



Does Attribute Framing Exist in Audit Decision Aid?

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ABSTRACT: This study aims to test the framing effect in audit decision aid. The research employs a between-subject experimental design involving 56 undergraduate students as the sample. The dependent variable is the tendency to follow the aid recommendation which is measured using Gomaa, Hunton, Vaassen, and Carree's (2011) scenario. Framing effect is manipulated as follows: (1) positive framing, (2) negative framing. The result shows that framing effect exists in audit decision aid, especially, in how the aid reliability presented (positive or negative) influences the final participant's decision. This research seeks to contribute to the development of framing theory, particularly to test the framing phenomena in audit decision aid. Previous studies on this realm focus on health, politic, finance, business, and marketing areas and only a few studies are found discussing this issue in the auditing area. The result would also be useful in the practical field where it should now be obvious that an auditor should never be over-reliant on decision aid. Decision aid can indeed make decision bias if the auditor thinks using only the aid is enough to make a decision and forgets to use professional judgment. The result of the study gives a warning to auditors that the way information on the reliability of a decision aid is presented can make a decision bias.

KEYWORDS: attribute framing; decision aid; auditor decision, audit context

Introduction

Nowadays, we are on the verge of the fourth industrial revolution, dubbed as Industry 4.0. This revolution emphasizes on automated processes and influences every single area of work, including auditing. Industry 4.0 can be described as the full integration of information and communication technology and automatic technology in the "factory of the future" (Heynitz, Bremicker, & Amadori, 2016). It raises serious challenges for auditing processes in which all client data are integrated via the internet. Auditors can use a technology to help them in their auditing process such as decision aid.

This decision aid gives an input to support auditors' performance in their auditing process (Alon & Dwyer, 2010). Dowling and Leech (2007) find that decision aid plays an important role in supporting auditors in every main phase of auditing process. However, the decision aid does not always give good influences. The automatic process of using decision aid is often problematic because people fail to rely upon it appropriately/reasonably (Lee & See, 2004). Decision makers can trust this decision aid, yet they must be aware that this decision aid can lead to a decision bias. In this context, we define decision bias as a condition in which a decision maker lacks their professional judgment or they are too dependent on the decision aid recommendation. According to Swinney (1999), this condition occurs when users ignore their human judgment and replace it with a technology.

The mismatches between the skills of decision-aid users and the complexity of the tasks also cause this phenomenon (Mascha & Smedley, 2007). The auditors tend to be heuristic and more dependent on the decision aid. As we all know, in auditing process, auditors do the more complex tasks and receive much pressures. Therefore, learning how an auditor uses the decision aid is more important and interesting. Understanding this issue will help auditors to be good decision aid users (Swinney, 1999).

One of the important factors which make auditors follow decision aid is its reliability. Decision aid is usually presented at a certain degree of reliability. The user of this decision aid is more likely to agree with the decision aid if they know that the aid is reliable (Brown & Jones, 1998). However, the way this decision aid shows or informs the user about its reliability may lead to a bias. F.-F. Cheng and Wu (2010) argue that judgments and decisions can be influenced greatly by the way information is presented or framed.

In framing theory, a positive labeling of an attribute can raise favorable associations in memory, while a negative labeling is more likely to cause opposite associations. In other words, informing the decision aid reliability with different accuracy may cause different associations in memory and finally result in different decisions. Framing model has been extensively used in the context of decision judging and making. The framing effect occurs due to information encoding in memory (Levin & Gaeth, 1988) and lack of individual attention about another available information (Smith & Levin, 1996), in which both of these factors have the potential to create a decision bias.

The framing effect phenomenon in accounting information system, especially in audit decision aid can be explained using attribute framing theory. Alewine, Allport, and Shen (2016) suggest that attribute framing does occur in accounting information system area. Levin, Schneider, and Gaeth (1998) explain that attribute framing is a single attribute of a particular object being framed positively or negatively and it occurs when the a positively described item is evaluated more highly than the same item described negatively. The information of decision aid reliability is a single attribute which can be framed. Hsee and Zhang (2010) in General Evaluability Theory (GET) suggest that there are three characteristics which should be considered when dealing with evaluability of any attribute, they are nature of the attribute, knowledge about the attribute, and how the attribute is presented. Especially for the last characteristic, it can cause cognitive bias known as framing effect.

Previous studies have examined framing bias in a variety of different decision making problems such as in medical treatment (Gallagher & Updegraff, 2012; Garcia-Retamero & Galesic, 2010; Peters, Hart, & Fraenkel, 2011), political election context (Bizer, Larsen, & Petty, 2011), promotion message design (Goh & Bockstedt, 2013; McKechnie, Devlin, Ennew, & Smith, 2012; Raghurir, 2005; Zhang & Han, 2012), marketing domain like product evaluation (F.-F. Cheng & Wu, 2010; F. F. Cheng, Wu, & Lin, 2014; Johnson & Levin, 1985; Levin et al., 1988) and financial problems (Cassotti et al., 2012). However, only a few studies explore framing effect on decision aid in the auditing area. Actually, heuristics and biases such as framing effect

have generated fairly considerable interests in behavioral auditing (Shanteau, 1989).

The possible reason for why we can only find a limited number of studies in this area is that accounting researchers have frequently had difficulty in translating the Kahneman and Tversky demonstrations into an auditing framework (Shanteau, 1989). Also, auditing judgments depend on problem characteristics which are irrelevant to framing decision. Thus, it is important to figure out this effect in the auditing area because auditors in auditing encounter higher pressure and risk than in another area. These pressure and risk make auditors more cautious in making decisions in auditing processes. Additionally, auditing also has different complexity of tasks from that of business area. These different task variables may lead to different results. Hence, framing effect may run to different way from other areas. This study focuses on testing the framing effect on audit decision aid.

Laboratory experimental method is used to test the hypothesis. This method is chosen because this study investigates the causal relationship between framing effect and the subject's tendency to follow the audit decision aid. We give positive or negative treatment to the subjects and evaluate the effect on the use of decision aid. This method enables us to control each variable. Participants will be distributed randomly into one of two experiment groups. Participants will read the experiment scenario and answer the question about the case in the scenario. At the end of the experiment, the participant will be asked about the manipulation check question and they will receive some debriefing. The results of the study are relevant to previous studies, i.e. framing effect does occur in audit decision aid. Specifically, participants with positive framing tend to use the decision aid recommendation than the participants with negative framing.

This research is contributing to the development of attribute framing knowledge and theory, especially about its effect on audit decision making. Previous studies focus on testing the framing effect of the decision aid in business and marketing areas. Since decision aid also used extensively in auditing process, it is also important to explain this effect in this area. The results of this study are also useful in practical field for auditors, in that auditor should not be too reliant on decision aid. The result of the study gives a warning to auditors that the presentation of decision aid reliability can cause a bias.

This paper is organized as follows. Section 2 reviews the prior literature and develops the hypothesis. Section 3 explains the methodology employed. Section 4 analyses the data, result and discussion and Section 5 conclude the findings.

Literature Review and Hypothesis Development

Prospect Theory

This theory states that people make decisions based on the potential final values of losses and gains and that people evaluate losses and gains using a

particular heuristic (Kahneman & Tversky, 1979). In prospect theory, the result is considered as a positive or negative deviation (gains or losses) from a neutral reference outcome, which has zero value (Tversky & Kahneman, 1981). In other words, under a favorable situation, individuals will tend to choose any profitable option. While under the opposite condition, individuals will tend to choose the option that has the least amount of loss (to minimize losses). Prospect theory can explain how framing effect occurs. Individuals will evaluate all information before making a decision. The option which seems most favorable is more likely to be chosen. Sometimes, while the options are actually the same, when they are delivered (gains or losses) differently, it can lead to different decisions.

Prospect theory helps many studies on decision making to develop and build their arguments (Edwards, 1996). Of course, this prospect theory can also explain the way auditors make a decision in accounting and auditing areas. Newman (1980) gives an example that a decision maker (internal accountant) will choose an information system which maximizes their utility. Another study by Grinblatt and Han (2005) find that the tendency of some investors to hold on to their losing stocks is also driven by prospect theory. They suggest that the difference between a stock's market price and its aggregate cost basis will be positively related to the stock's expected future return as well as a better predictor of future average returns than past one-year returns.

Attribute Framing

Judgments and decisions can be influenced greatly by how information is presented or framed (F.-F. Cheng & Wu, 2010; Tversky & Kahneman, 1981). Levin et al. (1998) classify the framing effects into three: attribute framing, goal framing, and risky choice framing. Goal framing is a persuasive message that is framed to emphasize the positive (negative) consequences of doing (not doing) an action. Risky choice framing occurs in choice of a value which is expected to be with or without some risks, depending on whether the available options are described positively or negatively. This study focuses only on attribute framing as the most appropriate form of framing to explain the framing of decision aid reliability. Attribute framing effect happens when the object's attribute is manipulated (such as the framing which involves probabilistic information) (Lacson, Wiegmann, & Madhavan, 2005). Johnson and Levin (1985) and Levin, Johnson, Russo, and Deldin (1985) state that attribute framing effect occurs when individuals' judgments vary due to the function of labels used to describe specific object attributes or characteristics.

The type of framing evaluation in decision aid reliability framing represents the choices to either approve or reject the decision aid recommendation. This evaluation may include favorability ratings (a level ranging from entirely unacceptable to entirely acceptable) (Levin et al., 1998). Attribute framing can explain how an object which is described positively looks more profitable than if it is described negatively. Positive labeling tends to lead to information encoding which evokes favorable associations in memory, yet labeling the same attribute negatively might cause an encoding that generates unfavorable associations in memory (Levin et al., 1998).

The decision aid reliability which is informed positively will cause different effects on the users than if it is informed in a negative way. The presentation of decision aid reliability leads to different results because of differences in how it is framed (Lacson et al., 2005). F.-F. Cheng and Wu (2010) examine the effects of framing on information technology reliability at intention level of buyers to buy online and find that there is a correlation between framing effects and tendency to follow the aid recommendation. When participants receive positive framing, they tend to follow the decision aid recommendation. In contrast, when participants received reliability information which is framed negatively, the level of their tendency to follow will be lower and even close to zero.

Hypothesis Development

The hypothesis is built using attribute framing theory which tests the argument that participants will have higher dependence on audit decision aid when they are in positive framing than when they are in negative framing. Levin, Johnson, Russo, and Deldin (1985) examine the effect of attribute framing in three tasks and observe the statistical reliability of framing effect and they find that more favorable ratings will be produced when the attributes are expressed positively than when they are expressed negatively. Other studies by Kramer (1989), Levin et al. (1998) and Loke and Tan, (1992) suggest similar findings, i.e. that the same alternative is rated more favorably when a key attribute is framed positively than when they are framed negatively.

The argument proposed by previous studies indicates that when positive framing occurs there will be information encoding that leads to favorable associations in participants' memory as described before in attribute framing theory section. This causes the user to have greater tendency to follow the aid recommendation. In contrast, when it is framed negatively, negative or unfavorable associations will arise so that they have lesser tendency to follow the aid recommendation. Lowe, Reckers, & Whitecotton (2002) and framing theory argument also state that individuals tend to pay more attention to negative information than positive information. Participants may be more careful in making decisions to depend on the decision aids when the reliability presented negatively than if it is presented positively.

There is a small amount of the research on the framing effects of decision aid. To the best of our knowledge, only a few studies have tested and confirmed this relationship, including studies by F.-F. Cheng & Wu (2010) and F. F. Cheng Wu & Lin (2014). However, their studies have different contexts. F.-F. Cheng and Wu (2010) examine the effect of framing on the Internet buyers' attitude and purchase intention. The result suggest that participants in a positive condition reveal more favorable responses than their counterparts in the negative condition.

Another study by F. F. Cheng Wu and Lin (2014) also find that framing effect occurs in consumer online decision. Unlike these previous studies, this research examines it in the context of accounting, in particular, the auditing processes. To the best of our knowledge, there has been no previous study which tests the framing effect of decision aid in this context. Auditors in their auditing processes encounter higher pressure and risk and do a more

complex task than in another area. These factors make auditors more cautious in making a decision in auditing processes and make the framing effect may go in different direction than in other areas. Auditors also need a judgment as an important variable to make a decision. According to Boritz (1997), framing effects is an important variable which potentially impedes audit judgment accuracy. Therefore, the hypothesis of this study is:

H₁: Participants tend to follow decision aid recommendation when the reliability of decision aid is shown in a positive form than when it is shown in a negative form.

Research Method

Participants

A between-subject laboratory experiment is designed to investigate the relationship between variables in this research. The experiment design can be seen in Table 1. There are two experimental groups. One group receives positive framing treatment, and the other receives negative framing treatment. 56 subjects participate in this experiment. Participants are undergraduate accounting students of a large university in Indonesia. The participants involved in this experiment are those who have completed and passed financial accounting course. This selection criterion is used to ensure that the students have enough comprehension to do the tasks on receivables on the experiment material. This way, it can be assumed that all samples have the same understanding level as that of a professional accountant if such tasks are given, and the decision they will make might be similar to accountants' decision.

Methods and Procedures

The experiment scenario in this study is a minor modification of Gomaa et al. (2011). We perform pilot tests three times with 57 students (who do not participate in the main experiment) to ensure our experiment scenario. After finishing each one the pilot tests, we organize an in-depth discussion with the pilot test participants and professional accountants about the results.

The experimental case is displayed in a paper-based form and all participants are randomly assigned to Groups 1 and 2. To ensure the randomization, we use the computer function to distribute each participant into the groups. We also use several experimenters to help us in the laboratory. We are not directly involved while the experiment is carried out. The procedures are further explained below.

Step one: Participants come to the laboratory. The experimenters randomly distribute them into one of the two groups (participants do not know which

Table 1 Experimental Design

Framing Manipulation	
Group 1 Framing Positive	Group 2 Framing Negative

group they are distributed to previously). Participants open the experiment material prepared by the experimenters. Participants are not allowed to work together with fellow participants. Participants are asked to read a case of Amalgamated Manufacturing, Incorporated (AMI), which is a high-tech equipment company. Together with the case, the company's key ratio of the current and previous years, financial position summary and summary of the income statement for the current year are also provided. In the reading, it is told that the management has estimated the difference of receivable write-off per 31/12 is at IDR 600,000. The audit committee and board of directors agree on the estimation and are reluctant to revise their estimation. On the other hand, the participants are given receivables in five years and write-off historical. Participants' task is to play a role as an auditor of a public accounting firm and to review the history of accounts receivable, thus it is expected that they would come to their own estimation. Participants also need to propose a year-end adjustment (if any) to the estimates provided by the management on IDR 600,000. The case material is designed in such a way that it would bring the participants to a certain amount of allowance, which is IDR 700,000. Participants are asked to offer their initial estimation of allowance for uncollectible accounts, which should be set at 31/12, and proposed a year-end adjustment.

Step two: The participants personally read about the decision aid assistance provided by their Accounting Firms. This decision aid uses historical information as well as the company's accounts receivable in the current economic conditions to predict the allowance for uncollectible accounts receivable. The aid tool has been frequently used by the firm and proved very helpful. The aid recommends that the allowance is Rp750,000 and gives the correct estimates for bad debts in every X of 10 cases. For positive framing condition, the participants have been informed that the decision aid is correct 8 times out of 10 cases (80% accurate), and for the negative one, they are told that decision aid is not correct 2 times out of 10 cases (20% inaccurate). After reading this information, participants are given the opportunity to change their initial estimates and propose a year-end adjustment, if desired. They are made fully aware that they do not have to change their initial estimates and do not have to propose adjustments or otherwise they could change their estimates and adjustments in every direction and magnitude. However, they have also emphasized that the estimation accuracy is very important because it concerns the reputation and possible risks faced by the firm.

Step three: Participant answer three questions about manipulation check. The result shows that the participants understand the task.

Step four: The experiment ends with a debriefing in which the previous simulation is explained.

Variable Measurement

The dependent variable in this study is the level of participant's tendency to follow the decision aid recommendation. This variable is measured by looking at the extent to which participants change their initial predictions to the suggestion made by the decision aid (Gomaa et al., 2011). The formula calculation is as follows (participants answer is within 0.00 to 1.00 range:

Table 2 Descriptive statistics

Framing	
Positive	n=28
	$\bar{Y}=0.33$
	$\sigma_x=0.27$
Negative	n=28
	$\bar{Y}=0.18$
	$\sigma_x=0.21$

Tendency to follow the decision aid recommendation = Final adjustment - Initial adjustment / ((Decision aid recommendation - Management estimation) - Initial Adjustment). The independent variables consist of one treatment at two levels, i.e. framing effects. The framing effects of decision aid reliability are presented in two ways, positively and negatively.

Result and Discussion

Descriptive Statistics

Table 2 shows the number of participants (n), the mean (\bar{Y}), and standard deviations (SD) for each group. The table shows that the numbers of participants in each group are: 28 (cell 1), 28 (cell 2). It can be seen that the mean of participants who get positive framing is 0.33 (SD=0.27), which is higher than that of the participants who get negative framing at 0.18 (SD=0.21).

Test of hypothesis

To ensure the randomization of our experiment, we distribute the participants into one of two experiment groups using computer functions. Initial subject participated in the experiment is 58 students. After the manipulation check, 2 participants fail and are excluded from our sample. The average age of participants is 21.04 years old. RÖnnlund, Karlsson, Lagnäs, Larsson, and Lindström (2005) suggest that age has no impact on the framing effect. The participants consist of 7 males (25%) and 21 females (75). Although the participants are dominated by female, the framing effects are not likely to vary by gender (Bateman, Fraedrich, & Iyer, 2002). We use independent sample T-test to compare between genders. The results show that there is no significant difference between male ($n = 15$, $SD = 0.22$) and female ($n = 41$, $SD = 0.27$) ($P>0.05$).

Our hypotheses state that participants tend to follow decision aid recommendation when the reliability of decision aid is shown in positive form than when it is shown in negative form. We test our hypotheses by comparing the positive framing group to the negative framing group. Table 3 shows the results of the independent sample t-test. The Levene's Test for Equality of Variances is insignificant ($P>0.05$), or it means that our data have equal variances. The analysis indicates that there is a difference between the two framing conditions (positive and negative). The results in Table 3 also

Table 3 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	Df	Mean Difference	Sig. (2-tailed)
Tendency to Follow The Aid Recommendation	Equal variances assumed	2.41	0.13	54	0.15	0.03
	Equal variances not assumed			51.40	0.15	0.03

shows that the mean distance between the two groups is 0.15 and it confirms that the difference is statistically significant ($P < 0.05$). This indicates that framing effect occurs on the way the decision aid reliability is presented. The decision aid reliability in positive form makes participants have greater tendency to follow decision aid recommendation than when it is presented in negative form.

Discussion

This study aims at investigating the framing effect of decision aid. In particular, we test whether or not framing effect occurs in the way the decision aid reliability is presented. Considering this purpose into consideration, the hypotheses of this research suggest that participants tend to follow the decision aid recommendation when the reliability of decision aid is shown in positive form than when it is shown in negative form.

Lowe et al., (2002) suggest that decision aid can be positive or negative depending on its reliability. Auditors are more reliant on the high-reliability decision aid than low-reliability decision aid. It is because high-reliability decision aid makes auditors have higher trust than the low-reliability decision aid. Dzindolet, Peterson, Pomranky, Pierce, and Beck (2003) and Lee and See (2004) suggest that trust is an important factor which make users rely their decision on decision aid. However, the way the decision aid reliability is presented can also make a bias. According to prospect theory, the information presented in a gain form is more likely to be followed by the users than that information presented in a loss form (Kahneman & Tversky, 1979).

Based on the argument stated above, informing the reliability of decision aid in different way may result in different decisions. Especially for this case, we can explain this problem using attribute framing theory. Levin et al., (1998) suggest that object attributes or characteristics affect user's item evaluation. The reliability of decision aid is an attribute that influences user's evaluation preferences. When positively presented, this attribute may lead to different decisions than when it is presented in a negative way.

Previous studies by F.-F. Cheng and Wu (2010) and F. F. Cheng, Wu and Lin (2014) confirm this argument. When the reliability of decision aid is informed to subjects in positive way, this cause high reliance on decision aid

than when it is informed in a negative way. Yet, previous studies only give evidences in general business area (online marketing and finance). In our study, we explore this theory in auditing area.

Study results show that this theory is also applicable in audit decision aid reliability condition. Negatively-presented decision aid reliability causes lower tendency to follow the aid recommendation than the positive reliability does. This supports the previous study that state framing effect occurs in decision aid. These results support Lowe et al., (2002) theory, attribute framing theory by Levin Schneider and Gaeth (1998) and the framing theory by Tversky and Kahneman (1981) which state that individuals tend to pay more attention to negative information than positive information. Submitting reliability information in different ways will lead to the different level of tendency to follow the aid recommendation. This study suggests a new finding, i.e. in an audit task context, and in the audit decision aid, the framing effect does exist.

Even, in auditing areas with its greater pressure, risks and more complex tasks, the framing bias is found to affect auditor's decision to follow the decision aid recommendation. It supports Boritz (1997) argument that framing effect is an important variable which potentially influences audit judgment. Auditors should be carefully read any information when making a decision. The presentation of information should not affect their decision because they are placed in a riskier situation and this condition demands them to be more cautious. However, our study suggests that presentation (in positive or negative way) affects auditors' decision. It rises important findings and needs to be explored further.

Conclusion

Several conclusions can be drawn from this study. Firstly, positive framing will cause higher degree of tendency to follow the audit aid than negative framing. This argument is consistent with prospect theory and previous research by (F.-F. Cheng & Wu, 2010; F. F. Cheng, Wu, & Lin, 2014). Secondly, one important finding is that in the context of audit tasks and in audit decision aid, framing effect is found to occur. It means that in the audit domain which has perceived greater risks than other domains, the framing effect is also robust.

The results of this study have several implications. The first result of this study confirms the presence of framing effect in audit decision aid reliability. It confirms the study result from some previous studies on framing. The implication for the world of practice is that this study can serve as an input or a reminder that the bias dependence may occur in the use of decision aids. Decision aid is only one of the inputs of decision-making that helps decision-makers and there are still many other inputs that can be used to help auditors to decide the right decision. Auditors should never forget that a decision also needs a professional judgment.

However, this study still has some limitations. Firstly, this study is conducted by laboratory experiments with students as its participants. The

experimental design has high internal validity, but not for external validity. It is expected that further study can verify this research result in the practical field, by doing field experiment which involves auditors its as participants. Secondly, future research should compare some areas (example: business, audit, online marketing etc.) to capture the differences. Finally, it is expected that future research can add other important variables and try to reduce this framing effect in audit decision aid.

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