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How measurement framing and accounting information system evaluation mode influence environmental performance judgments☆

Hank C. Alewine *, Christopher D. Allport, Wei-Cheng Milton Shen

College of Business Administration, University of Alabama in Huntsville, Huntsville, AL 35899

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ABSTRACT

How does information presentation within an accounting information system (AIS) influence environmental performance judgments? Decision makers generally analyze alternatives' performances in one of two evaluation modes: jointly or separately. Joint mode provides greater measure evaluability because of available comparisons between alternates. Thus, additional information garners greater decision weight in separate mode, where less contextual information exists. However, many environmental decision settings use separate evaluation mode because of no viable alternatives (e.g., large pollution abatement investments). In this setting, General Evaluability Theory (GET; Hsee and Zhang, 2010) suggests low measurement evaluability when low measurement knowledge and non-inherently understood measures exist—both common characteristics in environmental settings. This study introduces attribute framing to the GET framework as important to consider when analyzing environmental decision differences across modes, because frames are often a necessary component of information presentation and different descriptions often lead to different decisions (Dunegan, 1993). Experimental participants ($n = 206$) evaluated factory environmental performances with joint/separate mode and positive/negative attribute framing. Findings inform AIS designers as results suggest evaluation mode moderates the presentation of attribute frames on decisions. Specifically, higher (lower) evaluations occur when using positive (negative) framing, and this effect is more (less) pronounced in separate (joint) mode. Findings also suggest that more consistent judgments occur across evaluation mode with positive compared to negative framing of performance measures.

1. Introduction

Accounting information systems (AIS) are designed to collect and store data and to present this data to decision makers as relevant and reliable information (Romney and Steinbart, 2015). Decision makers evaluate this information in a wide range of organizational settings. Increasingly, AIS data matrices are expected to include nontraditional, nonfinancial, and relatively unfamiliar measurements. Decision settings consisting of large proportions of this type of accounting information include fair value accounting (Benston, 2006), goodwill accounting (Wines et al., 2007), and performance evaluations via a balanced scorecard (Humphreys

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* Corresponding author.
E-mail addresses: hank.alewine@uah.edu (H.C. Alewine), allporc@uah.edu (C.D. Allport), milton.shen@uah.edu (W.-C.M. Shen).

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and Trotman, 2011; Kaplan and Wisner, 2009). This decision setting is particularly prominent with environmental accounting information, which entities increasingly consider in decisions aimed at improving environmental stewardship strategic objectives (Joshi et al., 2001; Simnett et al., 2009). Because of the increasing focus afforded to the collecting, processing, and presenting of environmental accounting information for communication to entity stakeholders and for assessment to aid in environmentally conscious decisions, this study focuses on decision settings involving environmental AIS (Brown et al., 2005; Dilla and Steinbart, 2005).

When dealing with nontraditional or unfamiliar measurements, a particular challenge for an environmental AIS is to *present* environmental information in such a way that it alleviates, rather than accentuates, the cognitive hurdles decision makers will inevitably face when evaluating this data (Alewine, 2010; cf. Stone and Schkade, 1994). When dealing with the evaluability of any attribute such as a performance measurement, Hsee and Zhang's (2010) General Evaluability Theory (GET) suggests that three characteristics should be considered – the nature of the attribute, the knowledge about the attribute, and the mode of attribute presentation. An attribute's "evaluability" refers to the degree of ease in which a decision maker can successfully assess the information that is attached to the attribute, resulting in effective decision making. Low evaluability results when all three attribute characteristics are low (not instinctively or naturally evaluable, limited knowledge, and an isolated evaluation mode). The nature and knowledge characteristics are often low for attributes in environmental accounting settings, and thus the presentation mode garners extra significance in environmental AIS design when considering how to limit possible decision biases. Joint evaluation mode refers to a simultaneous analysis of multiple alternatives under consideration in a decision. Separate evaluation mode refers to the analysis of one alternative in isolation for a decision.

Based on the GET framework, evaluation mode is expected to play an important role in minimizing decision bias in an environmental AIS; however, other presentation factors are likely to impact attribute evaluations. One likely example would be attribute framing. Attribute framing occurs when functionally equivalent information is described either positively (chance of success) or negatively (chance of failure). The attribute framing effect occurs when the positive description of an item is evaluated more highly than the same item described with a negative description (Levin et al., 1998). The attribute framing effect has been robust across various decision contexts (medical vs. business) and decision makers (expert vs. novice), and the characteristics of environmental accounting information are likely to require the use of positive and/or negative descriptive valences (see Levin et al., 1998 for a literature review).

While the environmental context likely requires attribute frames, any AIS is likely to include characteristics to limit any decision bias based on positive or negative attribute descriptions. Specifically, attribute descriptions in an AIS are unlikely to be as valence-charged as those seen in psychological research; examples such as life vs. death are certainly not likely, while 'weaker' descriptors such as recycled vs. *not* recycled are likely. Such descriptive differences have been shown to impact the size of framing effects (Kuhberger, 1995). In addition, an AIS would likely include a benchmark as a reference point for decision makers. Very few framing studies have considered benchmarks (see Kerler et al., 2014 for an exception). Most importantly for the current study, however, is the impact of presentation mode on attribute framing effects. We predict that joint evaluations will increase attribute evaluability in decision making and therefore limit the effect of positive and negative attribute frames. Overall, the current study seeks to analyze the impact of *realistic* attribute frames on environmental accounting decisions across separate and joint evaluation modes.

In a laboratory experiment, participants ($n = 206$) were randomly assigned to one of four between-participant conditions; manipulated variables include attribute framing (positive, negative) and evaluation mode (separate, joint evaluation). An industrial benchmark was included as a control variable, with assessed factories being either all better-performing or all worse-performing than the benchmark (a within-participant variable). Participants assessed two factory performances on two environmental measures and evaluated them based on their environmental performance. This process was repeated for three other pairs of factory evaluations.

As predicted, the attribute framing effect was robust in expected directions in the separate evaluation mode—higher (lower) evaluations occurred when using positive (negative) attribute frames. These differences persisted even in the presence of moderate attribute descriptions and the presence of attribute benchmarks. However, consistent with the literature on presentation mode in decisions, when providing joint evaluations along with the industry benchmark, the attribute framing effect was not observed. That is, no evaluation differences were found between settings using positive and negative attribute frames.

Various information presentation characteristics have been examined by information system or AIS researchers (Kelton et al., 2010). The study's reported results inform decision makers and environmental AIS designers on how presentation mode (separate vs. joint evaluation) can benefit decision makers faced with non-traditional and/or unfamiliar data. Specifically, this study provides insight on the advantage of joint evaluation comparisons over separate evaluation (when possible), as descriptive valence differences do not impact decisions in joint evaluations. Additional analysis also suggests more consistent judgments occur across evaluation mode when positive descriptions are used compared to negative descriptions. This finding suggests additional presentation implications, as positive descriptions may cause less cognitive decision bias than negative descriptions. Finally, this study answers calls in the AIS literature to proactively address research matters that combine AIS and management accounting fields, and to expand perspectives on dealing with such issues by introducing theoretical foundations, such as GET, that have not been traditionally considered in the AIS literature (Granlund, 2011; Vasarhelyi, 2012; see Rom and Rohde, 2007).

This paper next describes the hypotheses development, followed by the procedure and reported results of an experiment. The paper concludes with a discussion of contributions, limitations, and avenues for future research inquiries.