Perception of Initial Uncertainty as a Determinant of Information Value

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This paper reports on an experiment which addresses subjects' perception of the effect on information value of the degree of uncertainty in the prior state probability distribution in a particular decision setting. As in the preceding paper (see Hilton, Swieringa, and Hoskin [1981]), we used an experimental setting which separates the processes of decision making and information evaluation. The next section discusses briefly the concept of degree of uncertainty and its functional relationship with information value. The following sections describe our experiment, present the results obtained, and discuss some of their implications.

Degree of Uncertainty

Rothschild and Stiglitz [1970] developed three criteria which induce equivalent partial orderings over probability distributions with respect to degree of uncertainty. Specifically, $p_1(z_1)$ exhibits greater uncertainty than $p_2(z_2)$ if $E(Z_1) = E(Z_2)$, and the following three equivalent statements hold: (i) All risk averters prefer $Z_2$ to $Z_1$. (ii) $Z_1$ is equal to $Z_2$ plus noise. (iii) $Z_1$ has more weight in the tails than $Z_2$.

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1 See Hilton, Swieringa, and Hoskin [1981], which precedes this paper, for a discussion of why this is important.

2 The meaning of (i) is clear. To understand (ii), consider the random variable, $Z$, which has the property that $E(Z/Z_2) = 0$ for all $Z_2$. Now let $p_1(z_1) = p_1(z_2 + z)$. This does not...
A decision problem is characterized by a mapping from action-state pairs to outcomes (e.g., money). The prior state probability distribution thereby induces a probability distribution over outcomes which is unique for each action. A partial ordering of decision problems, with respect to the degree of initial uncertainty in the outcome distribution, may be based on the Rothschild-Stiglitz notion of relative uncertainty. Decision problem I has greater initial uncertainty than decision problem II if the probability distribution over outcomes induced by the prior state distribution in problem I has greater uncertainty than that in problem II for every available action.  

Although initial uncertainty is an important determinant of information value (see, e.g., Gould [1974] or Hilton [1979]), there exists no general monotonic relationship between the two across decision problems (see Gould [1974]). However, such a monotonic relationship may exist, in either direction, in a specific decision problem, and in our experiment, a decision problem was specified wherein information value was increasing in the degree of initial uncertainty. The study focuses on subjects’ perceptions of this functional relationship.

**Method**

**Subjects**

The subjects (Ss) were 54 MBA students in a Graduate School of Business, who were guaranteed a minimum of $3.00 and were provided with an opportunity to earn as much as $20.00 for roughly one hour of their time. Payments to subjects ranged from $3.00 to $6.87 with a mean of $5.07. Subjects spent an average of 44 minutes for the entire session and an average of 25 minutes for the actual trials.

Ss were randomly assigned to one experimental and one control group.
The typical subject was about 24 years old, was concentrating in accounting, finance, or marketing, and had completed at least one course in statistics. Half were first-year MBA students and half were second-year MBA students.

**TASK**

The experimental method was identical to that used in our other paper, with Ss performing the task interactively with the computer. As before, Ss’ role was that of information evaluator (IE), while the computer performed the decision maker’s (DM) action selection function. Ss faced a series of binary information purchase decisions concerning information to be supplied to the DM for the action selection decision. The IE and DM shared the task of maximizing expected monetary value.

**ACTION SELECTION PROBLEM**

The action selection problem solved by the DM was fully described to Ss and was similar to that used by Uecker [1978]. Imagine 100 urns, each of which contains a large number of marbles, some white and some black. The urns are of three types: 70%B, 50%B, and 30%B, where a type X%B urn contains X% black marbles. An urn is selected randomly by a program in the computer, and the DM’s task is to guess whether the selected urn is a type 70%B or a type 30%B urn. The DM is not allowed to guess type 50%B (i.e., this is an infeasible action). The DM’s guess (action) and the true urn type (state) determine the pecuniary payoff (outcome) to the IE-DM team. Thus the payoff table for the DM’s action selection problem is as shown in table 1.

On a given experimental trial, the prior probability of each state (i.e., selected urn’s type), depended on the relative number of each type of urn from which the computer selected. These numbers of urn types varied across trials and were chosen from the set shown in table 2. Note that the degree of initial uncertainty in the action selection problem is greater for experimental condition i than for condition $i - 1, i \in \{2, 3, 4, 5, 6\}$.

**INFORMATION PURCHASE DECISION**

Before the DM made each action selection decision (guess of selected urn’s type), each subject had the option to purchase or refuse information at a specified price for the DM to use. The information, if purchased,
TABLE 1

<table>
<thead>
<tr>
<th>States</th>
<th>70% B</th>
<th>50% B</th>
<th>30% B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70% B</td>
<td>$10.00</td>
<td>$3.33</td>
<td>$-3.33</td>
</tr>
<tr>
<td>50% B</td>
<td></td>
<td></td>
<td>INFEASIBLE ACTION</td>
</tr>
<tr>
<td>30% B</td>
<td>$-3.33</td>
<td>$3.33</td>
<td>$10.00</td>
</tr>
</tbody>
</table>

TABLE 2

<table>
<thead>
<tr>
<th>Experimental Condition</th>
<th>70% B</th>
<th>50% B</th>
<th>30% B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>96</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>78</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>5</td>
<td>38</td>
<td>24</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>47</td>
<td>6</td>
<td>47</td>
</tr>
</tbody>
</table>

would be a draw with replacement of ten marbles from the randomly selected urn. The prior state distribution and price of the sample were systematically varied across experimental trials to determine the subject’s perceived value for the sample under various conditions of initial uncertainty in the problem. A subject’s perceived value for the sample under each condition of initial uncertainty was taken to be the average of the highest price for which the sample was purchased under that experimental condition and the lowest price for which it was refused under that condition.

A new urn was selected by the computer on each trial so that the urn type in one trial provided no information about the urn type on a subsequent trial. The net earnings of the IE-DM team on a given trial were the payoff from the DM’s action selection minus the price paid by the subject for information if the subject decided to purchase information. The IE-DM team was given an initial stake of $80.00. Information purchases were allowed on a trial even if the team’s cumulative net earnings at that point were insufficient to cover the purchase, in which case the team effectively borrowed the purchase price. As an incentive, each subject was paid the maximum of $3.00 or 2 percent of his team’s cumulative wealth at the conclusion of the experiment.8

8 Ss were asked a series of four multiple choice questions to check their understanding of the written instructions. Incorrect answers were followed by a correction, and Ss completed two practice trials prior to the actual experimental trials. In addition to the written instructions, Ss were told that calculators were not allowed, but that manual calculations were permissible. Nevertheless, Ss were encouraged to evaluate information using intuition and judgment since the study’s focus was perception of initial uncertainty as an information value determinant, not calculating ability. Ss were cautioned not to discuss the study with anyone prior to the experiment’s conclusion.
SEQUENCE OF EXPERIMENTAL TRIALS

Ss faced information purchase decisions in connection with the DM's action selection problem under each of the experimental conditions of initial uncertainty given above. Each level of initial uncertainty was used on several experimental trials. For each uncertainty level, the sample information was offered to the Ss at several different prices.

The sequence of prices for each uncertainty level was generated by a computer algorithm. The price sequence was thereby tailored to the subject's responses, and each price satisfied the following condition:

\[ P_{ij} \in (Q_{ij}, D_{ij}) \]  

where

- \( P_{ij} \) denotes the price quoted on the \( i \)th trial in which initial uncertainty level \( j \) was used;
- \( Q_{ij}(D_{ij}) \) denotes the maximum (minimum) price, prior to the \( i \)th trial for uncertainty level \( j \), for which the subject purchased (refused) the information.

Ss were told that the price sequence was independent across trials and an elaborate algorithm was employed by which the computer determined price sequences consistent with expression (1), but in such a way as to preclude detection by Ss of a price dependency.\(^9\)

Given independence among information prices in the sequence of trials, the optimal purchase decision was to purchase (refuse) information if its quoted price was less (greater) than the normative value, given the initial uncertainty level used on a particular trial. The normative vector of information values for uncertainty levels \{1, 2, \ldots, 6\} is \($0.21, $1.18, $2.14, $3.10, $4.06, $5.03$). Note that in this particular decision setting, as initial uncertainty increases, information value increases.

EXPERIMENTAL DESIGN

The design used 27 Ss in an experimental group and 27 in a control group. Ss assigned to the experimental group received feedback on each trial, which included the sample composition (if purchased), the DM's action, the true state, the team's payoff, the team's cumulative earnings, and the subject's share of the team's cumulative earnings. Normatively, this feedback should not have affected the subject's subsequent information purchase decisions. However, to isolate the effects of this feedback, Ss assigned to the control group performed the task without receiving feedback about the outcome of the DM's action selection decision. These Ss knew only the initial uncertainty level and information

\(^9\)See our preceding paper for a more detailed discussion of the algorithm. A precise description of the algorithm is available from the authors upon request.
price on a given trial. Ss in the control group received the remaining feedback information only at the conclusion of the experiment.\textsuperscript{10}

Ss were assumed to be risk-neutral. We checked this assumption, by administering a posttest to elicit Ss' utility functions over the range 0 to $100. The results of this posttest were then used to assign Ss to risk-neutral and non-risk-neutral groups.\textsuperscript{11} Table 3 shows the cell sizes for each treatment group.

Results

A vector of perceived information values under six levels of initial uncertainty was deduced from each subject's binary purchase decisions. A two-way multivariate analysis of variance (MANOVA) revealed that the effect of initial uncertainty on information value did not differ significantly between Ss who received feedback and those who did not receive feedback ($F = .56, df = (6, 45), p > .25$) or between Ss who were classified as risk-neutral and non-risk-neutral ($F = .70, df = (6, 45), p > .25$). There also was no significant feedback and risk attitude interaction ($F = .68, df = (6, 45), p > .25$).\textsuperscript{12} Based on these results, Ss in all four treatment groups were pooled in subsequent analyses.\textsuperscript{13} Table 4 (panel A) gives the perceived information value centroids for various subsets of the subject population.

Hotelling's $T^2$ statistic was used to test the null hypothesis of no difference between the mean perceived information value vector and the normative vector against the alternative that a difference exists:

\[
H_0 : \bar{V}_0 = N \\
H_1 : \bar{V}_0 \neq N
\]

where $\bar{V}_0$ denotes the vector of mean elicited values across all 54 subjects and $N$ denotes the normative vector of information values. On average, \textsuperscript{10} Subjects receiving feedback on each trial spent an average of 30 minutes for the actual trials. Subjects not receiving feedback on each trial spent an average of 40 minutes for the entire session and an average of 20 minutes for the actual trials.

\textsuperscript{11} The utility classification procedure used is described in our preceding paper. In effect, Ss were classified as non-risk-neutral if (1) either a quadratic or cubic regression provided a significantly (at the .05 level) better fit for the subject's elicited utility function than a linear regression, or (2) if the linear regression was insignificant (.05 level) in explaining the subject's utility function.

\textsuperscript{12} Since MANOVA results can be sensitive to unequal cell sizes, we also ran MANOVA with equal cell sizes of 12 after deleting Ss randomly from three of the cells. The results were consistent with those reported here.

\textsuperscript{13} A split-half internal replication was used to assess the internal validity of the elicited demand values. Half of the subjects in each of the four treatment groups were randomly assigned to a replication sample, and a replication treatment was included with the feedback and risk attitude treatments in a three-way multivariate analysis of variance. The main effect for the replication treatment was not significant ($F = .52, df = (6, 41), p > .25$) nor were the two-way and three-way interactions of the replication treatment with the feedback and risk attitude treatments ($F = .93, df = (6, 41), p > .25$).
**TABLE 3**  
Feedback  No Feedback

<table>
<thead>
<tr>
<th></th>
<th>Feedback</th>
<th>No Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk-neutral</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Non-risk-neutral</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

**TABLE 4**  
Means for $V$ and $V_p$ for Various Subsets of the Subject Population

<table>
<thead>
<tr>
<th>Group</th>
<th>NS</th>
<th>$V_1$</th>
<th>$V_2$</th>
<th>$V_3$</th>
<th>$V_4$</th>
<th>$V_5$</th>
<th>$V_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>54</td>
<td>.91</td>
<td>2.11</td>
<td>2.80</td>
<td>3.72</td>
<td>4.35</td>
<td>5.07</td>
</tr>
<tr>
<td>$F, RN$</td>
<td>12</td>
<td>.63</td>
<td>2.38</td>
<td>2.77</td>
<td>3.52</td>
<td>4.34</td>
<td>4.58</td>
</tr>
<tr>
<td>$NF, RN$</td>
<td>14</td>
<td>1.13</td>
<td>2.42</td>
<td>3.57</td>
<td>3.89</td>
<td>4.46</td>
<td>5.58</td>
</tr>
<tr>
<td>$F, NRN$</td>
<td>15</td>
<td>.76</td>
<td>1.79</td>
<td>2.49</td>
<td>3.80</td>
<td>4.79</td>
<td>5.75</td>
</tr>
<tr>
<td>$NF, NRN$</td>
<td>13</td>
<td>1.11</td>
<td>1.88</td>
<td>2.35</td>
<td>3.63</td>
<td>3.74</td>
<td>4.19</td>
</tr>
</tbody>
</table>

Clstr. gr. 1  27  .47  1.37  1.79  2.30  2.99  3.31

B Clstr. gr. 2  14  .45  1.45  2.63  4.74  5.53  7.72

Clstr. gr. 3  13  2.32  4.34  5.08  5.57  5.91  5.87

<table>
<thead>
<tr>
<th>Group</th>
<th>NS</th>
<th>$V_{p1}$</th>
<th>$V_{p2}$</th>
<th>$V_{p3}$</th>
<th>$V_{p4}$</th>
<th>$V_{p5}$</th>
<th>$V_{p6}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>54</td>
<td>.67</td>
<td>1.23</td>
<td>1.74</td>
<td>2.54</td>
<td>3.23</td>
<td>4.34</td>
</tr>
</tbody>
</table>
| Clstr. gr. 1 27  .44  1.00  1.48  2.20  2.80  3.84

C Clstr. gr. 2  14  .32  .90  1.46  2.64  3.59  5.35

Clstr. gr. 3  13  1.70  2.24  2.76  3.29  3.87  4.33

$F$-feedback,  
$NF$-no feedback,  
$RN$-risk-neutral,  
$NRN$-not risk-neutral.  
$V_f$-mean across $V_f$ for all $i$ in some subset of the subject population.  
$V_{p_i}$-mean across $V_{p_i}$ (i.e., information values elicited on postexperimental questionnaires) for all $i$ in some subset of the subject population.  
$NS$-number of subjects in group.

Ss' perceptions of the effect of initial uncertainty on information value differed significantly from the normative relationship ($T^2 = 22.82$ or $F = 3.44$, $df = (6, 48)$, $.005 < p < .01$).

To investigate the observed differences in more detail, a cluster analysis was performed on the 54 information value vectors to form relatively homogeneous subgroups of Ss. Three cluster groups were identified and the centroids for each group are presented in table 4 (panel B).  

14 The MIKCA cluster analysis routine was used to form the three groups (See McRae [1970]). The criterion used was minimization of trace $W$ (i.e., minimization of the sum of squared deviations of the observations from their cluster centers), and the distance metric used was Mahalanobis' $D^2$. See Green [1978]. Several cluster analyses were run, each with a different number of cluster groups. We plotted the centroids of each cluster group for each level of cluster analysis and chose the highest clustering level for which there was an apparent improvement in distinguishing among groups of relatively homogeneous observations. A three-group level was chosen.

15 The three cluster groups did not differ significantly in the proportion of feedback subjects ($X^2 = 2.54$, $df = 2$, $.25 < p < .50$), of risk-neutral ($X^2 = 3.229$, $df = 2$, $.10 < p < .25$) or of subjects with monotonic value functions ($X^2 = 3.03$, $df = 2$, $.10 < p < .25$).
ing’s $T^2$ test was used to test the following sets of hypotheses:

\[ H_0: \bar{V}_i = N, \ i = 1, 2, 3 \]
\[ H_1: \bar{V}_i \neq N, \ i = 1, 2, 3 \]

where $\bar{V}_i$ denotes the centroid of the $i$th cluster group. All three null hypotheses were rejected at the .025 level of significance or better. (Group 1: $T^2 = 25.81$ or $F = 3.47$, df = (6, 21), .01 < $p$ < .025; Group 2: $T^2 = 90.67$ or $F = 9.30$, df = (6, 8), .001 < $p$ < .005; Group 3: $T^2 = 57.02$ or $F = 5.54$, df = (6, 7), .01 < $p$ < .025). Ss in cluster group 1 overvalued information at low levels of initial uncertainty, but undervalued information at high levels of initial uncertainty. Ss in cluster groups 2 and 3 consistently overvalued information across levels of initial uncertainty.\(^\text{16}\)

To determine whether the amount by which Ss over- or undervalued information was relatively constant across levels of initial uncertainty, we analyzed the first difference (denoted $V_{ij}$) between the $i$th subject’s perceived information values for the $j$th and $(j + 1)$st levels of initial uncertainty. Let $\bar{V}_i$ denote the $i$th group’s centroid of first differences (where $i = 0$ denotes the entire population of 54 Ss and $i = 1, 2, 3$ denotes cluster group $i$). Table 5 presents these group centroids. Hotelling’s $T^2$ statistic was used to test the following sets of hypotheses:

\[ H_{0i}: \bar{V}_i' = N', \ i = 0, 1, 2, 3 \]
\[ H_{1i}: \bar{V}_i' \neq N', \ i = 0, 1, 2, 3 \]

where $N'$ denotes the vector of first differences in the normative information values. The null hypothesis for the population was not rejected ($T^2 = 6.87$ or $F = 1.27$, df = (5, 49), $p > .25$), nor was it rejected for group 3 ($T^2 = 16.31$ or $F = 2.18$, df = (5, 8), .10 < $p$ < .25). It was rejected for group 1 ($T^2 = 52.82$ or $F = 8.94$, df = (5, 22), $p < .001$) and for group 2 ($T^2 = 48.45$ or $F = 6.71$, df = (5, 9), .005 < $p$ < .01). On an individual basis, no subject came close to the rather constant marginal increments in information value across levels of initial uncertainty.

We also performed a two-group discriminant analysis for each of the 27 feedback Ss. Five models (see table 6) were estimated and then compared using a models comparison approach (Green [1978]). Model 1 included most of the independent variables which were available and might influence each feedback subject’s purchase decision. Model 2 was used to test the significance of $E_{t-1}$, the cumulative earnings variable, as

\(^{16}\) A postexperimental questionnaire asked the subjects to estimate the value of the ten-marble sample under each of the six levels of initial uncertainty. A two-way MANOVA revealed no significant main effects of feedback ($F = .85$, df = (6, 40), $p > .25$) or risk attitude ($F = .58$, df = (6, 40), $p > .25$) and no significant feedback $\times$ risk attitude interaction ($F = 1.51$, df = (6, 40), $p > .20$). The results were not sensitive to unequal cell sizes. All but two subjects’ postexperimental questionnaire value vectors were monotonically increasing in the degree of initial uncertainty. Centroids for the population and the cluster groups are reported in table 3 (panel C).
TABLE 5
Means for V for Entire Subject Population and Cluster Groups

<table>
<thead>
<tr>
<th>Normative</th>
<th>.97</th>
<th>.96</th>
<th>.96</th>
<th>.96</th>
<th>.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2 - V1</td>
<td>1.20</td>
<td>.69</td>
<td>.92</td>
<td>.63</td>
<td>.72</td>
</tr>
<tr>
<td>V3 - V2</td>
<td>.90</td>
<td>.42</td>
<td>.51</td>
<td>.68</td>
<td>.32</td>
</tr>
<tr>
<td>V4 - V3</td>
<td>1.28</td>
<td>.94</td>
<td>2.18</td>
<td>.71</td>
<td>2.17</td>
</tr>
<tr>
<td>V5 - V4</td>
<td>1.72</td>
<td>.99</td>
<td>.42</td>
<td>.43</td>
<td>.02</td>
</tr>
</tbody>
</table>

TABLE 6
Discriminant and Normative Models Ranked by Classification Accuracy

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent Variables</th>
<th>T</th>
<th>M</th>
<th>B</th>
<th>Average Percent Correctly Classified</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IU, I, P, C_{t-1}</td>
<td>24</td>
<td>3</td>
<td>0</td>
<td>84%</td>
</tr>
<tr>
<td>2</td>
<td>IU, I, P, C_{t-1}</td>
<td>22</td>
<td>4</td>
<td>1</td>
<td>82%</td>
</tr>
<tr>
<td>3</td>
<td>C_{t-1}, R_{t-1}</td>
<td>0</td>
<td>1</td>
<td>26</td>
<td>62%</td>
</tr>
<tr>
<td>4</td>
<td>IU, P, C_{t-1}</td>
<td>6</td>
<td>21</td>
<td>0</td>
<td>80%</td>
</tr>
<tr>
<td>5</td>
<td>IU, P, C_{t-1}, R_{t-1}</td>
<td>12</td>
<td>15</td>
<td>0</td>
<td>81%</td>
</tr>
<tr>
<td>6</td>
<td>Normative Model</td>
<td>0</td>
<td>0</td>
<td>27</td>
<td>57%</td>
</tr>
</tbody>
</table>

T, M, B denotes top, middle, and bottom, respectively.

R_t denotes the subject’s purchase response on trial t.

(N, Y) I_t denotes the number of trials prior to t in which the subject faced uncertainty level IU_t.
P_t denotes the price quoted on trial t.

C_{t-1} if the DM guessed incorrectly (correctly) on trial t - 1.

q_{t-1} denotes the team’s payoff on trial t - 1.

E_{t-1} denotes the team’s cumulative earnings at the conclusion of trial t - 1.

IU_t denotes the initial uncertainty level on trial t. This was defined in the discriminant functions by five 

a variable which explains Ss’ information purchase decisions. Model 3 was included as a plausible naive model for the Ss’ decision. An IE might purchase information on trial t if information was purchased on trial t-1 and the DM guessed correctly, or information was refused on trial t-1 and the DM guessed incorrectly. Similarly, the subject might refuse on trial t if the DM guessed correctly on trial t-1 without information, or guessed incorrectly on trial t-1 with information. Model 4 was included since the normative solution to the information purchase decision is to purchase (refuse) a sample if the quoted price is less (greater) than the normative value. Model 5 was estimated since it combines the independent variables from models 3 and 4.

After estimating each of these five discriminant functions for each subject, each function was used to classify the subject’s responses on which the function was built. The result was a proportion of correctly classified responses for each model for each subject. Each subject’s
responses also were classified according to the normative model (i.e., buy only when the normative value exceeds the quoted price). The normative model was denoted model 6. The six models were then ranked for each subject according to their relative ability to classify the subject’s responses.\footnote{When ties occurred, both models were ranked at the lower of the next two available ranks.}

Table 6 shows the number of times each model was ranked among the top, middle, and bottom two prediction models, respectively. Models 1 and 2 were the best discriminators for most subjects and models 3 and 6 were the worst. These results are not too surprising since models 1 and 2 included most of the variables and models 3 and 6 were the naive model and normative model, respectively.\footnote{$F$ tests were also performed to determine whether model 1 provided significantly better discriminatory ability than models 2, 3, 4, and 5. Model 1 was significantly better (at the .05 level) than model 2 for only three subjects but was better than models 3, 4, and 5 for over 85 percent of the subjects.} Table 6 also shows the average (across Ss) of correctly classified responses. Model 4, which included only the variables for the price quoted on trial $t$ and initial uncertainty level on trial $t$, on average correctly classified 80 percent of the responses. Models 5, 2, and 1, which included additional variables measured at trial $t$-1, performed only marginally better.

We also analyzed the proportion of Ss for whom the related discriminant function coefficient for each independent variable in model 1 had a sign such that an increase in the independent variable meant a greater likelihood of the information purchase decision being positive. Information price was the only variable which had a relatively consistent effect on the purchase decision. For 94 percent of the Ss, a price increase had a negative effect on the information purchase decision. For only 50 to 60 percent of the Ss did the other variables in model 1 have signs which implied a consistent effect on the information purchase decision.

Discussion

The results of this study differ from those of our previous study in several important ways. First, in contrast with our previous results, this study found that Ss’ pooled perceptions of the effect of initial uncertainty on information value were significantly different, on average, from the normative relationship. Second, a smaller percentage of the Ss in this study (about 20 percent versus 33 percent before) correctly perceived that information value was monotonically increasing in the degree of initial uncertainty in this particular decision setting. Third, the homogeneous groups identified in this study could not be classified as overvaluers, undervaluers, and those who approximated the normative relationship. Misperceptions appear to have been more complex than such a simple classification would permit.
These results suggest that it may have been more difficult for Ss to perceive correctly the functional relationship between initial uncertainty and information value than it was for Ss to perceive correctly the functional relationship between accuracy and information value. Fundamental differences exist between how information accuracy and initial uncertainty affect information value. Information accuracy is an information system characteristic, whereas initial uncertainty is an "extrasystem" determinant (i.e., an attribute of the decision setting rather than the information system). In addition, information value always monotonically increases (or at least does not decrease) with increases in information accuracy. However, information value may or may not be monotonically increasing with increases in initial uncertainty, depending on the decision context. These and other factors may make it more difficult for IEs to intuitively perceive the effects of initial uncertainty on information value. As a consequence, IEs may need more training on the effects of the decision setting on information value.

This study was conducted in a simple and abstract setting, so the results are subject to the caveats usually associated with laboratory experiments using student subjects.\textsuperscript{19} As in the earlier study, subjects indicated that they understood the task well, that they understood Bayesian probability revision and expected value maximization reasonably well, and that the task was interesting and not particularly difficult or unrealistic.\textsuperscript{20}

REFERENCES


\textsuperscript{19} See American Accounting Association [1972, pp. 455–70] for a discussion of these caveats.

\textsuperscript{20} A summary of the subjects' responses for the postexperimental questionnaire is available from the authors.