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## Public and Private Values

Dan Ariely, Anat Bracha, and Jean-Paul L'Huillier

### Abstract:

This paper experimentally examines whether looking at other people's pricing decisions is a type of heuristic—a decisionmaking rule—that people use even when it is not applicable, as in the case of clearly private value goods. We find evidence that this indeed is the case—an individual's valuation of a purely subjective experience under full information, elicited using an incentive compatible mechanism, is highly influence by valuations made by others. This result can shed light on price behavior, price rigidities, and rents.

### JEL Classifications: J64, E24, J11

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## **Introduction**

In many real-life situations before we make our own decisions, we find that it is useful to look at what others have done when they were facing similar choices. For instance, when considering a job offer we might consult others who recently accepted or rejected a related job offer. When purchasing an apartment we might seek information about what prices were paid recently for similar apartments, especially for those transactions taking place in the same neighborhood or even in the same building.

This general strategy is often a very useful one, as many, if not most, of the situations we encounter include some component of common values. This means that relying on others' decisions or on the prices they are willing to pay—as both of these signals convey some relevant information—can be helpful for making our own decisions. While this strategy is often a good one, at times applying it can be inappropriate. One notable example where following others is inappropriate is information cascades, where individuals fail to realize the information externality of their actions (Banerjee 1992; Bikhchandani, Hirshleifer, and Welch 1992; Simonsohn and Ariely 2008). Another instance is Asch's famous "line" experiment (Asch 1951) demonstrating that even in making visual judgments, the majority can influence individual perspectives and decisions, a common result for a range of social behaviors (see Petty and Wegener 1998 for a survey).

In this paper we examine if relying on the behavior of others can also occur in the case of pricing decisions for goods that are private value goods. Specifically, we ask whether looking at other people's pricing decisions is a type of heuristic, meaning a decisionmaking rule, that people over-apply even when this information is not applicable, as in the case of clearly private value goods. We provide experimental evidence showing that bids in private-value auctions indeed depend on the bids made

by others—a relationship we expect to find in common-value but not in private-value auctions.

To ensure purely private value situations and full information we use a novel hedonic stimulus: annoying sounds. This type of experience provides us with an experience that is direct, hedonic<sup>1</sup>, gives participants full information, and importantly is the type of experience that has no externalities and no possible trade. Eliciting values in our experiment is done using an incentive-compatible mechanism, either a BDM (Becker, De Groot, and Marschak 1964) procedure<sup>2</sup> (in stage 1 of the experiment) or a second-price auction (in stage 2 of the experiment). We find that subjective values, or bids, are interrelated in the sense that observing others' past bids has a statistically significant effect on the bids participants subsequently submitted.

One implication of these results is that figuring out how much individuals are willing to pay, even for simple experiences, may be more complex, or less readily available, than we usually consider. As a consequence of this complexity we over-apply the strategy of using others' behavior as a guide and input for our making our own decisions. This tendency may explain some anomalous price behavior and fashion trends.

## **The Experiment**

To make the point that participants' values are interrelated even in a situation of private values with perfect information, no externalities and with no trade, we recruited 45 students at the Massachusetts Institute of Technology. There were two stages, each with 10 rounds, to the experiment; in both stages, and in all rounds, participants bid for listening to an unpleasant tone over a headset. We used this artificial hedonic “good” for the following reasons: (1) we were able to provide subjects with a sample of the tone before they subsequently placed their bid, and as a result create a perfect information situation; (2) this is a purely subjective and personal experience; (3) there are no externalities; (4) there are no trading possibilities; and (5) to avoid a situation in which

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<sup>1</sup> That is, pleasurable and unpleasurable experiences.

<sup>2</sup> A second price auction against a random number.

subjects could solve the pricing problem by drawing on their own experiences. Unpleasant tones are not traded in the marketplace, so our subjects could not refer to similar decisions made outside the laboratory as a basis for their valuation. These aspects of the stimuli enable us to focus on the effect in which we are interested, if it exists (the procedure is similar to Ariely, Lowenstein, and Prelec 2003).

In the experiment we had two stages: in stage 1 we recorded the actual bids of a first group of participants. These bids were then used in stage 2 to study their influence on a second group of participants.

### **Stage 1**

Upon arriving at the lab, at the beginning of stage 1, we explained that the study involves bidding and listening to high-pitched sound. We then explained the bidding procedure—the BDM procedure—a second-price auction against a random number. In our particular case the random number was drawn from a uniform distribution between 5 cents and 95 cents. According to this procedure, if a subject's bid was lower than the number drawn, the subject would win the auction—s/he would listen to the sound and get paid the random number drawn. Otherwise, the subject would not listen to the sound, and would not get paid. This procedure was explained in detail before the start of the experiment, and we stressed its incentive compatibility property, including a few examples to show that bidding one's true value is the optimal strategy. Then subjects listened to the sound on their headphones for 10 seconds, and immediately after this first experience with the unpleasant tone, participants were asked to bid, meaning to state the minimum amount of money they demanded in order to listen to the same tone again (Willingness to Accept or WTA). This pricing procedure was repeated nine times (10 trials). Table 1 presents summary statistics of bids on each trial.

Table 1: Summary Statistics

	<b>Average</b>	<b>S.d.</b>	<b>Min</b>	<b>Max</b>
Trial 1	41	37	0	100
Trial 2	37	34	0	100
Trial 3	36	33	0	100
Trial 4	32	28	0	100
Trial 5	35	33	0	100
Trial 6	31	29	0	100
Trial 7	35	32	0	100
Trial 8	34	31	0	100
Trial 9	34	30	0	100
Trial 10	33	32	0	100
<b>Overall</b>	<b>35</b>	<b>32</b>	<b>0</b>	<b>100</b>

### Selection

Out of the 22 participants in stage 1, 17 subjects gave their consent to use their bids in future auctions; of these 17 participants we retained 12, avoiding bidders who consistently bid extreme values such as zero. The summary statistics of the bids of the 12 selected participants are shown below in table 2.

Table 2: Selection

	<b>Average</b>	<b>S.d.</b>	<b>Min</b>	<b>Max</b>
Trial 1	49	32	5	100
Trial 2	43	27	15	100
Trial 3	42	27	15	95
Trial 4	39	22	10	80
Trial 5	41	28	10	95
Trial 6	38	26	10	80
Trial 7	42	27	5	80
Trial 8	42	26	5	77
Trial 9	40	24	5	77
Trial 10	43	30	1	90
<b>Overall</b>	<b>42</b>	<b>26</b>	<b>1</b>	<b>100</b>

We then sorted the selected bids in each trial from low value to high value, and used the four lowest and four highest bids in each trial for the LOW and HIGH treatment of stage 2, as is explained next.

## Stage 2

Stage 2 was similar to stage 1: participants were asked to bid the amount they were willing to accept for listening to the same unpleasant high-pitched tone on a headset. As in stage 1, participants were first exposed to the tone, and only then asked to place a bid. However, in stage 2 subjects participated in a second-price auction, instead of the BDM procedure used in Stage 1. In the instructions, the notion of a second-price auction was explained, and it was stressed that it is an incentive compatible mechanism, meaning that the participants' best strategy is to bid their true value. Subjects were told they would participate in several trials of a second-price auction against four other bidders, and that these subjects had already placed their bids a few days earlier. The instructions followed: "In order to become familiar with the task, bids in the first round will be displayed to you momentarily . . . you will start bidding only in the second round."

Hence, starting in the second round subjects were asked to place their bid, meaning to state the minimum amount of money they would accept (their price) in order to listen to the same tone again (WTA). If the subject won the auction, she listened to the tone and earned the second-lowest bid in the auction (equal or greater than her bid). After each auction, the other four bids were shown to the subject. This procedure was repeated nine times, to complete 10 trials.

We had two treatments, HIGH and LOW: in each trial subjects participated in a second-price auction against either the four highest (HIGH treatment) or four lowest (LOW treatment) bids of retained bids for the same trial in stage 1. For example, in the first trial the participating bids in the HIGH treatment were [100, 99, 60, 80], and in the LOW treatment were [20, 25, 5, 20]. In subsequent trials (trial 2 through 10) the set of bids retained from stage 1 in each treatment (HIGH and LOW) was very similar to the bids shown above.

At the end of stage 2 we requested feedback by asking the subjects what was their bidding strategy. Out of the 23 participants who participated in stage 2, one indicated

s/he did not understand the auction and was confused. Another indicated s/he was testing the program to see whether the study was for real by, for instance, bidding 500 in one trial. As a result, we excluded these two participants when analyzing the data.

The results of Stage 2 are shown in figure 1 with mean bids in HIGH and LOW treatments, and table 3 showing these differences are significant in all trials ( $p < .03$ ).

Figure 1: Main Results

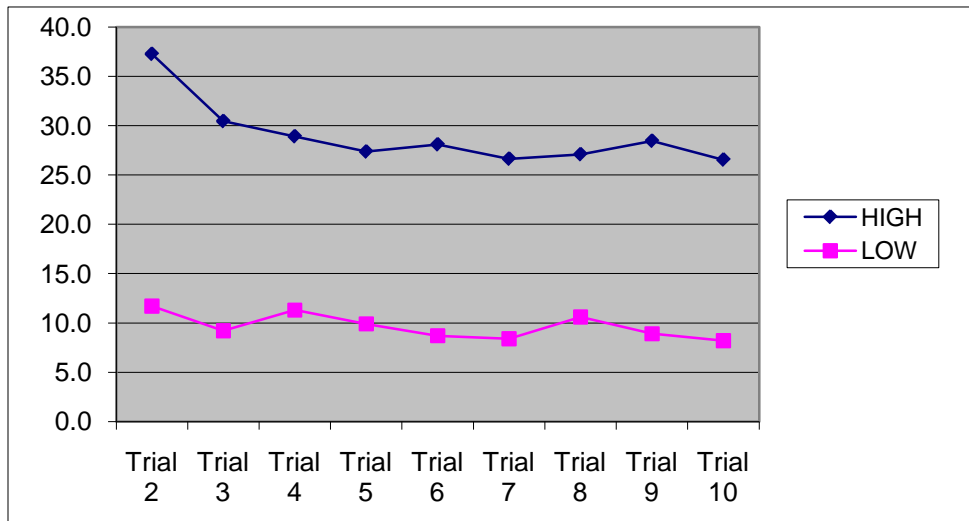


Table 3: Main Results

	<b>HIGH</b>	<b>LOW</b>	p-val
Trial 2	37.3	11.7	0.022
Trial 3	30.5	9.2	0.015
Trial 4	28.9	11.3	0.027
Trial 5	27.4	9.9	0.015
Trial 6	28.1	8.7	0.009
Trial 7	26.6	8.4	0.011
Trial 8	27.1	10.6	0.025
Trial 9	28.5	8.9	0.010
Trial 10	26.5	8.2	0.019
<b>Overall</b>	<b>28.97</b>	<b>9.65</b>	



## Discussion

Our question is whether looking at other people's pricing decisions is a type of heuristic, a decision rule that people over-apply even when it is not appropriate, as in the case of clearly private value goods. We find evidence that this is indeed the case—an individual's valuation of a purely subjective experience is highly influenced by the value others place on a similar experience. These results might be useful when thinking about value formation and pricing in actual markets. If the valuations of others affect an individual's valuation this can lead to rigidities (of price or quantities), and seemingly create a common value even in the absence of one, as in the case of fashion trends. This adds an aspect to firm-consumer interactions and gives an additional explanation as for why firms hire experts or public-opinion shapers. Beyond the role of information, firms may hire experts or public-opinion shapers to *generate* consumers' value and, in turn, economic rents. This view of interrelated private valuations not only has interesting industrial organization and marketing implications and applications, as described above, but also has macroeconomics effects. For instance, interrelated private valuations can help explain the origins of nominal rigidities: those consumers who cannot translate their subjective valuation into monetary units, as is the case in our experiment, may rely on the prices others are willing to pay. In such a case prices will be sticky.

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