
Psychology Models of Management Accounting

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Abstract

This review identifies subjective decision-making processes related to management accounting (MA) and uses these processes as a basis for organizing psychology-based research on MA. For each decision process we identify families of related psychology models that have supported robust theory-consistent empirical results. This MA literature addresses four main themes. First, individuals' subjective valuation of monetary payoffs often depends on frames (reference points) provided by MA, and frames can influence the use of MA information in decision making. Second, the subjective value of non-monetary (social) payoffs from sources such as fairness, honesty, reciprocity, social identity or affect influence and are influenced by individuals' MA-related decisions. Third, individuals' subjective models of MA-related decisions often incorporate predictable simplifications that influence and are influenced by MA. Fourth, MA can influence — sometimes bias or limit — individuals'

learning, and learning influences MA, as individuals acquire parameter and variable values or the information to estimate them subjectively. We also identify two emerging themes and three gaps in the psychology-based MA literature.

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1

Introduction

Management accounting (MA) practices (e.g., budgeting, cost estimation, performance measurement, and evaluation) support a variety of organizational activities, including the design of incentive contracts, the allocation of resources, and the legitimation of power (Chapman et al., 2007a,b, 2009). Much research has focused on the role of MA in providing information for individuals (e.g., accountants, engineers, managers) to solve problems, formulate judgments, and make decisions.¹ (Hereafter all three cognitive tasks will be called decisions unless we are referring only to problem-solving or judgments.) In our review we analyze the contributions of psychology-based research to explaining patterns in individuals' MA-related decision making.

Psychology is the science of the human mind (e.g., affect, attitudes, cognition, motivation, social interaction) and behavior (e.g., actions,

¹A *problem* occurs when an individual has a goal but does not know immediately how to attain it (Newell and Simon, 1972). A *judgment* is a comparison of a stimulus to another stimulus or the evaluation of a stimulus in relation to a standard (e.g., manager A's performance is better than manager B's performance, manager A's performance is excellent in relation to the organization's evaluation criteria). A *decision* is the choice of a stimulus (action, alternative) from a set of stimuli (e.g., a manager decides to produce product A and not products B and C).

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communications) (Birnberg et al., 2007). It focuses on behavior by individuals and small groups rather than by markets and organizations, and on subjective (cognitive) phenomena such as mental representations. Subjective phenomena play an important role in MA because subjective decision making is widely prevalent in organizations, in spite of the array of sophisticated quantitative techniques available to support managerial decisions.² For example, research on product pricing has shown that some firms estimate demand functions econometrically, other firms rely on managers' subjective judgments of the relation between product price and quantity, and still other firms use rules of thumb that base product pricing decisions on production costs or competitors' prices without explicitly considering demand (Blinder et al., 1998). The use of subjective decision making instead of or in addition to the use of quantitative techniques remains widespread, as indicated by surveys of practice over time and around the world (Green et al., 1977; Kathawala, 1988; Lam, 1993; Naudé et al., 1997; Francis and Minchington, 1999).³ A 2008 survey of executives by Accenture indicates that 40% of major corporate decisions are subjective rather than based on quantitative techniques (Wailgum, 2009). Even when quantitative techniques substitute for subjective judgment, as Einhorn and Hogarth (1981) point out, subjective decisions are required to select among multiple techniques, none of which is an exact fit to the decision at hand because each makes different simplifications.⁴

² Subjective decision making can take a variety of forms, such as deciding subjectively which of a number of alternative quantitative techniques to use, or thinking carefully through the steps of a rule of thumb decision model (e.g., "price just a little lower than the most important competitor"), or purely intuitive (automated or gut feel) decisions, in which the decision-maker is not fully conscious of why one alternative "feels right" and others do not. Even purely intuitive decisions typically exhibit consistent patterns and can therefore be modeled.

³ These surveys identify a number of reasons for reliance on subjective decision making. In some cases quantitative techniques have not yet been developed that are appropriate for the decisions managers make. When relevant models exist, their benefits may be uncertain, the data required by the techniques may be too costly to acquire, and/or use of the techniques may be hampered by employees' limited quantitative skills — "a shortage of analytical talent" (Wailgum, 2009).

⁴ Decision makers can also subjectively combine output from multiple models. Karmin (2008) describes the management of one of the largest currency-trading firms in the world as aggregating recommendations from about 20 quantitative models and then subjectively "tweaking" the results.

The psychology theories used in the research we review assume that subjective decision making depends on individuals' mental representations of their environment (March, 1994; Markman, 1999; Markman and Gentner, 2001; Weber and Johnson, 2009). Mental representations are relevant to understanding decision-makers' preferences as well as their beliefs: "We want what we want [i.e., prefer] because of the way we think about it." (Wendt, 1999, p. 119) In psychology theory, mental representations "act as *the effective environment* which arouses motives and emotions, and guides overt behavior toward its target or goal." (Baldwin, 1969, p. 326, emphasis added).

Psychology-based research thus takes a broad view of the roles of MA in decision making. A narrow view would restrict the role of MA to populating a decision model with values of parameters and variables — for example, the expected selling price and variable cost per unit of each product for a product-mix decision model or the realized values of multiple performance measures for a model of performance evaluation and reward.

In contrast, in the broad view supported by the psychology literature, MA also influences individuals' choice and valuation of decision objectives and the structure of their subjective decision models; it influences their choices of what variables to include and their judgments about the forms of relations and magnitudes of parameters and variables in their subjective decision models. For example, MA control systems can help define social relations in an organization and thus influence whether decision makers act only to maximize their own payoffs or also act to follow social norms of cooperation with other individuals with whom they identify socially (Rowe, 2004; Rowe et al., 2008). MA's provision of anchor (initial) values of parameters and variables (e.g., cost per unit) can support individuals' use of anchoring-and-adjustment heuristic decision models to make decisions that are more completely modeled as complex system dynamics problems (Sterman, 2000). Accounting classifications and report formats can direct individuals' attention and prompt their mental representations in ways that increase or decrease their performance in identifying relevant predictor variables or in estimating parameters in their subjective decision models (Vera-Muñoz, 1998; Luft and Shields, 2001).

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Psychology theory and research methods have a long history in MA (Birnberg et al., 2007). Starting in the 1950s several fields of psychology, in particular, cognitive, motivational, organizational, and social psychology, have been used to provide insight into issues such as how MA influences individuals' motivation (e.g., through budget goal setting) and social interaction (e.g., budget negotiations), and how individuals and small groups use MA to make planning and control decisions (e.g., cost-based pricing, performance evaluation). Recent MA research uses behavioral-economic models to investigate how individuals trade off the utility of monetary payoffs against utility of non-monetary payoffs derived from social psychological objectives such as fairness, honesty, and reciprocity.

Behavioral economics combines psychology theories with neoclassical economic theories in order to increase the theories' explanatory and predictive ability (Rabin, 1998; Camerer et al., 2004; Camerer, 2006; Della Vigna, 2009). One of the difficulties that researchers have encountered in integrating psychology with economics and accounting, however, is choice overload: "There are too many behavioral theories." (Fudenberg, 2006, p. 697). Psychology theories are numerous, diverse, and not necessarily consistent with each other. One way of mitigating this choice difficulty for MA researchers is to focus on the psychology theories that have proved to be robust predictors of MA-related behavior. The psychology-based MA studies that we review are robust in two ways. First, they draw on basic insights of psychology theory that are common to a variety of specific, related psychology models: thus the basic insights are robust to minor variation in model specifics. Second, their empirical results are robust to variation in research method choices such as experimental tasks, participants, and compensation magnitude.

The literature that we review in detail below addresses four main themes. Two additional themes emerge from recurring, but not always predicted, observations in this literature. The six themes are summarized in Table 1.1.

First, *framing and reference points*, often created by MA, can influence individuals' subjective valuation of monetary payoffs. For example, framing monetary payoffs in incentive contracts as gains rather than

Table 1.1. Themes of psychology-based MA research.

A. Main Themes Addressed in Existing Research

1. *Framing and reference points: subjective valuations of MA-related monetary payoffs*
The subjective valuation of a given monetary payoff can depend on how the payoff is framed (e.g., whether an individual's subjective reference point is above or below the payoff). For example, MA reports and budgets can frame payoffs by creating reference points (e.g., budget goals), and these frames can influence the use of MA information in making subjective decisions.
2. *Social influences on MA: subjective valuations of non-monetary payoffs*
How individuals make MA-related decisions can depend on how they value non-monetary (social) payoffs derived from objectives such as fairness, honesty, reciprocity, or social comparisons. For example, honesty or fairness concerns influence the accuracy of individuals' reporting of their private information in budgeting. Conversely, features of MA can influence the extent to which individuals value honesty or fairness.
3. *Predictably simplified subjective decision models for MA-related tasks*
Subjective decision models often include predictable simplifications that influence and are influenced by MA. For example, individuals making performance evaluations tend to use subjective decision models that simplify by omitting or under-using some information in order to avoid trade-offs between multiple dimensions of performance. These tendencies are exacerbated by MA that makes large quantities of information available.
4. *Limitations on learning: acquiring and subjectively estimating parameters and variables in MA-related decision models*
MA influences — sometimes biases or limits — individuals' learning, and learning influences MA as individuals acquire MA parameter and variable values or the information to estimate them subjectively. For example, characteristics of MA (e.g., classification, aggregation, report format) can influence individuals' learning of cost-driver and profit-driver relations by affecting their attention and memory. Conversely, MA is influenced by individuals' learning of parameters and variables that become part of MA (e.g., activity time estimates).

B. Emerging Themes

5. *Limited heterogeneity of subjective decision models*
Often the MA-related decision behavior of individuals can be accounted for by two or three distinct subjective models. Subjective models are neither so diverse as to be unpredictable nor so similar as to cluster around a single type. Aggregate behavior depends on the proportions and interactions of the limited number of subjective decision models.
 6. *Deliberative and intuitive decision making*
MA-related decision making is not always deliberative (consciously controlled). Individuals often make intuitive (automatic or gut feel) decisions. The effects of MA on subjective decision making can differ depending on whether the decisions are deliberative or intuitive.
-

avoided losses can change the magnitude of the payoffs principals offer and agents accept (Frederickson and Waller, 2005), and budget goals can provide reference points that influence individuals' willingness to

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exert effort and take risks, holding monetary payoffs constant (Sprinkle et al., 2008).

Second, individuals' *valuation of non-monetary (social) payoffs* influences MA, and individuals' valuation of these non-monetary payoffs can in turn be influenced by MA. For example, the most effective MA control system for an organization in which some individuals value honest communication or social identity will be different from the most effective system for an organization in which no individuals have such preferences (Evans et al., 2001; Towry, 2003). Conversely, characteristics of an MA control system such as budgeting procedures and compensation can influence the extent to which individuals put high values on honesty and/or fairness (Rankin et al., 2008; Zhang, 2008).

Third, *subjective decision models simplify the structure* of complex⁵ MA-related decisions in predictable ways, often omitting variables, truncating long chains of causal relations, and/or avoiding trade-offs. For example, individuals making performance evaluations tend to use subjective decision models that simplify by omitting or under-using some information in order to avoid trade-offs between multiple dimensions of performance (Lipe and Salterio, 2000). These tendencies are exacerbated by MA systems that make larger quantities of information available (Shields, 1980).

Fourth, there are *limitations on learning* as individuals acquire MA-related parameter and variable values or the information to estimate them subjectively from reports or from their experience. Characteristics of MA (e.g., classification, aggregation, report format), as well as characteristics of decision settings and decision makers, influence — sometimes bias or limit — individuals' attention, memory, and other learning-related subjective information processing. For example, capitalizing or expensing intangibles expenditures for internal reporting influences individuals' focus of attention and thus influences how well they learn the relationship between expenditures and profits from examining information on the two variables; individuals' learning then influences their performance in predicting future profits (Luft and

⁵ See Bonner (1994) for a definition of decision complexity.

Shields, 2001). Conversely, MA itself is influenced by individuals' learning of parameters and variables such as activity times.

These four themes have been investigated extensively in the MA literature, yielding results that appear robust across specific MA decisions, decision makers, and settings. Two additional themes have emerged in this literature as recurring (sometimes unpredicted) observations with important implications for future research.

The first of these emerging themes is the *limited heterogeneity of subjective decision models*. For a number of the MA-related decisions studied in the literature, two or three models account for the behavior of most individuals (e.g., Lewis et al., 1983; Ball et al., 1998). Thus, individual behavior is neither unpredictable because of its extreme diversity, nor is a single representative model sufficient. Rather, aggregate behavior depends on the proportions and interactions of the limited number of subjective decision models.

Second, subjective decision making is not a homogeneous construct, and one important dimension on which subjective decisions can differ is whether they are *deliberative* (consciously controlled) or *intuitive* (automatic or gut feel). The factors that influence subjective decisions are often different in these two cases. Intuitive decisions can be systematically influenced by information and/or motivations that individuals might not choose to include in their decision models if they were conscious of the influence. For example, many individuals invest some self-esteem in their economic success and therefore tend to screen out or reinterpret information that implies they are not performing well economically (Bloomfield and Luft, 2006; Tayler, 2010). This bias in information processing can reduce economic performance by leading to poorer decisions (Bloomfield and Luft, 2006). Therefore it is unlikely to be consciously chosen, and in consequence, it can be difficult (though not impossible) to mitigate (Tayler, 2010).

The first four themes described above are addressed in separate sections: the first theme is developed in Section 3, the second in Section 4, the third in Section 5, and the fourth in Section 6. The fifth and sixth (emerging) themes recur in a variety of studies and thus appear repeatedly across Sections 3–6. Before developing these themes in detail, we explain in Section 2 the organizing framework employed in our review.

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