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Fast-and-frugal trees as noncompensatory models of performance-based personnel decisions

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ABSTRACT

Employees' performance provides the basis for many personnel decisions, and to make these decisions, managers often need to integrate information from different performance-related cues. We asked college students and experienced managers to make a series of performance-based personnel decisions and tested how well weighting-and-adding, compensatory logistic regression and lexicographic, noncompensatory fast-and-frugal trees (FFTs) could describe participants' decision processes regarding both choices and reaction times. Results show that a significant proportion of the participants (i.e., nearly half of the college students and more than two-thirds of the experienced managers) applied FFTs to make such decisions, and that the majority of them adopted key features of FFTs adaptively in response to a manipulation of the required distributions of positive (bonus) or negative (termination) decisions. Overall, the process-oriented approach applied in our study provides insights on not only what cues managers use for performance-based personnel decisions, but also how they use these cues.

1. Introduction

Given the crucial role of human capital for organizational success, personnel decisions such as whom to fire, whom to promote, and whom to reward are among the most influential managerial decisions (Guion, 2011). Because employees' job performance provides the basis, at least in part, for such decisions, researchers have been studying how performance-related cues influence the decision process (e.g., DeNisi, Cafferty, & Meglino, 1984; Landy & Farr, 1980). An important recognition is that for various reasons (e.g., market fluctuation and personal development), employee performance is often dynamic, displaying short-term and long-term changes over time, and that cues of dynamic performance can strongly influence performance appraisals and performance-based decisions (e.g., Barnes, Reb, & Ang, 2012; Reb & Cropanzano, 2007).

The three well-studied cues of dynamic performance are the performance mean (i.e., the average performance level over an evaluation period), trend (i.e., the trajectory of performance changes), and variation (i.e., the degree to which the performance fluctuates). Fig. 1 shows an employee's performance profile in which these cues can be readily discerned. Previous research suggests that performance appraisals are highly correlated with performance mean and trend, whereas findings have been mixed regarding the influence of performance variation (e.g., Reb & Cropanzano, 2007; Reb & Greguras, 2010). Extending this research to personnel decisions, Barnes et al. (2012) showed that mean and trend—but not variation—of NBA players' performance were positively related to managers' decisions to increase a player's salary in a new contract.

Building on these and other related studies (e.g., Lee & Dalal, 2011), we aim to address two important questions that have not been well understood in research of performance-based personnel decisions. First, how do managers use dynamic performance cues to arrive at such decisions? And second, to what extent do managers' decision processes correspond to the characteristics of the task environment? Drawing on the work of Simon on bounded rationality (1955) and recent research on decision heuristics (e.g., Todd, Gigerenzer, & the ABC Research Group, 2012), we posit that a significant proportion of managers would use fast-and-frugal trees (FFTs; defined below), a type of noncompensatory, lexicographic heuristics, to make performance-based personnel decisions and that they could apply FFTs adaptively in different task environments.

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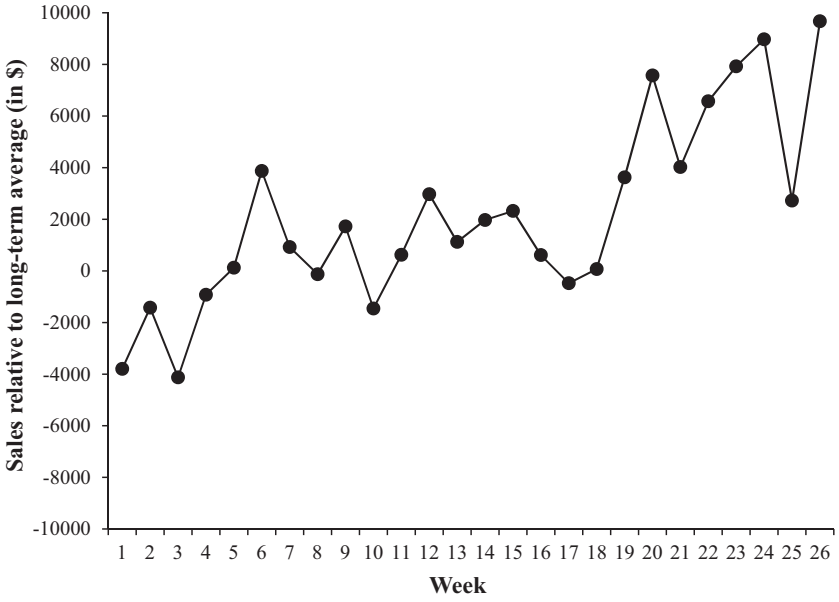

Fig. 1. A sample performance profile of an employee. Each point in the graph represents the employee's sales performance in a certain week, and the performance is quantified as the dollar amount the employee has made relative to the long-term average performance of all employees working for the company.

We investigated these questions in two studies with either college students (Study 1) or highly experienced managers (Study 2). In both studies, employees' performance in a certain period of time was displayed in charts similar to Fig. 1 and participants were asked to make a decision on bonus or termination for each employee. We varied three aspects of the performance—namely, the mean, trend, and variation—that could be used as cues for such decisions. In each study, we examined how well FFTs, in comparison to the compensatory logistic regression, could describe a participant's decision process, measured by the models' ability to predict both the choices and reaction times of the participant. Moreover, to study whether participants could adjust their decision processes adaptively, we manipulated the required distributions of bonus or termination decisions in different experimental conditions and tested how this would affect participants' decision processes.

In so doing, our research makes several noteworthy theoretical and methodological contributions. First, our prediction that managers use FFTs for performance-based decisions is novel in studies of dynamic performance. Analyzing data with either regression analysis or analysis of variance, previous studies have always assumed that managers integrate cues following a compensatory strategy by weighting and adding cue values. Whether this is what managers actually do has not been examined, nor have alternative, noncompensatory strategies been tested. Knowing the specific decision strategies managers apply will not only improve our understanding of *how* they integrate cues of dynamic performance to make decisions in addition to what cues they use, but also help us predict better what decisions managers would make and the importance of each cue in this process.

Second, the idea of "adaptive decision makers"—that people are capable of adapting their decisions strategies to the characteristics of the task environment—has been proposed and tested in many areas of decision making (e.g., Payne, Bettman, & Johnson, 1993; Simon, 1955; Todd et al., 2012), but received little attention in research of managerial decisions. Key to the success of an organization is the ability of its leaders and managers to apply strategies suitable for a task and be adaptive when the characteristics of the task have changed. Our study addresses this adaptiveness question in the context of personnel decisions, filling a critical gap in the literature.

Third, previous studies have found evidence for the use of FFTs in several domains of decision making (e.g., Dhami, 2003; Hertwig, Fischbacher, & Bruhin, 2013; Tan, Luan, & Katsikopoulos, 2017). Our study is the first to examine the possibility of FFTs for managerial decisions, a domain in which decision makers are argued to rely on heuristics to make many of their judgments and decisions (e.g., Artinger, Petersen, Gigerenzer, & Weibler, 2015; Hodgkinson & Healey, 2008). Furthermore, whereas past research has claimed that decision makers can adapt features of FFTs to different task environments (e.g., Luan, Schooler, & Gigerenzer, 2011), our study is the first to test this claim empirically.

Finally, we took a comparative approach in model testing by examining models with distinct assumptions and evaluated the descriptiveness of each model with respect to both choices and reaction times. These approaches are rarely applied in research on personnel decisions and managerial decision making more broadly, but can provide much insight on the underlying processes (e.g., Glöckner, 2009; Lewandowsky & Farrell, 2011). They are the main methodological contributions of our study.

1.1. Fast-and-frugal trees

FFTs are heuristics for binary decisions (i.e., decisions with two alternatives). As process models of decision making, FFTs make predictions not only about what cues will influence decisions but also how decision makers might use these cues. Formally, given m decision-related cues, an FFT is defined as "a decision tree that has $m + 1$ exits, with one exit for each of the first $m - 1$ cues and two exits for the last cue" (Luan et al., 2011, p. 320). An "exit" on an FFT points to the type of decision (e.g., award a bonus) made by a decision maker and is usually the outcome of meeting some specified condition set on a cue.

To illustrate how an FFT works, suppose that a manager is deciding whether to award a bonus to an employee upon seeing the performance profile shown in Fig. 1. The three cues that she could use to make the decision are the mean, trend, and variation of the employee's performance; and let us assume that the