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PERFORMANCE MEASURES: BANDWIDTH VERSUS FIDELITY IN PERFORMANCE MANAGEMENT

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ABSTRACT

Performance is of focal and critical interest in organizations. Despite its criticality, when it comes to human performance there are many questions as to how to best measure and manage performance. One such issue is the breadth of the performance that should be considered. In this paper, we examine the issue of the breadth of performance in terms of measuring and managing performance. Overall, a contingency approach is taken in which the expected benefits and preference for broad or narrow performance measures depend on the type of job (fixed or changeable).

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Performance measures should be task specific. The more specific and the more concrete, the better. Task specific measures allow for feedback that is clearly related to performance. These admonitions are so common in the performance management literature that we accept them without much, if any, critical thought. While specific tasks measures and feedback allow for less subjectivity and are more legally defensible, might there be situations for which these narrow measures aren't effective?

There is an old adage which states that you can't manage something if you can't measure it. Accordingly, effective performance management rests on effective measures of performance. So, what kind of performance measures are best? The performance appraisal/performance management field has, in our opinion, largely reached a consensus that performance measures need to measure performance rather than personal characteristics like personality. There can probably be little disagreement that performance measures should focus on performance. However, what should be the breadth of those measures? The common prescription has been that performance measures should be as specific and concrete as possible. The purpose of this paper is to explore this received doctrine (Barrett, 1972). While specific measures are less ambiguous and more defensible, there may be a place for more general measures of performance. The issue we address here is the utility of focusing on specific facets of performance versus looking at the bigger picture. Our contention is that, at least in some situations, the grand view can be beneficial and place things into an appropriate and useful context.

BANDWIDTH VERSUS FIDELITY

The appropriate breadth of measurement has been an issue wrestled with in the selection literature for quite some time. The breadth of measurement issues in the selection domain has been referred to as the bandwidth-fidelity dilemma (Cronbach & Gleser, 1965). In the selection arena, the bandwidth-fidelity issue has been associated with personality measures and their usefulness as predictors of job performance. The bandwidth-fidelity dilemma refers to the choice of using narrow or broad personality measures. In other words, is it better to go for precision or for a broad assessment? As described by Hogan and Roberts (1996), a bandwidth-fidelity dilemma is akin to choosing between a microscope and binoculars. Our preferred distinction between fidelity and bandwidth is breadth of measurement.

The bandwidth-fidelity construct may seem straightforward, but there are potential areas of confusion or disagreement. First, there is variance in the definitions for bandwidth and fidelity. Cronbach (1960) defined a narrow bandwidth measure as a measure that answers only one question or predicts only one outcome. A large bandwidth measure would tap a variety of characteristics. More recently, Ones and Viswesvaran (1996) described high fidelity measures as narrow and more concrete and behavioral. They described broad bandwidth measure as being more general and abstract. The Cronbach conceptualization emphasizes the degree of unidimensionality as determining whether a measure would be categorized as having a high fidelity or broad bandwidth nature. In contrast, the Ones and Viswesvaran (1996) approach emphasizes the degree of specificity/abstractness as the key factor.

The above conceptualizations are related, but the distinctions can be important. In our approach to the bandwidth-fidelity issue, we use the specificity definition put forth by Ones and Viswesvaran (1996). The degree of specificity or abstraction seems to us to be most relevant to

the topic of performance criteria. In terms of measuring the performance of workers, we are looking in this paper at the appropriate level of specificity/abstraction rather than at the unidimensionality or factorial purity of measures. In other words, our concern is with whether the fine-grained analysis of a microscope or the broad view of a wide-angle lens is more appropriate.

The bandwidth-fidelity issue has been focused on selection, but the issue is relevant to the measurement of criteria as to the measurement of predictors. How specific or broad should performance measures be? What is the best level of fidelity or bandwidth? Should we be using microscopes or binoculars? Put in more of a folk manner, the bandwidth-fidelity issue in performance management amounts to asking whether we are missing the forest for the trees or making mountains out of molehills. We certainly don't pretend to have the answers as to where the specificity/abstractness needle should be set in performance management. However, we do think that it is critical that the concept be recognized and explored.

BANDWIDTH-FIDELITY IN PERFORMANCE MEASUREMENT

How fine-grained should performance measures be? Perusal of performance appraisal literature indicates that broad performance measures are to be avoided. This prescription is most easily seen and understood in connection with personality traits as criteria. Personality traits can be ambiguous and mean different things to different evaluators. Further, personality traits can be erroneously evaluated due to implicit personality effects. Finally, it also can't be expected to be very useful to provide personality trait feedback to ratees. For example, telling an employee that they were rated low on "energy" and moderate on "leadership" probably isn't too helpful. Thus, the broad consensus seems to be to avoid broad performance measures.

The more concrete and behavioral the performance measures the more clear and defensible they are. Consider the following examples of performance measures and consequent feedback:

Sally, you make an average of only 8 salads per hour, while most workers make more than 12.

The average number of square feet you mop during your shift is over 200.

These kinds of measures are not only clear, they are hard to argue with. Further, it makes clear to the worker what needs to be done in order to improve his/her performance rating. Feedback on these more specific performance measures is directive and potentially more useful to the worker than broad performance measures. Thus, more narrow and concrete performance measures should be preferred over broad measures. Perhaps, however, this conclusion is an overstated prescription for performance measures? There may be, for example, situations in which more general measures are the best performance measures.

As illustrated in Table 1, jobs can be viewed as varying along a dimension from fixed to changeable. In the extreme, a fixed job might be illustrated by a traditional factory job in which a worker does exactly the same task during his/her shift. In the other extreme, a changeable job is one in which activities and responsibilities shift. One illustration of a high changeable job is a project-based organization where worker responsibilities can dramatically change from one project to the next. Table 1 presents the type of job continuum, from "fixed" to "changeable" and breadth of performance measures (i.e., broad, narrow).

Insert Table 1 About Here

Narrow performance measures make conceptual sense when the job is fixed. In the case of fixed jobs, the worker is expected to repetitively engage in the same tasks or perform the same physical act. In this situation, narrow measures reflect the nature of the job and reinforce to the worker the specific duties that they are to attend to. In contrast, narrow performance measures do not make a conceptual good fit in the context of a highly changeable job. In the changeable job situation, narrow performance measures would quickly become obsolete and provide an incorrect portrayal of performance expectations.

Broad performance measures would be a conceptual misfit with a narrow job. The broad measures would not adequately capture the specific duties that comprise the job. Further, the broad measures would likely not be helpful for workers saddled with repetitive duties. In contrast, broad measures should be conceptually compatible with a changeable job. Broad measures should reflect the broad characteristics needed in a dynamic situation.

While we don't have exact statistics, many job situations seem to be shifting toward the "changeable" end of the continuum (e.g., Cascio, 1995). Some of the reasons for the shift include increased empowerment and a greater customer orientation (Cardy, Gove, & DeMatteo, 2000). The extent to which jobs are changeable seems to be increasing.

Whatever the prevalence or trend regarding changeable jobs, the question remains as to whether this job characteristic might be a contingency factor in regard to the breadth of performance measures. As an initial exploratory investigation, we examined the perceived effectiveness of narrow and broad performance measures in fixed and changeable job situations.

DESCRIPTION OF STUDY & RESULTS

Setting and Participants

Participants were undergraduate students enrolled in a required course at a large university in the southern United States. Participation in the study was voluntary and all students attending class on the day the survey was administered received extra credit whether or not they participated in the study. Ninety four students attended class on the day that the survey was administered. All of the students completed the survey resulting in a 100% response rate. Three of the returned surveys had incomplete data and were therefore eliminated for data analyses purposes.

The average age of the participants was 23 and ages ranged from 18 to 43. Forty five percent of participants were female, and 43% White, 43% Hispanic, 6% Asian-American, 4% African-American, 3% International Student, and 1% Native-American. Approximately 50% of the participants worked at least 25 hours a week and approximately 30% of the participants worked full-time.

Procedure

The study was a 2x2 between subjects factorial design (see Table 1). Hence, there were four different combinations of job type and performance evaluation: 1) fixed task type with narrow performance evaluation, 2) fixed task type with broad performance evaluation, 3) changeable task type with narrow performance evaluation, and 4) changeable task type with broad performance evaluation. Each student was randomly assigned to receive a survey depicting one of the four possible combinations of job type and performance evaluation criteria. Each survey asked respondents to read a scenario about a worker and to give their impressions about the performance appraisal form that was to be used to evaluate the employee (See Appendix for an example set of materials.).

In order to assess the appropriateness of the performance measure, we developed a six-item measure (Table 2) to assess the perceived effectiveness of the appraisal. The content of the measure applies Greller's (1978) construct of perceived utility of appraisal. We constructed six statements representing various facets of appraisal effectiveness. As listed in Table 2, we included statements referring to the fairness of the rating system (1,5), acceptability of feedback (2), usefulness of feedback (3), developmental opportunities for employees (4), and employee performance (6). Respondents used a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) to indicate the extent of their agreement on each item.

The items were subjected to a principle components factor analysis with varimax rotation and each of the six items exhibited a strong loading on the main factor, with minimal evidence for the existence of other factors. In addition, a reliability and item analysis indicated a reliability coefficient (Cronbach's alpha) of .93, with item-total correlations ranging from .59 to .80. Factor loadings are presented in Table 2.

Insert Table 2 About Here

Results

We hypothesized that the greater the level of agreement between the type of job and the criteria for evaluation, the greater the perceived effectiveness of the performance measure. Pairing a changeable task with a broad performance evaluation form was expected to lead to a higher perceived appraisal effectiveness than pairing a changeable task with a narrow performance evaluation. Similarly, pairing a fixed task with a narrow performance evaluation

form was expected to lead to higher perceived appraisal effectiveness than pairing a fixed task with a broad performance evaluation.

To check whether the perceived effectiveness of appraisal was influenced by job type and breadth of the performance measures we conducted a univariate ANOVA in which the perceived effectiveness of the performance measure was the dependent variable and task type (fixed or changeable) and performance criteria (broad or narrow) were the between-subjects independent variables. The 2 X 2 between-subjects ANOVA failed to reveal a main effect for performance criteria ($F(1, 91) = .04; p = .83$) and task type ($F(1, 91) = .91; p = .34$); however, the ANOVA revealed an interaction of performance criteria and task type ($F(1, 91) = 5.27; p < .05$; see Figure 1).

Insert Figure 1 About Here

DISCUSSION

The study presented here is exploratory and only suggestive. We found evidence that narrow performance evaluation measures were perceived as more effective for jobs with fixed tasks while broad performance measures were perceived as more effective for jobs with changeable tasks. The results certainly suggest that the perceived effectiveness of narrow and broad measures depends on the fixed or changeable nature of the job. Of course, our measures were hypothetical and from students and they beg the question of what would be the effectiveness perceptions of real workers in real organizations? The applied issues will have to await further research. Our expectation, however, is that there is a place for broad performance measures.

We explored the type of job, ranging from fixed to changeable, as a contemporary factor regarding the bandwidth of performance measures. Another factor that may be an important contingency variable is the strategic orientation of the organization. An organization that is pushing toward achieving a strategic vision, particularly a vision that involves innovation, or greater customer service, might be best served through the use of broad performance measures. Consider for example, the usefulness of performance feedback for getting people on board with a strategic initiative. Broad performance measures capture a new strategic direction and signal to employees what is going to be important in the organization. In the short term, it may not be possible to develop narrow performance measures since the exact operational mixture of the strategy might not be known. However, broad measures could capture this strategic direction and motivate workers toward making the vision a reality.

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Table 1
Bandwidth vs Fidelity in Performance Appraisal

		Job Type	
		Fixed	Changeable
Performance Measures	Narrow	+	-
	Broad	-	+

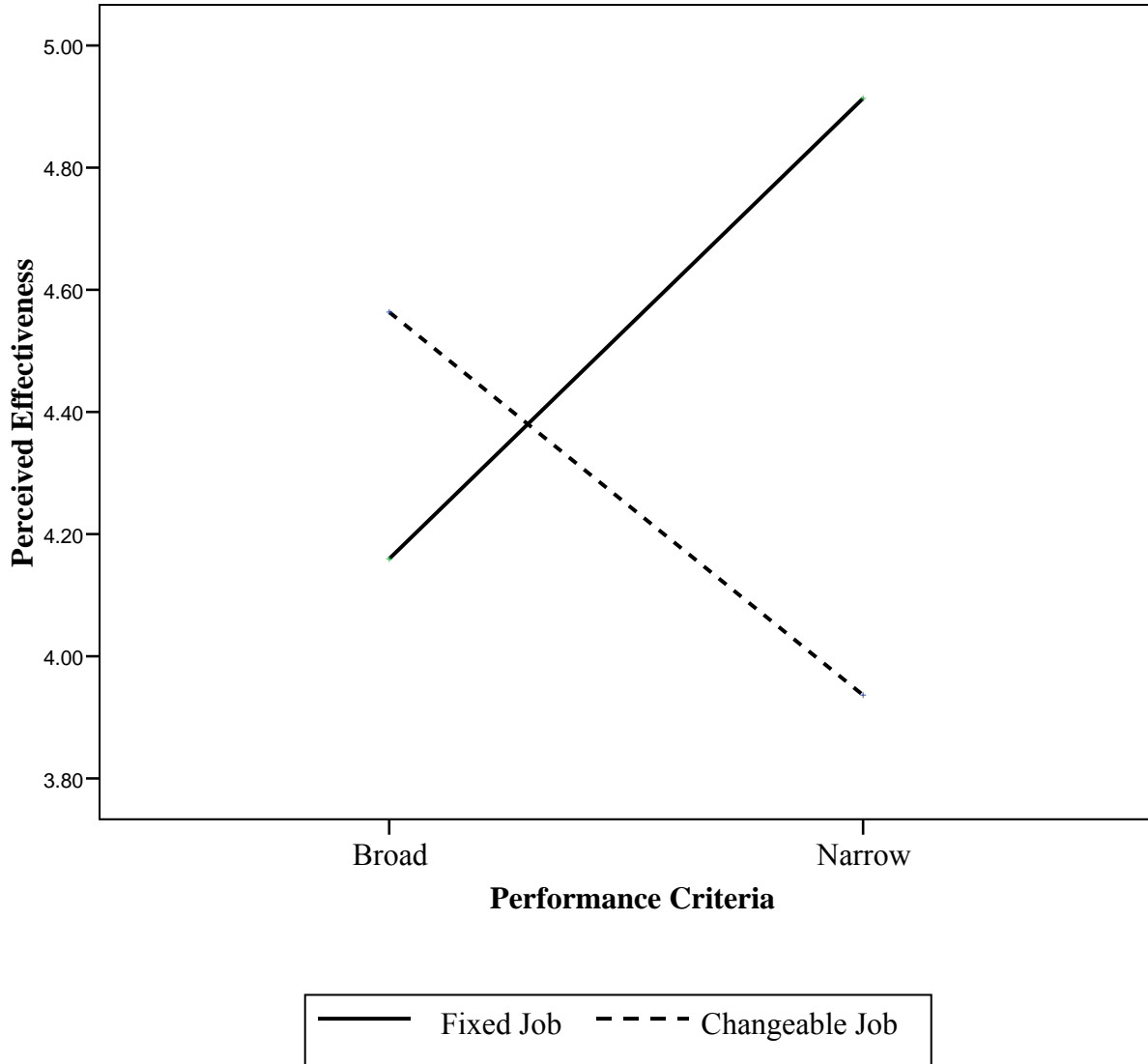
Note: The “+” cell entries refer to combinations that would seem to conceptually fit while the “-” cell entries refer to combinations that would be expected to be conceptual misfits.

Table 2
Perceived Appraisal Effectiveness Items

Statement	Factor Loading
1. The rating system is fair for Tom's type of job.	.67
2. The type of feedback from the evaluation should be acceptable to Tom.	.74
3. The feedback provided by the form is useful for Tom to advance in the company.	.78
4. This type of evaluation should help the company because the feedback helps develop better employees.	.74
5. The rating criteria on the form are fair for the job being evaluated.	.75
6. This evaluation form should be useful for helping managers maximize employee performance.	.74

FIGURE 1

**Perceived Effectiveness of Performance Appraisal
as a Function of Job Type and Bandwidth**



APPENDIX

Sample of Materials to Examine a Fixed Job with a Narrow Performance Appraisal

SECTION 1

In this section you will be provided a description of an employee in a manufacturing setting and a description of the performance appraisal form that will be used to evaluate his performance. Once you have read these descriptions, you will be requested to give your impressions of the performance evaluation form that will be used to rate the employee.

Employee Description

Tom works for an organization doing routine tasks. He works in a manufacturing section and his job is composed of tasks that he does on a daily basis. For example, setting up equipment and checking products against quality standards are typical parts of his job. Tom enjoys the predictability of his job and appreciates the manufacturing standards since he can use them to determine how well he is doing his job.

Tom's first annual performance appraisal is coming up and he will be evaluated using the Performance Evaluation Form on the following page. The form will be completed by his supervisor and will be used to evaluate his performance. Please look over the form for its appropriateness for evaluating Tom's work performance and then respond to the items on page 3.

Performance Evaluation Form

Employee: _____ Supervisor: _____

PRODUCT*

Quantity Evaluation

		A	B	C	D
Number of Pieces Produced	1 st Quarter				
	2 nd Quarter				
	3 rd Quarter				
	4 th Quarter				
Equipment Down Time (Hours)	1 st Quarter				
	2 nd Quarter				
	3 rd Quarter				
	4 th Quarter				
Average Set Up Time (Hours)	1 st Quarter				
	2 nd Quarter				
	3 rd Quarter				
	4 th Quarter				

Quality Evaluation

Number of Pieces Within Specification	1 st Quarter				
	2 nd Quarter				
	3 rd Quarter				
	4 th Quarter				
Number of Defective Pieces	1 st Quarter				
	2 nd Quarter				
	3 rd Quarter				
	4 th Quarter				

Specific Job Skills

(Circle the number that matches your assessment)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The worker needs to improve the speed of work.	1	2	3	4	5
The worker needs to improve the accuracy of work.	1	2	3	4	5
The worker needs to improve machine set-up skills.	1	2	3	4	5
The worker needs to improve machine repair skills.	1	2	3	4	5

* Note that the product columns labeled A, B, C, and D refer to the major types of pieces made in this area of the plant. Each cell in the table reports the number of pieces (or hours) logged for the worker in that quarter.

Please consider Tom's job and the form that will be used to evaluate his performance. Use the scale below to respond to each of the following items. For each item, please circle the number that best indicates how strongly you agree or disagree with that statement.

	1	2	3	4	5	6	7				
	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree				
1. The rating system is fair for Tom's type of job.					1	2	3	4	5	6	7
2. The type of feedback from the evaluation should be acceptable to Tom.					1	2	3	4	5	6	7
3. The feedback provided by the form is useful for Tom to advance in the company.					1	2	3	4	5	6	7
4. This type of evaluation should help the company because the feedback helps develop better employees.					1	2	3	4	5	6	7
5. The rating criteria on the form are fair for the job being evaluated.					1	2	3	4	5	6	7
6. This evaluation form should be useful for helping managers maximize employee performance.					1	2	3	4	5	6	7

SECTION 2

The following items focus on how you typically view work. Using the scale below, please circle the number that best indicates how strongly you agree or disagree with each statement.

	1	2	3	4	5	6	7				
	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree				
1. I like a lot of structure at work.					1	2	3	4	5	6	7
2. The more defined and concrete the performance measures at work, the better I like them.					1	2	3	4	5	6	7
3. At work I would rather be evaluated on specifics rather than on generalities.					1	2	3	4	5	6	7
4. I prefer to have my work performance evaluated on broad measures.					1	2	3	4	5	6	7
5. I like tight standards and performance measures at work.					1	2	3	4	5	6	7

SECTION 3

This section of the survey requests demographic information about you. Please answer each question by filling in the blank or placing a checkmark beside the most appropriate response.

Age: _____

Gender: _____ Female _____ Male

University Class Standing: _____ Freshman _____ Sophomore _____ Junior _____ Senior

University Attendance: _____ Part-Time Student _____ Full-Time Student

Race/Ethnicity:

_____ Native-American _____ African-American _____ Asian-American
_____ Hispanic American _____ White-American _____ International Student

Work Experience: _____ Part-Time Work Experience (*number of years*)

_____ Full-Time Work Experience (*number of years*)

Have you ever had responsibility for evaluating the performance of workers? _____ No
_____ Yes

Current Employment Status: _____ Part-Time (*hours/week*) _____ Full-Time (*hours/week*)