as follows, where x refers to the probability that people believe their answer is correct:

$$\frac{1}{B(a,b)}x^{a-1}(1-x)^{b-1} \qquad a>1 \text{ and } b>1, \tag{1}$$

2.2. Ego utility description

we take the cumulative distribution function of the probability x, $F(x)$, as the ego utility function. Using the cumulative distribution function as a utility function is supported by various empirical and theoretical research (Van Praag and Kapteyn, 1973; Gregory, 1980; Chen and Novick, 1982). This ego utility function satisfies two conditions:

1. It is a monotonically increasing function with respect to the probability x;
2. For the same value of x, the utility is higher when the question is difficult than when it is easy.

The value of $F(x)$ naturally satisfies the first condition. For the second condition, $F(x)$ is greater when the probability density function of the correct answer is skewed to the left (i.e., when the problem is difficult) than when it is skewed to the right (i.e., when the problem is easy).

3. Analysis and results

3.1. Relationship between ego utility and information seeking

As described in the last section, The prior cumulative distribution function (hereafter, $PriorCDF$) derived from (1) can be written as in (2), where $\mathrm{B_e(x; a, b)}$ is an incomplete beta function.

$$\frac{1}{B(a,b)}\int_0^x t^{a-1}(1-t)^{b-1}dt = \frac{1}{B(a,b)}B_e(x;a,b), \tag{2}$$

To obtain the posterior cumulative distribution function, we first need to consider the posterior probability density function, which depends on whether the person's answer is correct.

Depending on the decision makers check their answer correct or not, the posterior probability density functions can be derived as the following functions (3) and (4), respectively:

$$\frac{a+b}{a}\left[\frac{1}{B(a,b)}x^a(1-x)^{b-1}\right], \tag{3}$$

$$\frac{a+b}{b}\left[\frac{1}{B(a,b)}x^{a-1}(1-x)^{b}\right], \tag{4}$$

Since x represents the probability of being correct, decision makers face the posterior probability density function of (3) with a probability of x and the posterior probability density function of (4) with a probability of $1-x$. Thus, the $PosteriorCDF$ can be obtained:

$$\frac{1}{B(a,b)}B_e(x;a,b) + \frac{1}{(a+b+2)B(a,b)}x^a(1-x)^b\left[\frac{a-b}{ab}+\frac{a+b}{b}(1-x)-\frac{a+b}{a}x\right], \tag{5}$$

Difference between these functions:

$$PosteriorCDF - PriorCDF = \frac{1}{(a+b+2)B(a,b)}x^a(1-x)^b\left[\frac{a-b}{ab}+\frac{a+b}{b}(1-x)-\frac{a+b}{a}x\right], \tag{6}$$

Thus, the difference becomes zero at three points: $x = 0, 1$ and $\mathrm{\frac{a-b+a^2+ab}{(a+b)^2}}$ (hereafter, C).

The fact that the difference becomes zero at $x = 0$ and 1 is obvious because $PosteriorCDF$ and $PriorCDF$ take values of 0 and 1 respectively at each point. But C is contained in the open interval $(0, 1)$ under the assumption of unimodal beta distribution ($a\ and\ b > 1$) since:

$$0 < C = \frac{a-b+a^2+ab}{(a+b)^2} = \frac{(a-1)b+a+a^2}{(a+b)^2} < 1, \tag{7}$$

The denominator is positive, and the numerator is:

$$a-b+a^2+ab = (a+b)^2 + a(1-b) - b(b+1), \tag{8}$$

As $a(1-b)-b(b+1)$ is inferior to 0, $a-b+a^2+ab$ is smaller than $(a+b)^2$. Hence, $C \in (0,1)$.

By differentiating $PosteriorCDF - PriorCDF$ by x, we obtain the following:

$$f^{'}(x) = \frac{1}{(a+b+2)B(a,b)} \frac{(a+b)^2}{ab} x^{a-1}(1-x)^{b-1}\left[ac - (ac+bc+a+1)x + (a+b+1)x^2\right], (9)$$

From $f'(0) = 0$, $f'(1) = 0$, and $f'(C) < 0$, it indicates the difference between $PosteriorCDF$ and $PriorCDF$ becomes positive when decision makers in the range $(0, C)$, so they want to know the answer. For decision makers in the range $[C, 1)$, as this difference becomes negative, they do not want to know the answer. This means people who lack confidence in their answers are more eager to see the solution. Thus, this model can accommodate the situation mentioned in the introduction the worse the performance, the more people want to know the result (the better the performance, the less people want to know the result).

3.2. Comparison with the previous model

Compared to the model in Köszegi (2006), our approach preserves the implications of Köszegi's model while introducing originality.

Köszegi (2006) defined ego utility in association with the cumulative distribution function of the probability of success in investments, determined by a binary function that is 1 if its value is greater than 1/2 and 0 otherwise, while we employed a continuous cumulative distribution function to represent ego utility. This change allows for more precise analysis of the relationship between parameters and decision making without altering the overall implications of the model. By focusing on a continuous cumulative distribution function, we generated originality through enhanced analytical flexibility, particularly in contexts where economic outcomes are not a factor.

if we supposed the Köszegi's (2006) binary ego utility function taking 1 where cumulative distribution function is greater than $1/2$, and 0 otherwise. In this setting, individuals with a $PriorCDF$ below $1/2$, who expect their $PosteriorCDF$ to rise above $1/2$ will end up viewing the solution, as this is the only situation where their ego utility increases. Since their $PriorCDF$ is below 1/2, it is reasonable to assume these individuals lack confidence in their answers. Thus, our model's implications remain consistent with Köszegi's (2006) model.

3.3. Effect of the difficulty of the question

By examine the relationship between the parameters a and b, which determine the prior probability density function of correctness (beta distribution) and C, we can analyze how the difficulty of the question affects people's ego utility and further information seeking. The results of the partial differentiation of C with respect to a and b ($a \; and \; b > 1$) follow:

$$\frac{\partial C}{\partial a} = (a+b)^{-3}[(b-1)a + 3b + b^2] > 0, \qquad (10)$$

$$\frac{\partial C}{\partial b} = (a+b)^{-3}[-a^2 - 3a + (1-a)b] < 0, \qquad (11)$$

An increase in a skews the beta distribution right, indicating easier problems, while an increase in b shifts it left, indicating more difficult problems. Incorrect answers are more common in the b case, increasing the likelihood of avoiding seeing the result.

4. Conclusion and discussion

This study highlights how decision-making is not solely driven by the pursuit of optimal outcomes but is strongly influenced by ego utility, where self-esteem shapes information-seeking behavior. This challenges traditional economic views of rational decision-making, showing that people may avoid accurate information in favor of choices that reinforce their self-image.

Furthermore, we suggest further research in three areas: first, empirical testing to validate the model through experiments on confidence and decision scenarios; second, incorporating individual differences such as personality traits and cognitive abilities for a deeper understanding of behavior; Last, practical applications in fields like education, marketing, and public policy to promote better information-seeking and decision-making strategies. These should improve the robustness and applicability of our behavioral economic model and contribute to a deeper understanding of the relationship between ego utility and decision-making behavior.

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