

Searching for information in a time-pressured setting: experiences with a Text-based and an Image-based decision support system

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Abstract

Searching for the right information and making quick, accurate decisions within time-pressured settings is often non-trivial. We contrast the relative efficacies of written English (Text) and a more concise, compact communication mode (Image) for information search and decision making by using a financial incentive scheme to apply implicit time pressure on subjects. We found that, while Image users earned as much as Text users, they achieved this earnings parity by following speedier but less accurate strategies. We conclude with thoughts on possible refinements to our work that could steer subjects in the ideal direction of fast, accurate, lucrative decisions with languages like Image.

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1. Introduction

Searching for information is routine in many decision-making situations. Prior research (e.g., Refs. [1,8]) has discussed practices relating to the acquisition and use of information in organizations. Ackoff

[1] suggests that managers typically suffer from a shortage of decision-relevant information and a simultaneous overabundance of irrelevant information. Feldman and March [8] observe that organizations over-invest in information generally, while also gathering additional information when specific, important decisions are in prospect. These observations, unfortunately, still hold true in today's internet-worked business enterprises.

Sometimes, information search must be performed in a sequential manner. The decision-maker (DM) relies on the outcomes of prior search efforts to either guide subsequent search direction or cease

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information acquisition and begin decision making. Often, a DM is also faced with a time bound with added incentives for earlier decision task completion. Incentives may directly accrue to the DM (e.g., a cash bonus) or may be indirect (e.g., the firm involved snags a lucrative order). The compulsion to not merely meet, but to beat, a pre-defined time-bound could result in the creation of “time pressure”.

Acquiring decision support information is subject to costly errors of two kinds: over-acquiring and incurring excessive informational costs; and under-acquiring and incurring excessive risks of decisional error. The presence of time pressure could exacerbate either kind of error, particularly the latter. To mitigate such errors, a DM must implement an effective “information gathering and decision making strategy” that would also account for any resource constraints (e.g., a time bound) and incentive mechanisms (e.g., a reward/penalty for early/tardy completion) in place. In some circumstances, a DM must devise and implement an appropriate strategy in real time. In others, suitable strategies have already been defined—the DM must learn/memorize, store, recall and implement the appropriate strategy. As a third possibility, a DM may opt or be forced to pursue both strategies. An instance is when the DM attempts recalling and implementing a pre-defined strategy but resorts to improvising/innovating when the attempt fails.

Our interest here lies primarily in the kind of scenario just exemplified. In such situations, both the means and the times available for strategy learning, storage, subsequent recollection and application influence how successful a DM is at ensuing decision making episodes. With such considerations in mind, in this paper, we examine the impacts of two different information sources, direct monetary incentives and induced time pressure on a DM’s ability to learn, recall and apply predefined information gathering and decision making strategies. Each predefined strategy is an optimal strategy defined for a particular situation. Many such optimal strategies, applicable in different circumstances, are made available for study beforehand. Thereafter, instances of such circumstances are randomly generated and the DM must either recall and apply the appropriate strategy or devise a strategy that could be sub-

optimal. As such, the strategy applied would either converge with the optimal one or deviate from it to some degree. We use the extent of deviation and the decision-making time to determine the reward/penalty that accrues to the DM.

Our focus in this work is on two kinds of information sources for providing decision support information: conventional, written English text and a special, symbolic language that we have devised, called “Image” (where “Image” does not necessarily connote “iconic”). The efficacy of a symbolic alternative to English for factual information recall in a time-pressured, incentive-driven setting was first reported in Marsden, Pakath and Wibowo [15–17]. Our work is an extension in that we focus on both factual information recall and information search/purchase strategy recall in such a setting.

Our interest in examining an alternative to written English for such tasks is based on the following considerations. Written English dominates much of human–computer interaction but some of its features could manifest themselves as drawbacks in specific communication settings. First, English must usually be processed word by word, sequentially, from left to right and top to down. A suitably constructed language that relaxes either or both of these requirements, to whatever extent possible and feasible given a particular communication context, could result in speedier information processing. Second, English is amongst the most complex of languages with exceptions to its rules being considerably more in number than the rules themselves. A recent research study [19] argues that this complexity could be why there are twice as many identified dyslexics in English-speaking countries than in those (e.g., Italy, Spain, Finland, (the former) Czechoslovakia and Japan) with a one-to-one relationship between letters and sounds. Likewise, in a visual medium, a language with just a single interpretation for each of its constructs should result in enhanced comprehension speed and precision. This feature is especially desirable in today’s largely multi-cultural, global, business and social exchanges. Third, business telecommunication is increasingly shifting to mobile devices (like palmtops and web phones) that tend to have smaller displays than conventional laptop, desktop, and larger equipment. Yet, the use of mobile gadgets like web phones in the US lags

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