



Utility analysis: do estimates and format matter?

Utility analysis:
do estimates
matter?

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Abstract

Purpose – The present study aims to examine how adjustments to utility analysis (UA) estimates and restructuring UA information to include a tabular format affect managerial acceptance of a selection test.

Design/methodology/approach – Managers across organizations ($n = 185$) indicated whether they would accept and implement a new selection test based on a hypothetical scenario. They were randomly assigned to different scenarios based on UA dollar estimate size and visual format of the information.

Findings – Overall, managers were indifferent to the dollar size of the UA estimate and were not influenced by presentation format. Managers did report use of UA information when making decisions and qualitative analyses revealed several patterns that help explain why this information was useful.

Practical implications – When presenting UA information, practitioners should reexamine how they build support for both sides of the benefits-costs equation, potentially adding information beyond UA dollar amounts such as legal liability and company reputation.

Originality/value – The quandary remains regarding how to communicate the value of human resource initiatives to organizational stakeholders. The paper adds to the literature by investigating two variables not previously examined, the size of UA dollar estimates and the format used to present UA information. More importantly, the study incorporates a unique qualitative component to better understand managers' use or non-use of UA and corresponding rationale.

Keywords Utility analysis, Return on investment, Costs vs benefits comparison, Selection, Managerial decision making, Manager buy-in, Managers, Value added, Human resourcing, Decision making

Paper type Research paper

Both public and private organizations across the globe want evidence of the value added from human resource (HR) initiatives such as recruiting, selecting, and training (Cascio and Boudreau, 2008; Fitz-enz, 2009; Truss and Gill, 2009; Winkler *et al.*, 2010). Utility analysis (UA) has been proposed as one approach for communicating the financial benefits of HR interventions (Boudreau, 1991; Roth *et al.*, 2001). UA allows HR professionals to describe costs and benefits in a language that managers may find meaningful: dollar amounts (Brogden and Taylor, 1950; Rauschenberger and Schmidt, 1987), thereby adding credibility to the “soft” decisions often surrounding HR initiatives (see Connerly *et al.*, 2003 for an example; Cascio, 2000; Landy, 1989). That is, HR managers must decide which selection assessment tools, programs or interventions to implement in their organizations. In making such decisions, there is much information to process. How many people are affected? For how long? What is the cost of the intervention? How predictive is the intervention of future performance? What is



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the value of job performance in the organization? Would there be any legal ramifications of using any such program? UA can help in making such decisions. UA uses a mathematical model to combine much of this information and can result in a dollar cost estimate of the value of the intervention, a common metric understood by organizational decision makers. Although UA appears to aid decision-making, researchers continue to debate its usefulness.

Central to this debate is how the presentation of UA information influences managerial decisions (Carson *et al.*, 1998; Cronshaw, 1997; Latham and Whyte, 1994; Macan and Foster, 2004; Sturman, 2000; Whyte and Latham, 1997). Although previous research has examined the effects of UA information, conflicting findings have led to questions regarding whether to present the information and if so, how. **Thus, researchers have called for a better understanding of the potential role and use of UA information.** The present study addresses these issues by investigating how adjustments to UA estimates and presentation of UA information affect decisions. Such insight can shed light on ways to improve the development and design of UA models. As a result, practitioners can better communicate UA information to organizational decision-makers.

Effects of UA estimates

Brogden (1949) developed the initial UA mathematical model and Cronbach and Gleser (1965) expanded his work, resulting in the Brogden-Cronbach-Gleser UA model. Their classic model lay dormant for several years, but is now considered and used as the foundation for most UA research (Holling, 1998). The basic UA formula is an enhanced benefits and costs equation, where $UA = \text{benefits} - \text{costs}$.

Researchers have proposed several modifications to the basic single-attribute UA model, considering additional economic and finance variables that account for variable costs, discounting, tax rates (Boudreau, 1983) and other factors such as probationary periods (De Corte, 1994) and multiple selection devices (Boudreau, 1991). Inclusion of these variables tends to produce lower UA estimates. Using a computer simulation, Sturman (2000) examined the implications of such adjustments, finding that many resulted in a substantial decrease in the size of the UA estimate. Although researchers have not examined the impact of lower UA estimates, this decrease may lead to greater acceptance as managers may ignore utility estimates that seem unrealistic (Roth *et al.*, 2001). **UA acceptance is important because the fundamental strength of the information is its ability to show HR's worth in a language managers can understand (Rauschenberger and Schmidt, 1987). As Boudreau (1995) stated, the true "test" for UA is its effect on decisions.**

Several UA studies have focused on managerial acceptance of UA information. Latham and Whyte (1994) and Whyte and Latham (1997) found reduced managerial support for implementing a selection test when provided with UA information, noting the "futility of utility." In particular, Whyte and Latham (1997) found that managers reacted negatively when presented with a written explanation of UA, a written description of a UA performed for a selection system, and a video of an expert explaining the logic of UA. They suggested that their findings question the basic assumption of utility analysis; that managers rely on rational analysis when making such management decisions.

It is also possible that managers did not understand or comprehend the UA information, given the amount and potential complexity of the UA information provided. Examining this possibility, Carson *et al.* (1998) altered the scenarios used by Latham and Whyte (1994), making them shorter and easier to understand. In support of their suppositions, across two separate studies, Carson *et al.* found that when managers reported understanding the UA information, presenting it in a more user-friendly manner can result in more positive reactions. Others have also found small positive effects (Beckstein and Gilliland, 1996; Hazer and Highhouse, 1997). Macan and Foster (2004) not only found positive effects, but results showed that managers perceived UA information to be useful. Our first goal was to replicate previous positive findings when employing the shorter and easier to understand scenarios created by Carson *et al.* (1998):

- H1. Managers receiving UA information will be more likely to accept a new selection test than managers who do not receive UA information.

UA estimate size

It is important to examine the impact of additional alterations to UA information on managerial acceptance. As Latham and Whyte (1994) noted, the size of the UA estimate they used may have been a reason their findings contradicted previous UA results. While they argued that refinements should do little to increase managers' confidence in UA estimates, Cronshaw (1997) advocated for experimentally varying the magnitude of the UA estimates. Our study addresses this issue and is the first to examine empirically the extent to which the size of the estimate affects managers' use of the UA information in deciding whether or not to accept a new selection system.

In general, researchers have used the classic UA model as a springboard in producing even more refined UA estimates, primarily through various modifications based on a number of assumptions inherent in the model. These assumptions often limit the precision of the UA equation (e.g. inflating estimate size) because the model assumes that certain variables take on unrealistic properties and ignores other relevant variables that should be factored into the equation (Cascio, 1993). This may increase managerial uneasiness and skepticism because such estimates are often believed to be "too good to be true", which leads to questions concerning the estimate's credibility (Hunter *et al.*, 1988). For management to accept utility analysis, estimates must be credible (Shultz, 1996; Skarlicki *et al.*, 1996). Therefore, several algebraic modifications to the basic UA model have been proposed to account for more relevant factors when creating the UA estimate.

Sturman (2000) suggested that negative effects may result from a lack of credibility based on unrealistically large UA estimates. The final estimate in Latham and Whyte's scenario was approximately \$60 million dollars, which was also used in subsequent scenario replication studies (i.e. Carson *et al.*, 1998; Macan and Foster, 2004). Sturman compared the impact of five adjustments to the equation on the final estimate: economic/financial variables, employee movement, probationary periods, multiple selection devices, and job offer rejections. His computer simulation demonstrated a substantial reduction in estimate size (from \$60 to \$2.2 million) when using all five modifications. Whereas economic variables had the largest impact (\$42.8 million), the other four adjustments ranged from \$0.5 to \$9.3 million. No research to date, however, has examined whether altering the estimates leads to greater UA acceptance.

Therefore, our study examined whether estimate size actually has an effect on managerial acceptance of UA information.

We focused on modifying Carson *et al.*'s (1998) scenarios to include conditions with adjusted UA estimates. We wanted to extend the literature by examining managerial reactions to lower estimates. We included Latham and Whyte's (1994) original \$60 million estimate. Furthermore, we used Sturman's (2000) economic adjustments to create a moderate estimate of \$16.9 million dollars. Finally, although using all five adjustments may not be realistic in many situations, we included a lower estimate because many managers may not control (or relate to) monetary estimates ranging from \$15-\$60 million dollars (Shultz, 1996). Therefore, we examined a third estimate that took all five adjustments into consideration: \$2.2 million dollars. These modified estimates should provide anchors for more accurate decision-making (Tversky and Kahneman, 1974). We hypothesized that managers would be most accepting of this lowest estimate:

- H2. Adjustments to UA estimates will impact managers' likelihood of accepting a new selection test such that lower estimates will increase acceptance.

Presentation of UA information

We also examined the effects of presentation format. As the expert in Whyte and Latham (1997), Cronshaw (1997) offered his opinion that to be accepted, UA information should focus on being informational to managers. He suggested that managers may have felt intimidated by "high-pressure persuasive tactics" in his presentation, although that was not his intention or purpose (Cronshaw, 1997). Persuasive communication research may shed light on this issue (Highhouse, 1996). Petty and Cacioppo (1986) suggested that when selling an argument, one should decrease the level of complexity in the message. Dutton and Ashford (1993) advised that succinctly framing and describing information increases attention to the information. Carson *et al.* (1998) applied this principle, finding that managers reacted more positively to simpler scenarios.

Potential users of UA information need background and contextual information to make informed decisions, especially with limited exposure or training in UA methodology (Macan and Highhouse, 1994; Sturman, 2003). We sought to examine the effects of restructuring UA information by altering the visual presentation of the information through use of a table. Users of UA information not only need financial estimates, but also an explanation of how researchers arrived at the results. With strict "textual" formats, even managers who have a vested interest in the information may feel overwhelmed. Managers may better make sense of numerical and statistical information placed in graphs or tables as it sets the information apart from the text (Jarvenpaa and Dickson, 1988; Kleinmuntz and Schkade, 1993). Subsequently, research suggests that perceptually different information has a greater impact on decision making (Fagerlin *et al.*, 2005; MacGregor and Slovic, 1986).

Latham and Whyte (1994) included an expectancy table in their study, arguing that a visual depiction should prove effective in convincing managers to accept a selection procedure. Their findings, however, did not provide support for the presentation of the expectancy table. Comparing expectancy table information to UA information does not, however, allow for a direct comparison of the exact same content. We argue that to examine if information provided in a table is more effective than presenting the

information in textual format, the same content should be presented. In the present study, we make this direct comparison by presenting the same UA information in written form and in a tabular format.

We argue that the way previous research has presented UA information may not be the most advantageous when the goal is acceptance of a new selection test. Thus, we hypothesized that when numerical findings in UA scenarios are in tabular form, managers would be more accepting of the information as compared to text-only formats such as that used within Carson *et al.* (1998):

- H3. Presentation format will impact managerial acceptance of a new selection test such that the use of tables will increase acceptance.

In addition, we examined the combined effect between the original and restructured format conditions with lower financial estimates on managerial acceptance:

- H4. Presentation format will have a stronger impact for managers who receive low UA estimates than those who receive high UA estimates.

Finally, to fully investigate the “managerial acceptance – UA information” relationship, we included a qualitative component and directly asked respondents to share their reasoning behind their choices. Much of the previous research examined how or if managers react to specific manipulated variables, but had not asked managers why they did or did not use UA information. Our study is the first to answer the repeated calls from researchers that such a qualitative approach could prove fruitful (Carson *et al.*, 1998; Cronshaw, 1997; Latham and Whyte, 1994; Winkler *et al.*, 2010; Whyte and Latham, 1997). Understanding the underlying reasons for managerial actions and behaviors is an essential first step to offering ways to change and improve the UA process. Macan and Foster (2004) attempted to identify how managers make decisions by asking them to indicate the three most influential pieces of information they relied on when determining if to implement a selection test. Approximately two-thirds of their sample indicated that UA information was crucial to their decision-making process. While this confirmed the criticality of UA results, they did not ask why UA information was useful. Therefore, our study is unique in that we directly asked managers to describe what information they used and why it was a determining factor in their decision-making process.

Method

Participants

We recruited participants using a similar approach as in previous studies (i.e. Hazer and Highhouse, 1997; Macan and Foster, 2004). Participants were managers identified by undergraduate business students who worked directly on determining resource allocation decisions within their organizations. Our sample ($n = 185$)^[1] consisted of slightly more males (61 percent), with a mean age of 40 years (range 20-62). Managers stayed in their current job for an average of nine years and almost half (49 percent) made resource allocation decisions at least once a week, with the median resource allocation approximately \$150,000 per year. Most managers (73 percent) worked in positions outside of their human resource department, yet almost all managers (94 percent) had some level of responsibility for hiring employees. Over half (54 percent) were employed in the private sector and most (68 percent) worked in a service industry.

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As expected, only a small number (20 percent) had previously encountered UA during their career.

Study design

We used a 3×2 between-subjects factorial design with estimate adjustment (low vs moderate vs high) and format (text vs restructured table format). A control group received validity-only information. We randomly assigned participants to one of these seven conditions.

Materials

We used seven sets of stimulus materials. Carson *et al.*'s (1998) revised validity-only scenarios served as the basis for all seven conditions. Each scenario presented participants with four key sections of information:

- (1) context – a description of the manager's role in the situation and background information on the company, job, and current employee job performance;
- (2) description of current selection procedures;
- (3) qualifications of consultant presenting new selection test; and
- (4) consultant's summary of the proposal, which includes a description of the new selection test's validity, information about the procedures used to assess validity, and the costs associated with the new test.

These four sections comprised the validity-only control condition.

The other six conditions also contained UA information. For the estimate adjustment manipulation, Carson *et al.*'s revised validity + UA scenario (i.e. \$60 million) represented the high estimate condition. For the moderate estimate adjustment condition, we modified the Carson *et al.*'s scenario by reducing the original estimate to \$16.9 million. Similarly, the low estimate adjustment condition further reduced the estimate to \$2.2 million.

The format manipulation used Carson *et al.*'s scenario for the original format condition. For the restructured format condition, we visually restructured Carson *et al.*'s scenario by presenting the numerical UA information in tabular form in addition to the existing textual form. The only modifications we made to Carson *et al.*'s scenarios involved modifying estimate numbers and inserting a table with estimate information for the format manipulation conditions. The only difference from those used in prior studies is the mode of presentation.

Procedure

We randomly distributed scenarios to business students and instructed them to identify a manager willing to complete the study materials. They received extra class credit if they delivered the materials back to the researcher. The materials contained instructions and one of the seven scenarios. That is, managers read a scenario describing a critical selection problem with a possible solution. They were instructed to choose whether to implement the solution given available information by completing a set of questionnaires. In addition, managers provided relevant demographic information, including name and contact information for answer verification purposes. We contacted a third of the final sample and all confirmed their participation.

Measures

Managers responded to a series of questionnaires that assessed the following variables: degree of acceptance of the proposed solution; what pieces of information they used when forming their decision; and qualitative rationale (e.g. reasoning behind their decision).

Acceptance. Participants completed eight items taken from Macan and Foster (2004), measuring their degree of acceptance of the test ("ACCEPTANCE"; 1 = not at all; 5 = very). Examples include "How likely are you to implement the new selection test?" and "How confident are you that the new selection test will improve the quality of employees that your organization hires?" We averaged responses to produce a mean acceptance score. Internal consistency analyses revealed high reliability (coefficient alpha = 0.92).

We asked two related acceptance items: "Would you suggest using the test if asked for your opinion by the president of the company?" ("SUGGEST"; 1 = would strongly oppose; 4 = would strongly suggest) and "Would you implement the test if you were the final decision maker?" ("IMPLEMENTATION"; 1 = yes; 0 = no).

Useful information. In addition, we provided participants with a list describing each type of information found in the scenario. They rated the importance of each piece of information (1 = unimportant; 5 = very important) and after making this rating, they ranked the three pieces of information they found most influential in making their decision on whether to use the proposed selection test.

Qualitative rationale. We asked participants several questions related to the reasons behind their decision. First, participants elaborated on the choices indicated on the useful information questionnaire by providing reasons why the three pieces of information chosen were the most influential. Participants provided this information in a one-page or less written narrative. Second, we asked participants about their decision-making experience, focusing on whether the information presented was realistic and believable. We designed these questions to explore what they liked and disliked about various aspects (e.g. type, structure) of the information and their ability to understand the information. We assessed this with multiple items (1 = not at all; 5 = very). Examples include "How believable was the UA estimate?" and "How well did you understand the proposal for the new selection test?"

Results

Table I presents the descriptive statistics for the acceptance, suggest, and implementation variables for each of the seven study conditions. To test our hypotheses, we conducted a series of regressions. We ran regression analyses for the two continuous dependent measures (i.e. acceptance and suggest) and logistic regression for the dichotomous dependent variable (i.e. implementation). Across all regressions, we entered four covariates in the first step that included: manager knowledge of UA, manager gender, sector (private vs public), and manager level of responsibility for hiring.

Effect of UA estimate adjustments

Comparing findings. Given previous findings, we expected that managers who received UA information would be more likely to accept the selection test than those who received validity-only information. In using regression analysis, we dummy coded the

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Table I.
Descriptive statistics for acceptance, suggest and implementation by experimental condition

Condition	<i>n</i>	Acceptance		Suggest		Implementation Percentage of yes responses
		Mean	SD	Mean	SD	
Validity-only	27	3.36	0.80	2.56	0.70	59
High estimate, original format	26	3.79	0.76	3.15	0.67	88
Moderate estimate, original format	26	3.89	0.60	3.19	0.57	88
Low estimate, original format	26	3.63	0.88	3.04	0.72	77
High estimate, restructured format	27	3.53	1.01	3.04	0.85	74
Moderate estimate, restructured format	26	3.60	0.99	3.04	0.66	81
Low estimate, restructured format	27	3.45	0.93	2.96	0.71	74

Notes: Acceptance is a mean score based on eight items (1 = not at all; 5 = very); Suggest is one item (1 = would strongly oppose; 4 = would strongly suggest); Implementation is dichotomous (0 = no; 1 = yes)

categorical variables to determine whether there was a significant difference between the validity-only condition and all conditions containing UA information for the three dependent measures. After controlling for the four covariates in the first step, we entered the categorical dummy coded variable in the second step. As shown in Tables II and III respectively for type of information, we found significant overall effects for

	b	Acceptance				b	SE	Suggest			<i>F</i>	<i>R</i> ²
		SE	<i>t</i>	<i>F</i>	<i>R</i> ²			<i>t</i>	<i>F</i>	<i>R</i> ²		
<i>Covariates</i>				0.93	0.02				1.71	0.04		
Knowledge of UA	−0.15	0.17	−0.90			0.10	0.14	0.74				
Gender	−0.15	0.14	−1.07			−0.13	0.11	−1.18				
Sector	−0.10	0.13	−0.73			−0.19	0.10	−1.75				
Hiring responsibility	−0.09	0.27	−0.32			−0.28	0.22	−1.27				
<i>Type of information</i>	0.22	0.19	1.15	1.01	0.03	0.43	0.15	2.91**	3.11**	0.08		
<i>Adjustment</i>				0.88	0.04				2.29*	0.09		
Low	0.12	0.21	0.57			0.38	0.17	2.32*				
Moderate	0.31	0.22	1.45			0.48	0.17	2.83**				
High	0.22	0.21	1.03			0.44	0.17	2.62**				
<i>Format</i>				1.38	0.05				2.72*	0.09		
Original	0.35	0.20	1.73			0.48	0.16	3.03**				
Restructured	0.09	0.20	0.48			0.38	0.16	2.44*				
<i>Adjustment, format</i>				0.94	0.05				1.69	0.09		
Low, original	0.24	0.25	0.94			0.39	0.20	1.96*				
Moderate, original	0.49	0.25	1.78			0.53	0.20	2.65**				
High, original	0.36	0.24	1.49			0.52	0.19	2.70**				
Low, restructured	0.01	0.24	0.05			0.36	0.19	1.86				
Moderate, restructured	0.19	0.25	0.78			0.43	0.20	2.22*				
High, restructured	0.08	0.25	0.32			0.36	0.20	1.82				

Notes: **p* < 0.05; ***p* < 0.01

Table II.
Predictors of continuous criterion variables with no UA Information control condition as reference category

	B	SE	Wald	Implementation Odds Ratio	χ^2	Nagelkerke R^2
<i>Covariates</i>					2.19	0.02
Knowledge of UA	0.45	0.44	1.09	1.58		
Gender	-0.02	0.38	0.00	0.98		
Sector	0.31	0.37	0.70	1.36		
Hiring responsibility	0.14	0.81	0.03	1.15		
<i>Type of information</i>	1.02	0.47	4.67*	2.77	4.46*	0.06
<i>Adjustment</i>					5.68	0.06
Low	0.78	0.54	2.12	2.19		
Moderate	1.27	0.58	4.85*	3.56		
High	1.05	0.55	3.63	2.87		
<i>Format</i>					6.12*	0.07
Original	1.32	0.53	6.08*	3.73		
Restructured	0.79	0.50	2.47	2.19		
<i>Adjustment, format</i>					7.62	0.08
Low, original	0.90	0.65	1.94	2.46		
Moderate, original	1.57	0.76	4.25*	4.80		
High, original	1.61	0.75	4.64*	4.98		
Low, restructured	0.66	0.61	1.14	1.93		
Moderate, restructured	1.04	0.67	2.49	2.82		
High, restructured	0.66	0.62	1.12	1.93		

Notes: * $p < 0.05$; ** $p < 0.01$

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Table III.
Predictors of categorical
criterion variable with no
UA information control
condition as reference
category

suggest ($F(5,178) = 3.11$, $p < 0.01$, $R^2 = 0.08$) and Implementation ($X^2(1) = 4.46$, $p < 0.05$, Nagelkerke $R^2 = 0.06$), providing support for *H1*. Managers were more likely to suggest and implement the selection test when UA information was provided compared to when they had access to validity information only.

UA estimate adjustments. To test *H2*, we examined whether managers presented with the lower UA estimates were more likely to accept the selection test compared to managers provided with higher UA estimates and to managers with no UA information (i.e. control condition). That is, we ran regressions with the four covariates in the first step. Then, in the second step, we entered the dummy-coded estimate adjustment conditions with the no UA information control condition as the reference category. As shown in Table II, we found a significant effect for the dependent measure, Suggest ($F(7,178) = 2.29$, $p < 0.05$, $R^2 = 0.09$). Examining the coefficients revealed that managers were more likely to suggest use of the selection test across all the estimate adjustment conditions regardless of level (i.e. high, moderate or low), in comparison to those who did not have access to UA information (validity only control).

Format of UA information. Next, we examined whether the way UA information is presented affected acceptance. Again, we ran regressions with the four covariates in the first step. Then, in the second step, we entered the dummy-coded format conditions with the no UA information control condition as the reference category. As shown in

Table II, we found a significant effect for the dependent measure, suggest ($F(6,178) = 2.72, p < 0.05, R^2 = 0.09$). Examining the coefficients revealed that managers were more likely to suggest use of the selection test across both format conditions in comparison to those who did not have access to UA information (validity only control). We also found a significant effect of Implementation ($X^2(2) = 6.12, p < 0.05$, Nagelkerke $R^2 = 0.07$) as displayed in Table III. The Wald statistic indicated that managers who received the original UA format as used by other researchers said they would be more likely to implement the selection test compared to those who did not receive UA information.

Interaction of adjustment and format. We also examined how a combination of estimate adjustment and format might affect managers' acceptance. We ran regressions for each of the three dependent variables with the four covariates in the first step. We then entered as a set the dummy-coded estimate adjustment and format combinations with the no UA information control condition as the reference category. As shown in Tables II and III, the overall effect was not significant.

Overall model. We conducted three additional sets of regressions for each of the dependent variables. In the first step we entered the four covariates. In the second step, we entered a dummy-coded variable (i.e. Type of Information) to determine whether there was a significant difference between the validity-only condition and all conditions containing UA information. In the third step, we entered two dummy-coded variables to represent the three estimate adjustment conditions. That is, in this regression, we dummy-coded the variables without reference to the validity-only control group. Likewise, in the fourth step, we entered a dummy-coded variable for format. Finally, in the fifth step, we entered the interaction between the Adjustment and Format conditions. As shown in Table IV for the continuous dependent variables

	Acceptance					Suggest				
	<i>b</i>	SE	<i>t</i>	<i>F</i>	<i>R</i> ²	<i>b</i>	SE	<i>t</i>	<i>F</i>	<i>R</i> ²
<i>Covariates</i>				0.93	0.02				1.71	0.04
Knowledge of UA	−0.17	0.17	−0.99			0.07	0.14	0.52		
Gender	−0.14	0.14	−0.98			−0.09	0.11	−0.82		
Sector	−0.03	0.14	−0.23			−0.15	0.11	−1.34		
Hiring responsibility	−0.17	0.28	−0.63			−0.36	0.22	−1.66		
<i>Type of information</i>	0.47	0.25	1.89	1.01	0.03	0.56	0.20	2.84**	3.11**	0.08
<i>Adjustment</i>				0.91	0.04				2.32*	0.09
Low	−0.24	0.25	−0.95			−0.18	0.20	−0.88		
High	−0.11	0.25	−0.45			−0.04	0.20	−0.22		
<i>Format</i>				1.28	0.06				2.18*	0.09
Restructured	−0.28	0.25	−1.13			−0.13	0.20	−0.67		
<i>Adjustment, format</i>				1.02	0.06				1.77	0.10
Low, restructured	0.06	0.35	0.16			0.10	0.28	0.37		
High, restructured	−0.04	0.35	−0.11			−0.07	0.28	−0.26		

Table IV.
Predictors of continuous
criterion variables:
overall model

Notes: * $p < 0.05$; ** $p < 0.01$

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and Table V for the categorical dependent variable, results are similar to previous findings that managers who had UA information were more likely to suggest using the test and implement it than those who did not have access to UA information. The size of the estimate and how the UA information was presented overall did not tend to affect these results.

Qualitative analyses

Table VI displays average importance ratings and shows which pieces of information managers ranked as essential for making their final decisions. Approximately two-thirds of managers indicated a clear preference for UA information, regardless of UA condition, followed by the validity of the test (55.1 percent), the validity procedures (40.5 percent) and the cost of the test (39.2 percent). After excluding UA information for the control group, validity and cost of the new test tied for the highest ranking at 59.3 percent, followed next by validity procedures (44.4 percent).

To obtain additional qualitative rationales, we asked managers to explain their reasoning behind the rank ordering. Two trained raters coded all 55 managerial narrative responses to identify general themes in explaining the effect UA information had on managerial decisions (Cohen's kappa = 0.87). Both raters used an inductive approach where they let the data drive the coding scheme, which resulted in four themes: focus on ROI, legitimacy of UA, importance of the benefit vs cost comparison, and the use of other information. Examples of statements made within each of the four themes are displayed in Table VII.

The first central theme consisted of a return on investment (ROI) rationale. The general consensus revealed that UA information was another way of stating the return on investment that occurs when comparing the benefits and costs associated with

	<i>B</i>	<i>SE</i>	<i>Wald</i>	Implementation odds ratio	χ^2	Nagelkerke <i>R</i> ²
<i>Covariates</i>					2.19	0.02
Knowledge of UA	−0.55	0.46	1.44	0.58		
Gender	0.13	0.40	0.11	1.14		
Sector	−0.18	0.39	0.21	0.84		
Hiring responsibility	−0.41	0.84	0.24	0.66		
<i>Type of information</i>	1.62	0.76	4.52*	5.03	4.46*	0.06
<i>Adjustment</i>					1.00	0.06
Low	−0.71	0.79	0.82	0.49		
High	0.00	0.88	0.00	0.99		
<i>Format</i>					1.94	0.08
Restructured	−0.58	0.80	0.52	0.56		
<i>Adjustment, format</i>					0.55	0.08
Low, restructured	0.34	1.03	0.11	1.40		
High, restructured	−0.42	1.11	0.14	0.66		

Notes: **p* < 0.05; ***p* < 0.01

Table V.
Predictors of categorical
criterion variable: overall
model

Table VI.
Information managers
reported to be influential
in implementing the new
selection test

Type of information	Rating ^a	Most influential	Second most influential	Third most influential	Percentage of responses for UA group	Percentage of responses for non-UA group ^b	Percentage of responses for entire sample (n = 185)
UA information ^c	4.19	50	28	21	62.7	NA	NA
Validity of the new test	4.21	42	33	28	55.1	59.3	55.7
Validity							
procedures used	4.06	14	34	28	40.5	44.4	41.1
Cost of the new test	3.95	26	24	28	39.2	59.3	42.2
Consultant's qualifications	3.81	12	20	18	25.3	37.0	27.0
Current							
selection							
procedures	3.58	8	12	13	14.6	37.0	17.8
Job	3.32	7	7	13	13.9	18.5	14.4
UA table ^d	3.24	0	5	6	13.8	NA	NA
Size of UA estimate	3.41	3	6	11	12.7	NA	NA
Position	3.06	10	7	5	10.1	22.2	11.9
Company	3.31	4	6	11	9.5	22.2	11.4

Notes: ^aImportance Rating Scale: 1=Unimportant; 5=Very Important; ^bPercentages based on the 27 participants in the Validity-Only Control group; ^cUA Information was only given to 158 of the 185 participants responding to these items; ^dUA Table was only given to 80 of the 185 participants responding to these items

Four themes with corresponding summary	Sample quotes
1. Focus on ROI: information of how much the company would benefit from implementing the proposal	<ol style="list-style-type: none"> 1. "Any process that ensures qualified employees that will positively benefit the company's bottom line should be used" 2. "Spend money to save some is a wise decision to me" 3. "The economic value to the company alone was worth investigating further"
2. Legitimacy of UA: the extent to which the UA information is seen as accurate and valid	<ol style="list-style-type: none"> 1. "If the data is not valid, the estimated savings would be incorrect" 2. "If there is a flaw in the information, then the estimates may be inaccurate" 3. "The UA calculations make too many assumptions"
3. Importance of the benefit vs cost comparison: the value of having both pieces of information, the cost and the benefits	<ol style="list-style-type: none"> 1. "UA info gave high level picture of the risk and reward provided by the new process" 2. "The cost and benefits were most important because that is the information that I would need to sell it to my boss" 3. "Need to compare cost and benefits to make a good decision"
4. Use of other information: the importance of having non-UA information	<ol style="list-style-type: none"> 1. "I would like to see cash flow and profit/loss statements used more prominently" 2. "Validity of the test is important because we want to make sure it is a valid process before this time and money is involved" 3. "If it costs too much to get slightly better results, it may not be worth it"

Table VII.
Summary of managers'
written qualitative
comments regarding
usefulness of UA
information

implementing the new selection test. Based on the UA information, many managers were impressed with how much the company would benefit from implementing the proposal and realized that the company would be better off using the new test because more qualified, productive employees would be hired, resulting in significant savings for the company over the long-term. Examples of managers' written comments include: "any process that ensures qualified employees that will positively benefit the company's bottom line should be used," "spend money to save some is a wise decision to me," and "the economic value to the company alone was worth investigating further."

Conversely, a smaller number of managers were concerned with the legitimacy of the UA information. Several managers described the numbers found in the UA information as "soft" and were not convinced that the UA was "accurate" and valid. They believed the numbers were "too good to be true" and "if the data is not valid, the estimated savings would be incorrect." Managers also noted that the scenarios either made "too many assumptions" or "did not provide enough detail to take the information seriously." This viewpoint was dispersed across all three adjustment levels, with half of these cases residing in the low estimate (i.e. \$2.2 million) condition, providing some evidence that even the lower estimate may still be too large for managers to accept as true and believable. These managerial responses also

corroborate Sturman's (2000) "two fundamental problems," that he argued are holding back UA as a useful tool for managers in addition to the dollar value. That is, our study provides evidence for Sturman's notion that the complexity of the UA computation and the necessity for training of managers in using such sophisticated UA information is needed.

Another pattern centered on how UA gave the reader a better sense of the overall picture by presenting both benefits and costs. While only a handful of managers in the UA conditions noted the importance of having access to the benefits and costs for implementing the new test, a third of the managers in the validity-only control group decided that it was difficult to make a decision based solely on the costs involved with the proposal (e.g. "need to compare benefits to how much cost to obtain true benefits." Again, the validity-only group received cost information but was not provided with the possible benefits, which might also explain why managers in the control group ranked cost as more influential relative to the managers in the UA conditions. Interestingly, managers often mentioned cost in the same breath when describing UA information, which makes sense because it is quite difficult to discuss the financial impact of the test without examining both sides of the benefit – cost equation. Thus, it becomes apparent that at least some managers use, or want to at least have, UA information because of its inherent benefit vs cost comparison.

Managers also provided an explanation as to why they believed other pieces, besides UA information, were important. As stated earlier, the control group made decisions primarily using the validity and cost information. These factors were also highly important for those who received UA information, ranking second and fourth, respectively (see Table VI). In particular, the majority of managers, who explained why validity was important to forming their decision, stated that it was necessary to have "confidence" in the validity of the test because without this, there is no point in considering anything else. For example, one manager explained that "the validity of the test proves its effectiveness in the past and offers assurances of its usefulness in the current company." Another manager felt it was essential to start with a "proven, accurate tool" because it provides the key to a successful selection program. Furthermore, managers indicated that if a test lacks validity, then it is neither worth the time nor money that would be spent to change the system. Although a few managers were not convinced that the test was valid, it was evident that test validity is a sticking point with managers when making their decision, if for no other reason than to have a "basis for comparison" between the new and old selection tests.

Similarly, this type of thinking runs parallel with their preference for knowing the cost of the new test. UA and validity information play important roles in managerial decision-making, but the cost of the test was also a critical piece of information. Some managers placed the cost of the test in the context of whether or not the organization could actually allocate the money needed to pay for the test given the current state of the organization's budget. As one manager explained, the "bottom-line for any company is the cost factor." To support this, over a third of the managers felt that the cost of the test was an essential factor in their decision-making and another third indicated that the costs exceeded any benefits that may result from implementing the test.

The overall qualitative picture revealed that managers used cost and UA information to show how the proposal affects the company's bottom line, but there is

no point in using a new test without having validity evidence to support its implementation. These results offer a view into the types of information managers want when making decisions and also provide a better understanding as to why they desire these pieces over others.

Reactions to decision-making scenario. We measured understanding of the proposal with the same two items used by Carson *et al.* (1998), which asked managers to what extent did they understand the proposal and was the proposal clearly presented. We averaged these two items to create an understanding of the proposal composite score (1 = not at all; 5 = very) with an alpha of 0.76. The questionnaire also included two additional items targeting the understanding of certain pieces of information in the scenarios, specifically validity and UA information. Again, we averaged these two items to create an understanding of the information composite score (1 = not at all; 5 = very) with an alpha of 0.80. Over two-thirds of the managers indicated that they had a good understanding of the proposal and over half felt they were able to comprehend the information presented in the scenario[2]. We examined whether managers would have a better understanding of the proposal and its information due to the UA table insertion, but we found no difference between the restructured and original format groups for both understanding of the proposal ($F(1, 152) = 2.00$, $p < 0.16$, $\eta^2 = 0.01$) and understanding of the information ($F(1, 152) = 0.99$, $p < 0.32$, $\eta^2 = 0.01$).

In addition to understanding UA information, managers provided their perception on the realism found in the scenarios. Overall, the majority found the scenarios realistic and plausible given the context of the situation. We found no differences regarding realism for format and estimate conditions.

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Discussion

Prior research provides two arguments for the mixed results found in the current research stream. Latham and Whyte's (1994) conclusion focused on the idea that managers reacted negatively to UA information because of something inherently wrong with the UA model. Carson *et al.* (1998) went a different direction and emphasized the presentation of UA information as the driving force behind managerial acceptance. From this, we designed the present study to explore both types of explanations by addressing how estimate size and format structure influence managerial acceptance. Our primary goal was to provide guidance on how to enhance UA information through major (adjusting the UA equation) and minor (tweaking UA information structure) modifications. Our results did not support either approach. Instead, we learned that managers were indifferent to estimate size and were not more favorable to UA information when presented in a tabular format compared to the original, written presentation. We did find, however, that managers report using UA information, perhaps as a means to support their suggestions to upper management to use the new selection test. Our qualitative findings provide unique insight into how managers use UA information when making decisions, an important element of the UA puzzle not revealed by previous research. Such managerial perspective can serve to change the direction of future research in UA. We discuss each point and corresponding ideas for future research studies below.

Size of UA estimate

Regarding UA estimate magnitude, Hazer and Highhouse (1997) identified the need for investigating how much of an effect UA estimate size has on the credibility of UA information. Our results revealed that managers were no more accepting of the smaller estimates compared to the higher estimates. One possible explanation is that even Sturman's (2000) adjusted estimates were too high for managers to use in a meaningful way. For example, several managers expressed surprise at the size of the UA estimate and the majority questioned its believability and credibility, even in the low estimate condition. Although estimate magnitude may still be too large for managers to truly believe, the levels used in the scenarios are more realistic than what has been empirically tested in past research.

Clearly the estimate size may have disheartened some managers, yet another potential driving force behind their indifference may stem from their perception of the estimate's accuracy. UA information can potentially bring something unique and useful to the decision-making situation as long as the information is verified as accurate and valid. Our qualitative data suggests that managers wanted clarifying information (i.e. explanations of assumptions and other supporting data such as references) to help them understand the calculation of the final estimate. Without this additional information, managers seemed unsure whether the estimate was an accurate reflection of the true benefits of the selection test. If the components used to calculate the estimates are missing or unrealistic, then do the perceived inaccuracies of the components and supporting information have a more direct impact on managerial acceptance than estimate magnitudes? Future research should examine the effects of training managers to understand UA and the assumptions inherent in the estimate modifications on their decision-making to disentangle these issues.

Although in their written comments some managers felt uncomfortable with how the estimate was derived, this could be viewed more as a strength rather than as a perceived weakness of the scenarios. For example, the lack of supporting information is more realistic of actual decision-making situations because these decisions do not have the luxury of being based on entirely complete information. The limited supporting information within each scenario may provide a truer decision-making experience compared to one where every detail and calculation is given to the decision-maker. It is also possible that managers who have a strong understanding of how UA calculations and estimates are constructed would better comprehend that the values are best estimates. Future research should aim to tease out the extent to which managerial understanding of the UA calculations affects managerial confidence in the process and value of the resulting estimates. Winkler *et al.* (2010) lend support to these notions in their findings for causal chain analysis. They found that including non-financial information such as employee commitment and customer satisfaction led to more favorable reactions than single-attribute UA. We concur with Winkler *et al.* (2010) that future research should further explore these comparisons.

Presentation of utility analysis

Regarding UA information format, researchers have only scratched the surface when examining how UA information is presented and communicated to decision-makers. Carson *et al.* (1998) revised their scenarios to be shorter and easier to understand, but did not alter the visual structure of the information. Our results indicated that using a table to display UA information was not a significant improvement in presenting UA

information to decision-makers. This finding may result from staying too faithful to the original formats used by previous researchers. The UA tables were intentionally developed to be embedded within the text and to repeat the same numerical information found earlier in the scenario. This was done to minimize changes to the content of the scenario. Adding conditions in future research where numerical UA information is found only in tabular form and combined with cost information may yield the expected improvement. Furthermore, we recommend researchers consider moving past these scenario formats and focusing on presentation methods that are more typically used by business practitioners. In fact, we would “blow up” the textual scenarios and start anew with formats companies currently use to share this type of information to decision-makers. Most managers are not reading long technical reports explaining the ROI of a study. Instead, they are provided with short executive summaries and presentations that include compelling tables and graphs to tell the story of how the company can save money by implementing a new selection tool, such as in the slideshow presentation used in the study by Winkler *et al.* (2010).

In addition to examining the structure of UA information, researchers should also investigate the specific language used to communicate UA to decision-makers. When we provided managers the opportunity to elaborate on their responses, several instances occurred where they referred to utility analysis in terms of “return on investment” and would describe their answers in the context of “benefits vs costs.” These examples suggest that it may also be necessary to describe the information using terminology and language normally associated with financial matters. Rauschenberger and Schmidt (1987) recommended that when communicating utility analysis to decision makers, it is extremely important to have a conversation with someone in the financial or accounting department “to determine standard formats for discussing and presenting information related to money.” Practitioners recommend talking with all stakeholders early in the project to get their input on how best to frame performance metrics, which should help increase the face validity of the information (Fallon, 2009). Future researchers may build on this by examining different variations on the type of language used to describe UA information (e.g. UA vs ROI) and study its effect on managerial acceptance.

Qualitative rank-ordering

We provided another contribution by incorporating a qualitative component into the study’s design. The general consensus among researchers is that we do not understand why managers are unimpressed with UA information (Cabrera and Raju, 2001; Latham and Whyte, 1994; Skarlicki *et al.*, 1996). We addressed this need by asking managers to indicate their top three most influential pieces of information and then elaborate on why they used them in making their decisions.

As expected, nearly two-thirds of managers rated UA information as being one of the three most influential pieces of information used when making their final decision. This finding is consistent with previous research (Macan and Foster, 2004) and confirms that UA information does play a significant role in managerial decision-making. Our findings offer directions future researchers should explore to understand better the role played by UA information in managers’ judgment processes as well as exploring individual differences in managerial use of UA. Assessing only a manager’s overall acceptance of the selection test may be too broad and simplistic.

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Overall, our qualitative findings suggest that UA may be appropriate or useful in certain situations and for certain managers.

Perhaps one role UA information plays is as a means for managers to “fall back on the data” when suggesting to senior management to adopt the selection test. The qualitative analyses revealed that another key driver for why UA is influential may stem from the benefit vs cost comparison that ultimately results. A manager’s decision-making process often involves the comparison of the advantages and disadvantages for each option, with the prevailing option being the one where the positives outweigh the negatives (Weirich, 2004). If this inherent benefit vs cost comparison is the underlying reason for using UA, then the literature’s consistent finding of little or no managerial acceptance may result from how well the case on either side of the equation is developed and argued. Researchers need to examine this possibility and whether this need for this comparison is only relevant for certain groups of managers. Practitioners may need to reexamine how they build support for both sides and should incorporate additional information besides dollar amounts, such as legal liability or the effect on company reputation (Macan and Foster, 2004) or the effects on customer satisfaction (Winkler *et al.*, 2010), to further strengthen their case.

Besides UA information, a large number of managers reported that the validity and cost of the test were influential in their decision-making. The validity of the test was rated just as important and ranked almost as often as UA information; qualitative analyses revealed that the majority of managers needed to be confident in the test’s validity before considering anything else. These findings revealed that validity may be used as an initial hurdle and that full consideration of all the information would only take place if the test was first deemed valid by the reader. Managers want to know that the new test is just as good or better than the test it is replacing and it appears that the test’s validity is a useful indicator of this factor. Thus, we echo Macan and Foster’s (2004) call for future research on managerial perceptions of the validity coefficient and its use as an independent variable in the current research stream. These findings also lend support to their suggestion that “when validity is very high or very low, UA information is not particularly useful for making decisions.”

In addition to UA information and test validity, managers reported the cost associated with the new test as crucial to their decision-making. In fact, the control group rated and ranked the test’s costs at the same importance level as that of the test’s validity (which were the two highest for this condition, see Table VI). Given the importance of controlling costs in today’s business environment, it is not surprising that managers heavily considered the monetary expenses of the new selection test when making their decision; however, managers in the UA conditions ranked costs (39.2 percent) much lower relative to UA information (62.7 percent) and the test’s validity (55.1 percent). One possible explanation for this difference could again be due to the inherent cost vs benefit comparison that may occur when thinking about UA information.

The qualitative analyses also revealed information about what was missing or excluded from the scenarios. The qualitative data was filled with many requests for additional or clarifying information. Several managers expressed an interest in having a contrast between the old test and multiple alternative tests. Managers also requested information about whether the new selection test was being utilized by their competitors. Comparisons involving multiple options or companies would also be compelling if the goal was to persuade upper management of the value and merit of

replacing the existing test with a newer one. Future research should investigate this and determine whether UA information is more useful when derived for several options being considered simultaneously.

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Limitations

While we surveyed actual managers and the decision-making context was genuine in many respects, our scenarios were unable to simulate true decision-making situations. In a real organization, managers would be forced to make decisions that have real consequences. Although it is difficult to conduct UA studies in applied settings, we recommend developing more realistic decision-making scenarios and provide financial incentives to managers making final decisions.

In addition, the UA tables had minimal impact on managers' acceptance of the information. Although we maintained the integrity of Carson *et al.*'s (1998) scenarios, we encourage future studies to continue making modifications by not only changing aesthetic (i.e. spacing, headings) and structural (i.e. numerical tables) components, but perhaps taking an entirely different approach altogether. By using scenarios that mirror components of actual sales presentations from I/O consultants, practitioners may start seeing improvement in use and acceptance rates of UA information. Winkler *et al.*'s (2010) slide presentation serves as one possible template to consider.

Furthermore, practitioners should include additional variables to account for the lack of managerial acceptance of UA information. In an applied decision-making situation, managers not only have to consider the information presented in the scenario, but also take into consideration other situational factors, such as organizational politics, timing of the proposal, and the proposal's impact on organizational directives (Skarlicki *et al.*, 1996; Winkler *et al.*, 2010).

Conclusion

Discrepant results and conclusions exist in the research literature on UA, leaving one to ask: is UA futile or useful? Our study's contribution focused on an examination of variables suggested by previous researchers as possible reasons for the differing findings, but not yet considered in the UA decision-making context – estimate size and format structure. Neither offered the definitive answer. That is, managers given UA information in our study did not fully replicate the small positive effects found in earlier studies (Carson *et al.*, 1998; Macan and Foster, 2004), nor the negative findings of Latham and Whyte (1994) and Whyte and Latham (1997). Managers did, however, report using UA information in their judgment process, signifying the potential benefits of continuing to explore the role of UA information in managers' decision-making processes. The qualitative data we collected also provides a wealth of information that could be used in future studies to help improve the "utility" of utility analysis.

Notes

1. Our power analysis recommended a sample of 189 to achieve 80 percent power for our study.
2. Analyses were rerun using a subset ($n = 107$) of the final sample based on those managers who had a high understanding of UA information (i.e. rated at least a four out of five for the UA information item). This resulted in miniscule changes in effect sizes and non-significant differences for each of the three dependent variables.

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