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EFFECTS OF IRRELEVANT ALTERNATIVES IN RELATIVE PERFORMANCE EVALUATION

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Research

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Abstract

In this study we examine the effect of the presence of irrelevant performance information on the rank order decisions made by supervisors in relative performance evaluation (RPE). Specifically, we investigate the effect of two types of irrelevant performance information patterns in what has been termed an asymmetric dominated decoy and a viable decoy. We also examine whether relative performance information (RPI) size (evaluating 3 versus 9 subordinates at a time) can moderate the adverse influence of irrelevant information. The empirical results from our experiment support that the asymmetrically dominated decoy information pattern (where an additional subordinate is included in the RPE whose performance is similar to and is dominated by one of the original subordinates – referred to as the target subordinate) can increase the rank ordering of the target subordinate. Contrary to our expectation, we do not find that the viable decoy information pattern (where an additional subordinate is included in the RPE whose performance is partially dominating the target subordinate) has a significant influence on the rank ordering decisions of subordinates. Our results also provide support for an interaction between the decoy information and RPI size for the asymmetric dominated decoy such that the rank order effect is only present when the RPI size is small (evaluating 3 subordinates in our case). Our study informs designers of accounting information systems in several ways.

Keywords: irrelevant information, accounting information systems, relative performance evaluation

1 Introduction

Performance evaluation decisions play a vital role in accounting information systems, and are important for a number of different purposes, including performance measurement, coordination, feedback and program evaluation (Cleveland, Murphy and Williams, 1989; Martinsons et al., 1999; Hu and Huang, 2006; Huang and Hu, 2007; Chen, 2010). Thus, the quality of performance evaluation decisions is essential for both organizations and employees. However, despite the sophistication of accounting information system, the human factor continues to play an important role and may lead to biases (Kim and Kankanhalli, 2009). We explore effects of irrelevant information in a performance evaluation setting to inform designers of accounting information systems on adequate set-ups of performance evaluation systems.

The effect of irrelevant information on decision making has been investigated in a variety of areas, such as psychology (Nisbett, Zukier and Lemley, 1981; Gaeth and Shanteau, 1984; Simon and Baker, 1995; Lu and Proctor, 2001), education (Rice, 1975), decisions of juries (Sue, Smith and Caldwell, 1973), auditing (Hackenbrack, 1992; Shelton, 1999) and accounting (Thaler and Johnson, 1990; Garland, 1990; Duxbury, 2012; Fargher and Wang, 2014). However, potential adverse influences of irrelevant information in performance evaluation contexts are relatively unexplored.

Imagine that there is a supervisor evaluating two original subordinates - subordinate A and subordinate B. Subordinate A and B are evaluated on two performance measures - sales revenue per square meter and return on sale. The supervisor judges the performance of subordinate A to be better than that of subordinate B on sales revenue per square meter and subordinate B to be better than subordinate A on return on sale. Thus, overall the supervisor has no preference for subordinate A over B or subordinate B over A. Now, imagine that there is another subordinate C, who is similar to subordinate B but shows overall slightly lower levels of performance than subordinate B. Since the performance levels of subordinate A and B do not change, the performance of subordinate C should be irrelevant for the relative comparison of subordinates A and B. However, by adding the performance of subordinate C to the evaluation, the supervisor's preference between A and B has changed. Now, supervisor judges the performance of subordinate B to be overall better than the performance of subordinate A.

Since performance evaluation plays a vital role in feedback, effort-stimulation, remuneration and career development, it is important to investigate whether such a situation can occur. If such a situation occurs, it would reduce the quality of performance evaluation decisions and bring negative consequences to both organizations and employees. Thus, it is also essential to investigate whether we can design accounting information systems in a way that such a situation does not occur.

When a supervisor subjectively evaluates performance of several subordinates, one option is to rank them based on their relative performance information (RPI). Frederickson (1992) calls this process relative performance evaluation (RPE). Prior research has shown that supervisors' behaviours in RPE can be affected by several factors (e.g. Bol, Kramer, Maas and Richtermeyer, 2015). We examine whether supervisors' behaviour in ranking of subordinates decisions is influenced by particular information patterns that include irrelevant information (such as information about subordinate C in the example above).

We examine whether one type of irrelevant information, the decoy, can reduce the performance evaluation decision quality. We focus on two types of decoy – the asymmetrically dominated decoy and the viable decoy. The asymmetrically dominated decoy is the alternative which is similar to and dominated by one but not all original alternatives (Huber, Payne and Puto, 1982; Herne, 1997; Simonson, 1989). In contrast, the viable decoy subordinate is partially dominating the target subordinate but is still viewed as an inferior to the target alternative (Hartzler, 2012).

Drawing on the example above, subordinate C can be seen as irrelevant information in the RPE context because he or she should not have an effect on the rank ordering of the original subordinates (subordinates A and B). The dominance heuristic theory predicts that the decoy can increase the attractiveness of an alternative which is most similar with it (Herne, 1997; Tenbrunsel and Diekmann, 2002; Connolly, Reb and Kausel, 2013). The theory has been developed in the domain of customer choice. The question remains whether this theory also has explanatory power in the RPE domain. RPE involves managers who need to make relative comparisons among several subordinates. Such a relative ranking involves different cognitive processes. Huber, Payne and Puto (1982) suggest that changing the complexity of the decision task could change the decoy effect. Thus, our first research question asks whether in RPE the rank ordering of subordinate is subject to a decoy effect.

Our second research question explores whether more relative information decreases a possible decoy effect. Steele (2011) demonstrates that decision makers who can integrate more relevant information into a decision make better decisions (see also Bol, 2011).

We designed a 3 × 2 experimental design to investigate the questions. The first factor was information pattern with three conditions: control condition, the asymmetrically dominated decoy condition, and the viable decoy condition. The second factor was RPI size with two conditions: small RPI size condition and large RPI size condition. 175 business students took part. They were expected to take the role of a regional manager of a chain store and their task was to give a rank to all store managers based on their provided RPI (Bol, Kramer, Maas and Richtermeyer, 2013).

Our study makes several contributions to the literature. There is evidence in the literature showing that performance evaluation can be biased (e.g. Murphy and Cleveland, 1995; Tan and Jamal, 2001; Bol and Smith, 2011; Bol, Kramer, Maas and Richtermeyer, 2013). However, little is known about how irrelevant information influences supervisors' performance evaluation assessments in RPE. Our study contributes to the RPE literature by showing that irrelevant information, such as the decoy, can influence rank ordering decisions. It is important for managers and designers of accounting information systems to be aware of unwanted influence factors. Biases in performance evaluation can have adverse effects to both firms and subordinates. If performance evaluations are biased, selecting the right subordinate for the right job can become difficult (Moers, 2005), additional costs from higher turnover and lost human capital may occur (Prendergast, 1993), and motivation and effort can be lost (Sims, Gioia and Longenecker, 1987; Moers, 2005). Due to these negative effects, special attention should be given to how to improve the accuracy of performance evaluations, such as reducing potential decoy effects in RPE. This may inform designers of accounting information systems to set-up performance evaluation systems appropriately.

Further, our study contributes to the literature on accounting information systems by examining the potential benefits of enlarging relevant information size. Since enlarging information size increases information gathering costs, it is essential to determine in which situations additional information is justified.

2 Background and Hypothesis Development

2.1 Relative performance evaluation and irrelevant alternatives

Performance evaluation is an integral part of performance measurement systems (PMSs) such as balanced scorecards (Premkumar and King, 1994; Kaplan and Norton, 2001; Hu and Huang, 2006; Huang and Hu, 2007). Performance evaluation can be conducted in a relative fashion. In organizational settings it is normally the case that supervisors manage more than one subordinate (Bandiera, Prat, Sadun and Wulf, 2014). When a supervisor tends to compare performance across several subordinates, one option is to rank them based on their RPI. Frederickson (1992) calls this process relative performance evaluation (RPE). RPE is frequently used in many activities. For example, students are ranked by their relative academic performance at schools. In financial markets, mutual funds attract investors based on their relative performance (Genakos and Pagliero, 2012). In sport tournaments, sportsmen are ranked by performance relative to their competitors. Similarly, it is common for subordinates in organizations to be evaluated and rewarded not simply by their own absolute performance, but rather for their performance measured relative to the performance of their peers (Gibbons and

Murphy, 1990). The issue of RPE has attracted considerable attention in recent years. Many scholars point out that RPE has some advantages compared with other performance evaluation methodologies.

First, RPE could filter out common uncertainty from compensation contracts (e.g. Holmstrom, 1982; Gibbons and Murphy, 1990; Chow and Haddad, 1991; Frederickson, 1992; Mahlendorf, Kleinschmit and Perego, 2014). Consistent with agency theory, common uncertainty is described as the uncertainty faced by all agents (Frederickson, 1992). The outcome of one agent's action provides information about another agent's state of uncertainty; therefore, other agents' performance can be used to filter out the common uncertainty from an agent's evaluation (Holmstrom, 1980; Chow and Haddad, 1991). For example, the CEO performance measured relative to other CEOs in the same industry can exclude the effect of some exogenous shocks, such as the global financial crisis (Albuquerque, 2009). Compensations based on RPE without common uncertainty could improve risk sharing between agents and principals, and motivate agents to enhance their effort levels (Mahlendorf et al., 2014).

Second, social comparison theory indicates that people have a drive to perceive similarities between themselves and their peer group (Festinger, 1954; Frederickson, 1992; Brown, Ferris, Heller and Keeping, 2007; Hannan, Krishnan and Newman, 2008; Tafkov, 2013). Hannan, McPhee, Newman and Tafkov (2013) suggest that RPE could induce psychological incentives to subordinates. More specifically, subordinates feel pride if their performance is above that of their peers, and feel shame if their performance is below that of their peers, influencing effort levels. Therefore, RPE can encourage subordinates to compare themselves with others and can motivate higher learning, effort, and performance.

Prior accounting research focuses on how subordinates' performance is affected by the use of RPI (Hannan et al. 2008; Hannan et al. 2013; Tafkov 2013; Newman and Tafkov 2014). However, a limited number of studies include the perspective of the supervisors. An exception is Hecht, Newman and Tafkov (2015) who investigate how managers use discretion over the provision of RPI. They find that managers with discretion over RPI are more likely to provide RPI to low-performing team-members than high-performing team-members to increase their effort. It further has been evidenced that supervisors can be subject to biases and decision errors in the RPE process. For example, supervisors have a tendency to asymmetrically compress ratings when subjectively assessing performance by using RPI and this centrality bias can have negative organizational consequences (Bol, Kramer, Maas and Richtermeyer, 2013).

We explore whether RPE is distorted when supervisors are subject to irrelevant information. Supervisors usually receive a great deal of information in the RPE process (Nisbett, Zukier and Lemley, 1981). Some decision makers are given information which is useful to make a decision. Other decision makers are given a mix of useful and useless information to make a decision. The information that is of "*little or no value to a specific task or predicted future outcome*" has been termed irrelevant information (Selby, 2011 p. 1).

A prominent example of irrelevant information is sunk costs that are frequently incorporated into decision processes (Thaler and Johnson, 1990; Garland, 1990). Sunk costs are believed to play an integral part in the irrational decisions to continue investing in projects that should have been abandoned on a rational economic basis (Keil et al. 2000; Duxbury 2012; Fukofuka, Fargher and Wang 2014). Furthermore, providing irrelevant information to decision makers can increase the likelihood of information overload (O'Reilly 1980), have adverse effects on decision quality (Sue, Smith and Caldwell, 1973), dilute relevant information (Nisbett, Zukier and Lemley, 1981; Lu and Proctor, 2001), decrease processing efficiency (Simon and Baker 1995) and lead to less extreme decisions (Hackenbrack, 1992).

Regarding RPE, when supervisors rank two subordinates (e.g. subordinate A and subordinate B in the introductory example), the RPI of another subordinate (subordinate C) can be seen as irrelevant information because he/she should not have an effect on rank ordering decisions among the original subordinates and should be of no value to make preference judgments between the original subordinates (subordinate A and B). In consumer behaviour literature the widely observed effect in which a third alternative changes the preference between the first and second alternative has been termed decoy effect (Huber, Payne and Puto, 1982; Simonson, 1989; Shafir, Simonson and Tverkey, 1993; Simonson, Carmon and O'Curry, 1994; Highhouse, 1996; Herne, 1997; Doyle, O'Connor, Reynolds and Bottomley, 1999; Hedgcock and Rao, 2009). The decoy effect is a violation of the principle of independence of irrelevant alternatives that "*the preference ordering between two options should not be altered by the introduction of additional alternatives*" (Shafir et al. 1993, p. 21).

2.2 The decoy information pattern

Hartzler (2012) summarizes three different types of the decoy alternatives: the asymmetrically dominated decoy, the viable decoy, and the symmetrically dominated decoy. We focus on the asymmetrically dominated decoy and viable decoy because the decoy effect is not evident when the decoy alternative is symmetrically dominated (Hartzler, 2012). The asymmetrically dominated decoy effect describes that introducing a new alternative, which is asymmetrically dominated by one but not all original alterative, increases the attractiveness of the dominating alternative. Unlike the asymmetrically dominated decoy, the viable decoy partly dominates the original alternatives, but is still viewed as an inferior to at least one original alternative (Hartzler, 2012).

A theoretic explanation for the decoy effect is the dominance heuristic theory (Huber, Payne and Puto, 1982; Simonson 1989; Hartzler, 2012). According to this theory, when the decoy is used as the heuristic, the dominating alternative will be more attractive either because the dominance is an indication of the superiority of the alternative or because decision makers perceive that it would be the easiest to justify choosing this alternative (Highhouse, 1996; Hartzler, 2012). Adding an asymmetrically dominated decoy alternative may provide a simple reason for choosing the dominating alternative, thereby increasing the attractiveness of the dominating alternative and leading to less negative affect in decision making (Simonson 1989). Hedgcock and Rao (2009) provide neuroscience evidence. They find that the choice set with a decoy leads to less activation in the amygdale, which is a brain area associated with negative emotion.

In the viable decoy people choose the intermediate alternative as a compromise (Herne 1997). An explanation is that alternatives with extreme values are relatively less attractive than alternatives with intermediate values (Shafir, Simonson and Tversky, 1993). When the intermediate alternative becomes a compromise, it is the safest way for decision makers to justify their decision when they choose the intermediate alternative.

Figure 1 illustrates the two types of decoy in a RPE context using the introductory example. The two performance measures - sales revenue per square meter and return on sales - are referred to as performance measure X and performance measure Y in the examples.

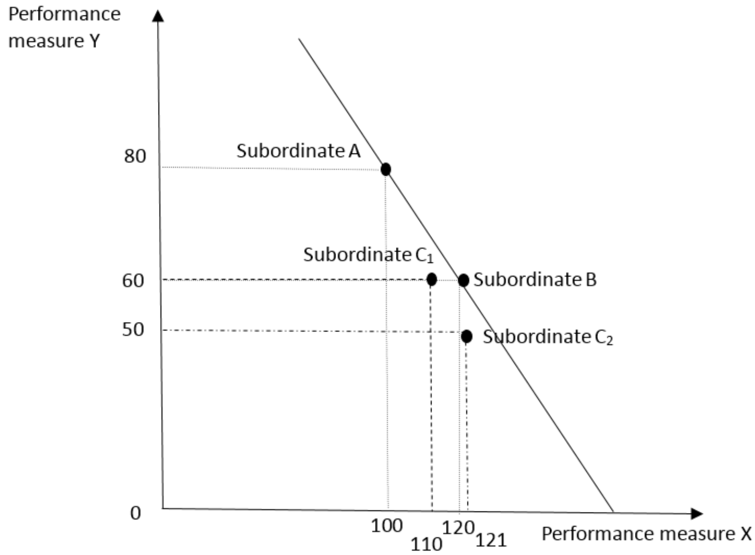

Figure 1: Illustration of two types of decoy

In Figure 1, similarly to the introductory example, subordinate A and B are the two original subordinates defined on two performance measures. Subordinate B shows a level of performance on performance measure X of 120, which is higher than subordinate A (100). On performance measure Y subordinate B shows a level of performance of 60, which is lower than subordinate A (80). Thus, neither of the original subordinate dominates the other when summing up X and Y (180).

Now, let us consider subordinate $C_{1.}$ C_1 shows a level of performance of 110 on performance measure X, which is higher than that of subordinate A (100) but lower than that of subordinate B (120). C_1's performance on Y is 60, which is lower than that of subordinate A (80) but same as that of subordinate B (60). In this case, subordinate B dominates subordinate C_1 whereas subordinate A does not. Therefore, subordinate C_1 in Figure 1 is called an asymmetrically dominated decoy. Following the dominance heuristic theory (Simonson 1989), due to the presence of the asymmetrically dominated decoy subordinate C_1, supervisors perceive subordinate B more attractive than subordinate A.

Considering subordinate C_2 in Figure 1, C_2's performance on performance measure X is 121, which is higher than that of subordinate A (100) and that of subordinate B (120). C_2's performance on Y is 50, which is lower than subordinate A (80) and subordinate B (60). While the dominance relationships of C_2 to both subordinates A and B is the same, C_2 is more similar with respect to performance levels to subordinate B than to A. In this case, the subordinate C_2 is called the viable decoy. Following the compromise heuristic (Herne 1997), due to the presence of the viable decoy subordinate C_2, supervisors perceive subordinate B more attractive than subordinate A.

Generally, in RPE supervisors use peer subordinates' performance as a heuristic to evaluate the target subordinate's performance. We suggest that effects consistent with the dominance heuristic or compromise heuristic observed in consumer behaviour can occur in RPE. Considering our RPE example, the RPI of the decoy subordinates $C_{1/2}$ can be seen as irrelevant alternatives because they should not change the rank ordering of subordinates A and B.

Because the asymmetrically dominated decoy effect and the viable decoy effect are based on different relationships (dominance relationship vs. relative superiority relationship), we test them separately in two hypotheses:

H1a: The asymmetrically dominated decoy increases the rank ordering of the target subordinate in relative performance evaluation.

H1b: The viable decoy increases the rank ordering of the target subordinate in relative performance evaluation.

2.3 Information size and decision quality

A large number of scholars attach importance to the role of information in accounting systems. For example, Shields (1983) points out that information choice is an important consideration in organizations, because information supplied by accountants could affect managers' decision and subsequently organizations' efficiency and effectiveness. Ashton (1974) documents another issue on the use of information in performance evaluation and control systems. He suggests that accountants, as designers of performance reports, must consider how much information to include in performance reports. The quantity of information in a performance report is referred to the information size. Often information inputs are quantitative and consequently information size is measured in terms of the number of quantitative items provided to managers (Iselin, 1988).

The effect of information size on management decision quality has attracted considerable attention in the accounting literature (e.g. Shields, 1983; Iselin, 1988). However, the relationship between information size and managers' decision quality remains unclear. Some scholars find that larger information size can enhance the quality of managers' decisions (Barefield 1972; Abdel-Khalik 1973) others do not find an association (Snowball 1980; Casey 1980) and others report a negative association between managers' decision quality and accounting information size (Dickhaut 1973; Wright 1979).

The relationship between the quantity of repeated accounting information and decision quality is commonly modelled to be an inverted U curve (Schroder, Driver and Streufert, 1967; Jacoby, Speller and Berning, 1974; Jacoby, Speller and Kohn, 1974; San Miguel, 1976; Shields, 1980; Iselin 1988; Chewning and Harrell, 1990). As the amount of information provided to the decision maker is increased, the quality of decisions initially rises. However, beyond a certain point, a larger amount of information provided to a decision maker results in a decrease in decision quality. The decline in decision quality happens due to finite limits of the ability of humans to process information (Jacoby, 1977; Casey, 1980).

However, many studies do not distinguish between the relevant information size and the irrelevant information size. Several studies in psychology indicate that adverse effects of irrelevant information on decision quality may diminish with increased relevant information size (Freeberg 1969; Nisbett, Zukier and Lemley 1981; Steele 20110. Bol (2011) argues that one reason of centrality and leniency biases in performance evaluation is the lack of complete relevant information on employee performance. Consequently, more relevant information on employee performance for managers could increase their performance evaluation quality.

In this view, regarding RPE, more relevant information (RPI size of original subordinates) can increase the accuracy of supervisors' rank ordering decisions because it could reduce the salience of irrelevant information (the decoy) in RPE and it is less likely that the decoy is used as a heuristic. Thus, it is expected that increasing relevant information size can moderate the association between the presence of irrelevant information and decision quality. Hence, we expect that RPI size influences whether there is a decoy effect in the rank ordering of the subordinates. We formulate the second hypothesis:

H2: RPI size influences whether there is an association between the control condition and the decoy condition in the rank ordering of the subordinates:

- when the RPI size is small the target subordinate is ranked higher in the decoy condition than in the control condition.
- when the RPI size is large there is no association between the control condition and the decoy condition in the rank ordering of the subordinates.

3 Research design

Six conditions were designed based on a 3 (information pattern: control, asymmetrically dominated decoy, viable decoy) × 2 (RPI size: small, large) between-subjects experiment. All participants were randomly assigned to the six conditions. The task was to rank managers based on the information provided. Figure 2 displays the research model.

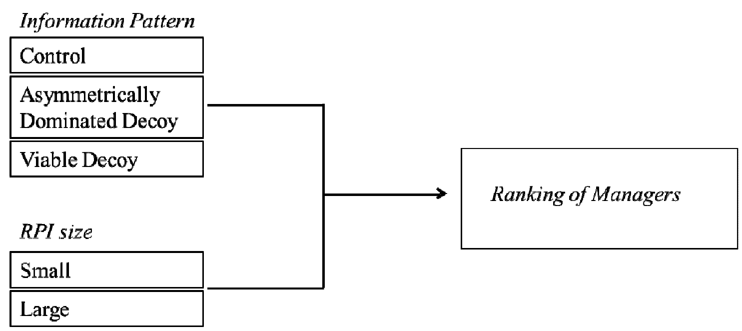

Figure 2: Research model

3.1 Participants

186 business students took part in the experiment. The experiment was conducted in a behavioural laboratory of a large university. Each participant was seated in front of a computer to complete all experimental materials individually. The computers were separated via partition walls. On average, participants took approximately 10 minutes to complete the task.

Ten participants were removed from the sample because they did not pass a test business case at the beginning of the instrument (as explained further below). One participant was excluded because he/she ranked the asymmetrically dominated decoy subordinate first. The final sample consisted of 175 business students which comprised 119 undergraduate and 56 postgraduate students. The proportion of undergraduate and graduate students across conditions is similar and not significantly different (Chi-square = 1.758, df = 5, p = .881). The mean age of the participants was 21.96 years and 40% of them were male. 96.6% were full-time students and 84% of them were doing a business major. Participants had an average part-time working experience of 1.52 years and full-time working experience of 0.59 years. There were no significant differences across six cells for age (F=0.551, p=0.783), gender (Wald=0.477, p=0.49), part-time working experience (F=0.681, p=0.638), and full-time working experience (F=0.915, p=0.472).

3.2 Experimental task

There were eight steps for participants to complete the instrument (see Appendix). In Step 1 participants were asked to read an introduction. In Step 2 an explanatory statement was presented. In Step 3, the business case information was provided. Participants took the role of a regional manager (hereafter, supervisor) of a chain store and received RPI about store managers they were supervising (hereafter, subordinates, when referring to this role). The task for the participants was to assess their subordinates' performance and give a rank ordering of all subordinates based on their provided RPI. The scenario was constructed under the assumption that all stores were of similar size, sold the same products and were located in the same metropolitan area, hence faced similar economic and market conditions. Participants were also informed that although stores were relatively close, they did not directly compete with each other. It was explained that all subordinates performed similarly, but were different in only two key performance indicators: sales revenue per square meter and return on sales (Bol, Kramer, Maas and Richtermeyer, 2015). Participants were informed that sales revenue per square meter and return on sales were of equal importance (referred to as performance measure X and performance measure Y for the task). In Step 4, an example business case was shown in order to teach participants how to rank managers based on RPI. Participants were informed that the top ranked store manager was the best store manager in terms of his or her performance. In Step 5, participants were required to complete a test business case in order to make sure they understood all the given information. They were asked to rank 3 managers based on their RPI by dragging and dropping managers on an interactive screen. There was only one correct answer for the test business case. Participants who did not give the correct answer were excluded from the sample. In Step 4 and 5 managers were given names reflecting gender. In order to avoid a gender bias, we referred to the managers using letters in Step 6 (see also Figure 3). Step 6 included the different treatments containing RPI on two performance evaluation measures for the store managers. The order of the store managers was counterbalanced in each treatment in order to control for the effect of subordinates' order on the results. The position of the decoy subordinate was always at the bottom for all business cases. As shown in the Appendix Step 6, participants had to draw all managers to be ranked above a line. This should make sure that participants did not leave the ranking as presented to the participants in the first place. Participants were asked to rank all store managers using the RPI provided. Subordinates could not be ranked equally but had to be brought into an order. These ranks are used to test the hypotheses. After ranking store managers, participants were asked to explain the rationale for their ranking decision on a following screen. Step 7 contained the manipulation questions. Step 8 demographic questions.

3.3 Independent variables

The first independent variable is the *information pattern*, which contains three conditions: (1) control condition, where the supervisor ranks original subordinates without the decoy subordinate; (2) the asymmetrically dominated decoy information pattern condition, where the supervisor ranks original subordinates and an additional asymmetrically dominated decoy subordinate; and (3) the viable decoy information pattern condition, where the supervisors ranks original subordinates and an additional viable decoy subordinate.

The second independent variable is *RPI size*. The RPI size is manipulated at two levels: (1) small RPI size, where all participants are asked to rank two original subordinates and participants in asymmetrically dominated decoy treatment and viable decoy treatment need to rank one additional decoy subordinate; (2) large RPI size, where all participants are asked to rank nine original subordinates and participants in asymmetrically dominated decoy treatment and viable decoy treatment need to rank one additional decoy subordinate as well. An example of the treatment asymmetrically dominated decoy/small RPI size is shown in Figure 3.

3.4 Dependent variables

We use two dependent variables to measure the ranking of the target subordinate. The target subordinate is the subordinate who dominates the decoy subordinate in at least one performance evaluation measure, and is most similar with respect to performance levels to the (viable or asymmetrically dominated) decoy subordinate (see Figure 1).

The first dependent variable, *RankTarget*, denotes the position of the target subordinate in the rank ordering without the decoy subordinate. The decoy subordinate is excluded because this study aims to investigate the change of rank ordering of the original subordinates in RPE.

The second dependent variable, *RankTargetHalf*, is derived from the *RankTarget* variable to enable comparisons between the small RPI size condition and large RPI size condition. It equals 1, when the ranking of the target subordinate is in the top half; it equals 2 when the ranking of the target subordinate is in the bottom half. In the small RPI size condition both dependent variables are equal. In the large RPI size condition, the range of *RankTarget* is from 1 to 9, while *RankTargetHalf* equals 1 when the target subordinate is ranked 1^{st}, 2^{nd}, 3^{rd} or 4^{th}, and equals 2 when the target subordinate is ranked 5^{th}, 6^{th}, 7^{th} or 8^{th}.

Version A		
	Performance measure X	Performance measure Y
Store A manager	120	60
Store B manager	100	80
Store C manager	110	60
Version B		
	Performance measure X	Performance measure Y
Store A manager	100	80
Store B manager	120	60
Store C manager	110	60

Note: Version A and Version B were counterbalanced. In Version B Manager A and B are swapped in comparison to Version A. The original screen was interactive such that participants could drag and drop the managers for ranking purposes.

Figure 3: Example of Treatment: Asymmetrically Dominated Decoy/Small RPI Size

4 Results and discussion

4.1 Manipulation checks

After completing the experimental task participants answered a manipulation check question. The question asked how many store managers participants had ranked in the business case. Nine participants did not answer the manipulation question correctly (2 in Cell 1, 2 in Cell 2, 1 in Cell 3, 2 in Cell 5 and 2 in Cell 6). We did not exclude these nine participants from the sample because participants had answered the test business case correctly which indicated that they understood all the given information and also understood how to rank subordinates. Results without the ten participants who failed the manipulation question are very similar and inferences do not change.

4.2 Test of Main Effect

Hypothesis 1a predicts that the presence of asymmetrically dominated decoy subordinate increases the rank ordering of the target subordinate in RPE. Panel A in Table 1 shows the descriptive statistics. We can observe that from the 28 participants in the control group, 10 of them ranked the target subordinate first (35.7% of the total in control condition) and 18 ranked the target subordinate second (64.3% of the total in control condition). From the 28 participants in the asymmetrically dominated decoy information pattern condition, 19 participants ranked the target subordinate first (67.9% of the total in the asymmetrically dominated decoy condition) and 9 of them ranked the target subordinate second (32.1% of the total in the asymmetrically dominated decoy condition). Panel B in Table 1 shows the results of the Chi-square statistic. The value of the Chi-square statistic is statistically significant ($\chi^2 = 5.793$, $p < 0.05$), confirming that the asymmetrically dominated decoy information pattern has a significant influence on the rank ordering of the target subordinate in RPE. Thus, Hypothesis 1a is supported.

Panel A: Descriptive statistics

RankTarget:	Information Pattern: Control	Asymmetrically dominated decoy	Difference
No. of participants who ranked the target subordinate first:	n=10 (35.7%)	n=19 (67.9%)	-9
No. of participants who ranked the target subordinate second:	n=18 (64.3%)	n=9 (32.1%)	+9
Total	n=28 (100%)	n=28 (100%)	

Panel B: Chi-Square analysis (χ^2) for H1a

	χ^2-Value	Df	p^*
Pearson Chi-Square	5.793	1	0.016

Note: * Two-sided. RankTarget is the rank of the target subordinate in the rank ordering without the decoy subordinate which ranges from 1 (better performance) to 2 (worse performance). n=number of participants.

Table 1: Results H1a

Hypothesis 1b predicts a viable decoy effect. Panel A in Table 2 shows the descriptive statistics. The percentages of participants who ranked the target subordinate first or second are relatively similar across the control and viable decoy information pattern. Consequently, the value of the Chi-square statistic is not significant (χ^2 =0.113, p = 737, see Panel B in Table 2). Thus, Hypothesis 1b is not supported.

Panel A: Descriptive statistics

RankTarget:	Information Pattern: Control	Viable decoy	Difference
No. of participants who ranked the target subordinate first:	n=10 (35.7%)	n=12 (40.0%)	-2
No. of participants who ranked the target subordinate second:	n=18 (64.3%)	n=18 (60.0%)	0
Total	n=28 (100%)	n=30 (100%)	

Panel B: Chi-Square analysis (χ^2)

	χ^2-Value	Df	p^*
Pearson Chi-Square	0.113	1	0.737

Note: * Two-sided. RankTarget is the rank of the target subordinate in the rank ordering without the decoy subordinate which ranges from 1 (better performance) to 2 (worse performance). n=number of participants.

Table 2: Results H1b

4.3 Test of Interaction Effect

Table 3 Panel A and Table 4 Panel A show the descriptive statistics and Panels B the Chi-square analyses for the large RPI size conditions. As expected in H2, there are no significant differences between the control and the decoy conditions for the large RPI size. This in combination with the significant decoy effect in the small RPI size for the asymmetrically dominated decoy pattern (H1a), supports that information size moderates the influence of the asymmetrically dominated decoy.

Figure 4 Panel A graphically shows our predicted effect, that there is a decoy effect in small RPI size, but not in large RPI size. Panel B depicts the results for the asymmetrically dominated decoy. Panel C depicts the results for the viable decoy. In Panel B we can observe that the difference between Cell 1 and Cell 2 is larger in the small RPI size than in the large RPI size as predicted by H2.

Planned contrasts using the weights [1,-1, 0, 0] and [0, 0, 1,-1] for Cells 1,2,3,4 as defined in Panel A/B of Figure 4 confirm that there is a significant decoy effect for the small RPI size (χ^2 = 5.582, p = .017) but not for the large RPI size (χ^2 = 1.656, p = .195) (Bonett et al. 1985). Thus, our interactive expectation in H2 holds for the asymmetrically dominated decoy.

Panel A: Descriptive statistics

	Information Pattern:		
RankTargetHalf:	Control	Asymmetrically dominated decoy	Difference
No. of participants who ranked the target subordinate first:	n=13 (46.4%)	n=19 (63.3%)	-6
No. of participants who ranked the target subordinate second:	n=15 (53.6%)	n=11 (36.7%)	+4
Total	n=28 (100%)	n=30 (100%)	

Panel B: Chi-Square analysis (χ^2)

	χ^2-Value	Df	p^*
Pearson Chi-Square	1.673	1	0.196

Note: * Two-sided. RankTargetHalf refers to whether the target subordinate is ranked in the top (1) or bottom (2) half. The observations which ranked the target subordinate 5th are excluded from this consideration. A Chi-Square analysis based on RankTarget is also not significant p = 0.392.

Table 3: Results H2

Panel A: Descriptive statistics

	Information Pattern:		
RankTargetHalf:	Control	Viable decoy	Difference
No. of participants who ranked the target subordinate first:	n=13 (46.4%)	n=16 (57.1%)	-3
No. of participants who ranked the target subordinate second:	n=15 (53.6%)	n=12 (42.6%)	+3
Total	n=28 (100%)	n=28 (100%)	

Panel B: Chi-Square analysis (χ^2)

	χ^2-Value	Df	p^*
Pearson Chi-Square	0.644	1	0.422

Note: * Two-sided. RankTargetHalf refers to whether the target subordinate is ranked in the top (1) or bottom (2) half. The observations which ranked the target subordinate 5th are excluded from this consideration. A Chi-Square analysis based on RankTarget is also not significant p = 0.206.

Table 4: Results H2

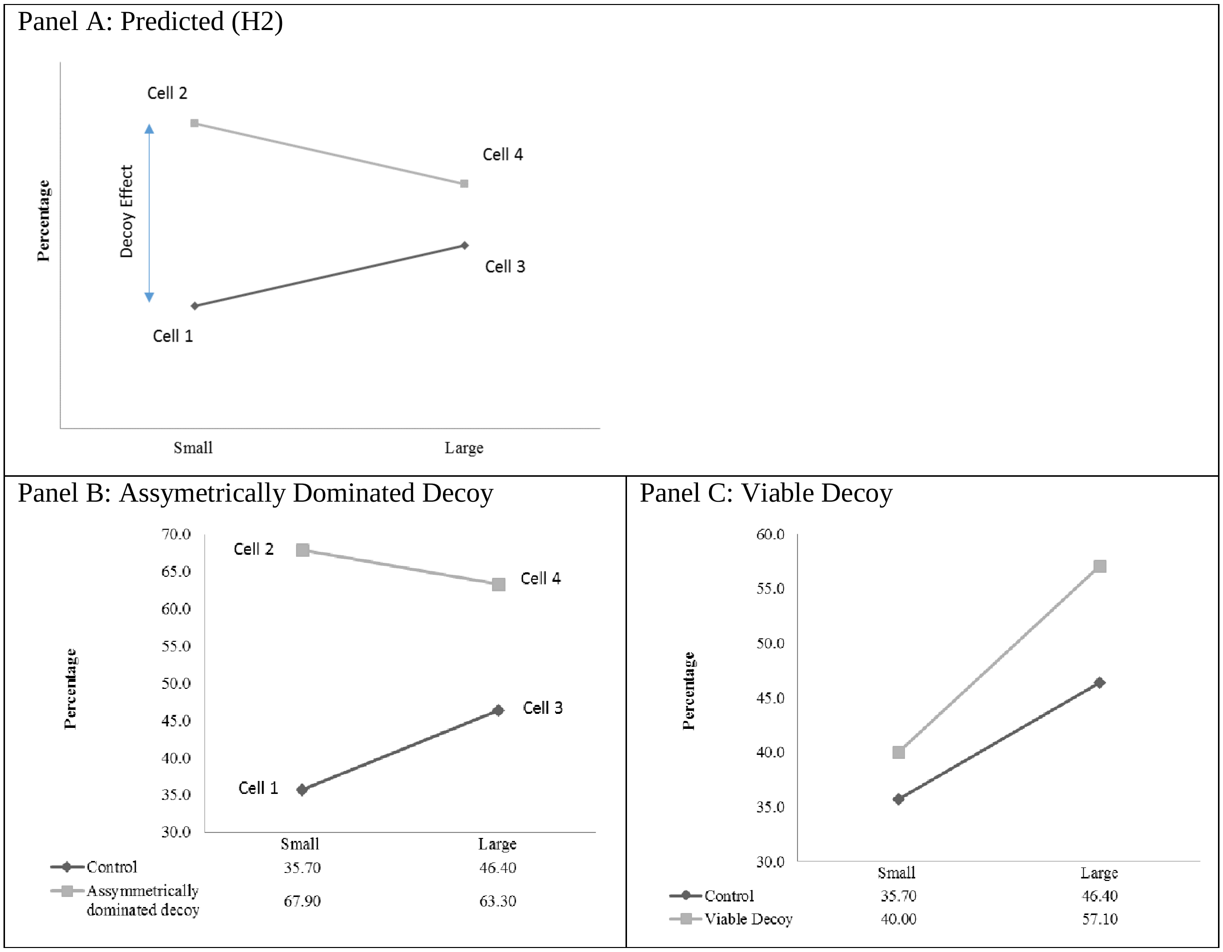

Figure 4: Percentage of participants who ranked the target subordinate in the top half across conditions

5 Conclusions

In this study we examine how certain information patterns can influence the rank ordering of subordinates in RPE and how such influences on supervisors' assessments can be mitigated. Under conditions of small RPI size, we find that the asymmetrically dominated decoy information pattern can change preferences for subordinates in RPE. However, we do not find a significant effect of the viable decoy information pattern on the rank ordering of subordinates in RPE.

Further, we explore whether RPI size can mitigate decoy effects. When RPI size is large, our results indicate that both the asymmetrically dominated decoy information pattern and the viable decoy information pattern do not change the preferences for subordinates in RPE significantly. Therefore, increasing the RPI size can reduce the decoy effect.

The findings of this study have important implications for management accounting practice and designers of accounting information systems. First, the study highlights the importance of irrelevant information in the design and use of accounting information systems. The results show that irrelevant information in RPE can directly influence the supervisors' rank ordering decisions. Thus, irrelevant information does not only increase the cost of information gathering process (Langfield-Smith, Thorne, Smith and Hilton, 2015), but can also distort performance evaluations. Second, the study indicates the importance of an adequate RPI size for performance evaluation decisions. The results indicate that increasing the RPI size can moderate the influence of a decoy effect on supervisors' performance assessments. This implies that accounting information system designers could enlarge the subordinate supervision size in order to reduce negative effects of irrelevant information and increase the accuracy of performance assessments. However, the potential benefit of overcoming the negative effect observed stands in stark contrast of additional costs for the supervisor to evaluate more subordinates and potential other information processing shortcomings.

Our study is subject to limitations that may provide potential future research opportunities. Next to the usual limitations of laboratory experiments this study only examines the effect of RPI size on the adverse influence of irrelevant alternatives in RPE. There are several other factors that can influence the effect of irrelevant information on supervisors' performance assessment decisions. For example, Gaeth and Shanteau (1984) find that the adverse effect of irrelevant information on expert judgments can be reduced with training. Additionally, qualitative performance information or the number of performance metrics used can change the nature of the effects observed. Hence, future studies could investigate whether training or other types of performance information can also reduce the negative effect of irrelevant information in performance evaluation contexts.

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Appendix: Steps in Experiment

<table>
<tr><th>Step</th><th>Subject</th><th>Content</th></tr>
<tr><td>Step 1</td><td>Introduction</td><td>Welcome and information about what to expect and the flow of the experiment (e.g. what type of buttons to click to proceed).</td></tr>
<tr><td>Step 2</td><td>Explanatory Statements</td><td>Basic information about the experiment for ethics clearance (e.g. that participants can withdraw anytime)</td></tr>
<tr><td>Step 3</td><td>Business Case Information</td><td>Information about task, background information about chain stores, and information about performance evaluation measures</td></tr>
<tr><td>Step 4</td><td>Example business case</td><td>
The following is an example
Find below performance information for three store managers.
Store managers' performance information:
<table>
<tr><th></th><th>Performance measure X</th><th>Performance measure Y</th></tr>
<tr><td>John</td><td>110</td><td>70</td></tr>
<tr><td>Amy</td><td>130</td><td>90</td></tr>
<tr><td>Paul</td><td>90</td><td>60</td></tr>
</table>
Example Instruction:
Rank the 3 managers based on their overall performance. Note that all managers should be above the line.
Answer:
Amy 1
John 2
Paul 3
____line____
Explanation:
In both, Performance measure X and Performance measure Y, Amy outperforms John, and John outperforms Paul. Therefore, Amy is ranked first as she enjoys the best performance. John is ranked second because he performs better than Paul but worse than Amy. Paul is ranked third because he has the lowest numbers on both measures among the three managers.
</td></tr>
<tr><td>Step 5</td><td>Test business case (interactive screen)</td><td>
This is an example test.
Store managers' performance information:
<table>
<tr><th></th><th>Performance measure X</th><th>Performance measure Y</th></tr>
<tr><td>Chloe</td><td>85</td><td>60</td></tr>
<tr><td>Tina</td><td>120</td><td>85</td></tr>
<tr><td>Eric</td><td>100</td><td>75</td></tr>
</table>
Instruction:
Please rank the 3 managers based on their overall performance, and make sure that all managers are above the line.
____line____ 1
Chloe 2
Tina 3
Eric 4
</td></tr>
<tr><td>Step 6</td><td>Business Case Information and Treatment (interactive screen)</td><td>Repetition of Business Case Information from Step 3 and random assignment of treatments (3 x 2 between-subjects design).</td></tr>
<tr><td>Step 7</td><td>Manipulation Check question</td><td>Question on how many store managers participants ranked in the treatment.</td></tr>
<tr><td>Step 8</td><td>Demographic Questions</td><td>Questions on demographics (gender, age, major)</td></tr>
</table>