Impact of Warning Messages on the Reliance Level on Decision Aids under the Framing Effect

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ABSTRACT

Manuscript type: Research paper

Research aims: This study empirically examines the role of warning messages on the reliance level on decision aids. We examine whether the offer of warning messages can lower the effect of framing so that it can influence the reliance level on decision aids.

Design/Methodology/Approach: This study employs a 2 x 3 experimental design involving 65 undergraduates and 13 Accounting Profession Program professionals as samples. The dependent variable is the decision aid reliance which deploys a scenario that previously belonged to Gomaa, Hunton, Vaassen and Carree (2011). The framing effect is then manipulated as: (1) positive framing, and (2) negative framing while the warning messages are manipulated as (1) no warning, (2) weak warning, and (3) strong warning.

Research findings: This study shows that the warning messages reduce the framing effect on decision aids. In particular, the findings show that in an audit context, both the weak and strong warning messages are successful in decreasing the framing effect bias on decision aids. These results suggest that warning messages can assist auditors in getting the best decisions in an audit process.

Theoretical contribution/Originality: To the best of our knowledge, previous studies had only examined the debiasing effect of framing

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within a business context. In contrast, this study may be the first of its kind to test this debiasing technique within the auditing context.

Practitioner/Policy implication: Warning messages can function as one of the best tools for auditors to produce the best decisions within an auditing process. Managers in public accountant firms can use the warning messages as a way to maintain their auditors or to employ the audit decision aids carefully.

Research limitation/Implications: This study only measures the reliance level, and not the overreliance level because using a specific measure of overreliance can produce different results.

Keywords: Decision Aid Reliance, Framing Effect, Warning Message, Audit Task Decision
JEL Classification: M42

1. Introduction

Among the many factors that can influence the reliance level on a decision aid, the reliability of the decision aid is one of the most important. Brown and Jones (1998), and Gomaa et al. (2011) suggested that the more reliable the decision aid is, the more the user would agree to use it. However, the choice of method for presenting the reliability information of the decision aid to users can potentially create a bias. A variety of designs in performing decision aids reliability can cause different reliance levels (Cheng & Wu, 2010; Cheng, Wu, & Lin, 2014; Lacson, Wiegmann, & Madhavan, 2005). For example, presenting the same situation in either a positive or a negative frame would lead to different decisions.

Informing the decision aids reliability with different accuracy can also cause various associations in the users' memory. This can finally result in different decisions (Levin & Gaeth, 1988). The more reliable the accuracy is, the more association and positive sense users can get. Besides the accuracy of the reliability, different ways of informing or framing can also create different decisions. The framing model is used extensively in the context of decision judging and making (Levin & Gaeth, 1988).

Several studies have examined the effect of framing on decision aids. Septiari and Goedono (2019) had shown that an auditor's final decision is influenced by how the decision aids reliability was presented (positive or negative). Cheng et al. (2014) confirmed that framing could influence the user's decision. Cheng and Wu (2010) explored the framing phenomena in an online shopping context and found that the

way information was framed had an effect on the individual's judgment and decision. Huerta, Glandon and Petrides (2012) also examined the framing effect of two aid systems: automated and manual. They verified that the framing effect was type-dependent.

The framing effect was caused by the information encoded in the memory (Levin & Gaeth, 1988), and also by the individual's lack of attention on the available information (Smith & Levin, 1996). Both these factors are the potentials for creating a decision bias. Encoding effects emerge from the way information is delivered. This encoding effect then increases when the individual ignores the related information. It is thus essential to have more studies explore the debiasing techniques so that such a problem can be resolved. It is also necessary to examine the methods that could engage people to pay more attention to all the information that could impact on their decision.

In this regard, warning messages can be helpful in response to this problem. The warning messages would strengthen the individuals' attention, thereby making them decide carefully. Warning messages had been used to reduce cognitive biases, such as like hindsight bias (Hasher, Attig, & Alba, 1981; Reimers & Butler, 1992), anchoring bias (Block & Harper, 1991), and outcome effect (Clarkson, Emby, & Watt, 2002). In a study of online shopping, Cheng et al. (2014) suggested that warning messages can be effective for reducing decision aids bias. They found that the magnitude of the framing effect was attenuated and eliminated in such warning conditions.

The purpose of this study is to examine the role of warning messages on the reliance level on decision aids in an audit task context. To achieve this purpose, we conducted a 2 x 3 between-subject experimental design, which involved 65 undergraduates and 13 Accounting Profession Program individuals as samples. The first independent variable used in this study is framing which can be manipulated as positive framing or negative framing. The second independent variable used in this study is warning messages which were manipulated as no warning, weak warning and strong warning. The results showed that the warning messages reduced the framing effect on decision aids. In particular, the findings showed that in an audit context, both the weak and strong warning messages were successful in decreasing the framing effect bias on decision aids. These results suggest that warning messages can assist the auditors in getting the best decisions during an audit process.

This study has three contributions. First, it contributes to the development of framing and the warning theory. The prospect theory states

that the framing bias occurs because individuals have a lack of attention on the information given. The bias may be reduced by giving them the instruction which can make them rethink their decision. However, the use of the warning theory in previous studies had also noted that the framing effect debiasing technique also bore some inconsistent results. For example, Cheng and Wu (2010) tested the framing effect on the Internet buyers' attitudes and their purchase intentions. They revealed that a strong warning message was more effective than a weak one. Clarkson et al. (2002) found that a simple instruction or warning about the potentially biased effect of the outcome information was also less effective. Other studies (e.g., Almashat, Ayotte, Edelstein, & Margrett, 2008; Cheng & Wu, 2010; Cheng et al., 2014) which examined the framing effect's debiasing technique in the business context had also failed to prove the usefulness of the framing debiasing technique. As a result, the current study proposed that different tasks and different strength levels of the warning messages may have led to this inconsistency. According to Zhen and Yu (2016), different task contexts may modulate an individual's framing effect. This study examines the debiasing effect of warning in the auditing task context. By testing a context that is different from the previous studies, we suggest that weak and strong warning messages may together be effective for the framing effect of the debiasing technique. This study placed participants in a scenario where they must perform immediate decisions based on whether they depend or do not depend on the provided recommendation of the decision aids. This scenario would create a situation which resembled the real audit task. The participants would assume the role of an accountant who needs to make a professional judgment and decision. The findings derived from this study would give a new perspective to the warning theory when used in the audit context. Warning messages can effectively reduce the bias among framing. The findings obtained from this study have also indicated that there are different effects of warning on the relationship between framing and decision aids reliance. In the audit task scenario, both the weak and strong warnings are helpful as a framing debiasing technique.

Unlike previous studies which generally use a 7-point Likert scale to measure participants' perception of reliance, the current study uses a slightly different approach. In this regard, it adapts Gomaa et al.'s (2011) reliance measuring instrument to measure the behaviour of the participants in their decision-making. We tested the hypotheses through an experimental method. The results of our study are consistent with

previous studies – when there were no warning messages, participants with the positive framing had a higher level of decision aids reliance than participants with negative framing. The giving of a warning message seemed to reduce the effect of framing on the audit decision aids. Another important finding of the current study is that in the audit and the behaviour context, either the weak or the strong warning message was equally effective in reducing the framing effect bias. This outcome was different from a study of heuristic bias, which had stated that only warning messages with a stronger level could reduce the effect of framing.

Finally, this study also contributes to the practical environment, as the findings are beneficial to the practical field of auditing. Auditors are often required to make better decisions during the audit process, yet they are frequently faced with the occurrence of heuristics bias in their work. In this regard, the audit leader can use a warning message to assist the auditors in producing the best decision.

This paper is organised as follows: Section 2 outlines the literature review and the study's hypotheses. Section 3 discusses the methodology employed. Section 4 explains the data analysis and Section 5 explains the discussion of the findings. Section 6 concludes this article and provides suggestions for future research.

2. Literature Review and Hypotheses

2.1 Decision Aids Reliance

Decision aids which are currently present in the form of computerised systems, such as expert systems, neural networks and decision support systems (Eining, Jones, & Loebbecke, 1997; Hampton, 2005; Swinney, 1999; Van Dongen & Van Maanen, 2013) have emerged in various manuals, such as algorithms, procedures and standard formats (Alon & Dwyer, 2010; Brown & Jones, 1998; Eining et al., 1997). Decision aids are desirable when they have a good track record to map the correct or highly correct decision domain (Mascha & Smedley, 2007). Reliance on decision aids can operationalise into the user's agreement with decision aids' recommendations (Hampton, 2005). The more the individuals agree with the decision aids' recommendation, the more they will rely on this aid. Some previous researchers (Ashton, 1990; Brown & Jones, 1998) have suggested that the increase in decision making based on decision aids is a sign of the reliance increasing.

Users must be aware that the aid's recommendations are merely inputs for more appropriate decisions. In a reasonable level of reliance, the information generated by the decision aids would assist users in making the right choice. Conversely, when the users become over-reliant, the decision aids would ruin their judgment. Over-reliance occurs when users prefer to depend on a decision aids system rather than use human analysis (Swinney, 1999). This means that the auditors would trust the reliance more than their own judgment. Nonetheless, the aids tool may not be robust for all domains when the decisions are applied. Further, a decision aid may also be wrong if it is without any adequate knowledge (Mascha & Smedley, 2007). In this regard, we need to know the factors that cause reliance (Swinney, 1999).

Brown and Jones (1998) classified the factors that caused decision aids reliance into four: (1) characteristics of the decision aids, (2) characteristics of the decision-makers, (3) characteristics of the decision tasks, and (4) factors that affect the evaluation of the decision strategy. Ashton (1990), Eining et al. (1997), Gomaa et al. (2011), Kaplan (2001), and Lowe, Reckers, & Whitecotton (2002) had examined some of these characteristics of decision aids, and they found aids reliability as one of the crucial factors of reliance.

Nevertheless, studies examining the reliability of the aids can also be inconsistent (Dzindolet, Peterson, Pomranky, Pierce, & Beck, 2003; Dzindolet, Pierce, Beck, & Dawe, 2002). Lacson et al. (2005) stated two possible reasons why aids reliability research had become inconsistent. First, it may be due to the accuracy or errors of the decision aids reliability performance. Secondly, it could be due to the framing of any information about the reliability (framing effect). Many studies of information reliability were positively inclined, and thus far, there has been no research on the negative outcomes (Dzindolet et al., 2002; Lacson et al., 2005). In relation, Tversky and Kahneman (1981) proposed that the differences in presentation format or framing could influence people's decision.

Due to the above reasons, it is essential to examine reliability from the negative perspective. Lowe et al. (2002) used the framing theory (Tversky & Kahneman, 1981) in their study. They noted that individuals tend to pay more attention to negative information in comparison to positive information. Kuvaas and Selart (2004) asserted that negative presentations stimulate more effortful and thorough information processing than positive ones. In this regard, it is expected that people would be more careful in deciding how to rely on decision aids when the

aids reliabilities are presented in the negative frame rather than in the positive frame. In the case of auditors, little potential information about the unreliability audit tools could change their judgment. This is because auditors encounter higher pressure and risks; they also do more complex tasks, hence these make them more cautious when making a decision.

2.2 Prospect Theory, Framing Effect of Decision Aid Reliability and Warning Messages

The framing effect when explained through the prospect theory states that people make decisions based on the potential final losses and gain values, and that people evaluate losses and gains by using a particular heuristics (Kahneman & Tversky, 1979). This theory suggests that in a favourable situation, the individual tend to choose a profitable option. The individual will also tend to choose the decision that has a small amount of losses (to minimise losses).

The framing phenomenon is also observed in the context of auditing. Boritz (1997) suggested that the framing effect is an important variable which potentially impedes audit judgment accuracy. When the auditors evaluate the aid recommendations in their audit work, they would assess the reliability of those aids first. The more reliable the aids are, the better these would be trusted. Therefore, if that reliability information was delivered negatively, it would look less trustworthy, thereby causing unfavourable perceptions. This situation also applies vice versa. Septiari and Goedono (2019) confirmed that the framing effect could influence decision aids reliance within the audit context. They found that positive framing caused a higher degree of following the audit aids as compared to negative framing.

There are three types of effect from framing: attribute framing, goal framing and the framing of risky choices (Levin, Schneider, & Gaeth, 1998). The first type, the framing attribute, is a single attribute of a particular object which is framed either positively or negatively. The second type, the goal framing, is a persuasive message which emphasises on positive consequences (negative) of doing (not doing) an action. The last, framing of risky choice, occurs when the frame captures any risk possibility of aids decision. This study, however, focuses on the attribute framing, due to the necessity to explain the framing of decision aids reliability as a framing attribute.

Hsee and Zhang (2010) in the general evaluability theory (GET) had proposed the consideration of three features when dealing with the

evaluability of any attributes – nature, knowledge and presentation. The last characteristic, in particular, can cause cognitive bias, known as the framing effect. The framing effect of attributes occurs when the object attribute (such as framing includes probabilistic data) is manipulated (Lacson et al., 2005). Attribute framing refers to the single attribute of a specific object being positively or negatively framed. This occurs when the positively described item is higher than the negatively described item (Levin, Gaeth, Schreiber, & Lauriola, 2002). It is possible to define attribute framing in a situation whereby a single attribute of a given context is the subject of the framing manipulation (e.g., describing ground beef as ''80% lean'' or ''20% fat'') (Freling, Vincent, & Henard, 2014). The information of decision aids reliability is one single attribute which can be framed through that theory. Alewine, Allport and Shen (2016) noted that attribute framing also occurs in the accounting infor-mation system area while Septiari and Goedono (2019) endorsed that attribute framing exists in decision aids reliability.

There are various types of evaluations in reliability framing because decision aids represent choices between approving and rejecting the decision aids recommendations. These evaluations may include favour-ability ratings (levels ranging from not at all acceptable up to the level of entirely acceptable) (Levin et al., 1998). Attribute framing can explain how an object describes positive looks more effectively than those negatively depicted (Levin et al., 1998).

Septiari and Goedono (2019) also found evidence indicating that framing effects are vital in audit decision aids. Informing the auditors about the decision aids reliability in different ways could lead to different levels of tendency in following the aids recommendations. Cheng and Wu (2010) and Cheng et al. (2014) had examined the effects of framing on information technology reliability. Their study focused on buyers' intention to buy online. They found that there was a correlation of framing effects to reliance. When participants received positive framing, their trust for decision aids was high. In contrast, when participants received reliability information that was framed negatively, their decision aids reliance tended to be low, even zero.

The results of previous studies by Cheng & Wu (2010), Cheng et al. (2014) and Septiari & Goedono (2019) had raised the need to study more about the debiasing techniques of the framing effect on decision aids. Some research had suggested warning messages as an effective debiasing technique of cognitive biases like hindsight bias (Hasher et al., 1981; Reimers & Butler, 1992), anchoring bias (Block & Harper,

1991), and outcome effects (Clarkson et al., 2002). This input is similar to Cheng and Wu (2010) whose study indicated that warning messages can be used as a debiasing technique. They had found this technique to be successful in reducing the framing effect. However, Cheng and Wu (2010) had limited the effectiveness of the debiasing technique to online shopping with a strong warning treatment. As a result, it is necessary to re-examine these studies in the context of auditing by including all the warning conditions (no warning and weak warning).

2.3 Hypotheses Development

In the prospect theory, people make decisions based on the potential final losses and gains value; they also evaluate these losses and gains by using a particular heuristics (Kahneman & Tversky, 1979). People tend to choose any profitable option when they are placed in the favourable condition, and they tend to take any alternative that has a small amount of losses (to minimise losses) if they are placed in the unfavourable situation.

The framing effect occurs because individuals are less concerned with information (Smith & Levin, 1996) and with encoding the information in memory (Levin & Gaeth, 1988). Because of that, individuals become bias, thereby choosing the decision which is most profitable or less detrimental for them. To debias this effect, we need to call the individual's attention in a certain way so as to make them concerned about all the information that could help them in their decision-making. According to Clarkson et al. (2002), warning messages are the best tool for this purpose because this debiasing technique would make the individuals rethink or revisit the decision process.

Previous researchers have confirmed the role of warning messages in reducing cognitive biases. Block and Harper (1991) attempted to reduce the anchoring bias with a salient warning. They argued that when participants received the warning before making final estimates, the effect of anchoring and adjustments reduced although not completely. Hasher et al. (1981) and Reimers and Butler (1992) also examined the results of warning messages in reducing hindsight bias effect. They proposed that warnings reduced the effects of hindsight bias, but they do not eliminate them completely. Clarkson et al. (2002) examined the debiasing outcomes' effect in the auditing domain (the law's judgment for negligent auditors) with instructions or warnings. Their results showed that simple instructions or warnings of the bias potential effect

were effective, but weak. The study by Cheng and Wu (2010) of online shopping showed that warnings had a significant interactive effect on framing. Their result suggested that the warning messages were associated with the framing effects.

The warning message that was received by an individual can be strong or weak. Strong warnings about the potential biasing effects would make the individual more aware of the bias than weak instruction (Clarkson et al., 2002). In the prospect theory, individuals make a bias in their decision because they were not aware that the condition which they faced was the same, but framed differently. Even though the information was framed in the gains or losses, these individuals were influenced by the framing of gains and losses, without realising that the information was the same. In this regard, such individuals need to be reminded with warnings about this bias so that they can rethink their decisions. The stronger the warning is in reminding them, the better it will attract their attention.

In Cheng and Wu (2010), the influence of the warning message on the participants' framing attitude was only mitigated, not eliminated. The result of their study was similar to Clarkson et al. (2002) who had shown that strong debiasing instructions revealed better performance than weak ones when mitigating the outcome effects. Cheng and Wu (2010) argued that the strength of the warning arguments, and the nature of the judgmental bias were possible causes for these findings. Therefore, in this study, we extended this issue by changing the judgemental context to the auditing task context. This was achieved by revising the methodology so that both the weak and strong warning messages would be effective in reducing the framing effect. The decision in the audit process contained more risks and is of high pressure hence, auditors would consider each information that is related to their decision.

In this study, we divided the warning messages into three types: no warning, weak warning and strong warning. In the condition where there was no warning, individuals did not receive any warning. They were completely under the framing bias. In this situation, the positive presentation of decision aids reliability led to more decision aids reliance than those in the negative presentation. In the condition where there was weak warning, the participants received information about the possibility of framing effect presence. This information may make people recall the prior information that is related to their decision. The last is the strong warning which gives participants the information that they were clearly under the framing bias. Therefore, this information

would lead them directly to rethinking or revisiting their decisions, thereby reducing the framing bias and helping them make better decisions. We argue that warning messages would moderate the influence of the framing effect on decision aids reliance. For participants with no warning, receiving a positive framing message would result in more reliance on decision aids than their counterparts receiving a negative framing message. For participants with a warning, a positive or negative framing message would result in a similar reliance on decision aids. Based on this, the hypotheses formulated for this study are as follows:

H_{1a}: The participants who received a weak warning, a positive or negative framing message results in a similar reliance on decision aids.

H_{1b}: The participants who received a strong warning, a positive or negative framing message results in a similar reliance on decision aids.

3. Data and Methodology

3.1 Experiment Design

A 2 x 3 between-subject laboratory experiment was designed to investigate the correlation between the variables in this study. Two treatments of decision aids reliability were applied: 1) positive framing with 80% accurate aids information and negative framing with 20% inaccurate aids information, and 2) treatments encompass three types of warning messages (no warning message, weak warning message and strong warning message). The design of this experiment is illustrated in Table 1.

Table 1: Matrix of Experiment

Framing	Warning Message		
	No	Weak	Strong
Positive	Cell 1	Cell 2	Cell 3
Negative	Cell 4	Cell 5	Cell 6

3.2 Procedures and Experiment Scenario

The experiment scenario in this study was adopted from Gomaa et al. (2011) and Cheng and Wu (2010). The participants completed the

experiment within 45 minutes. Participants were asked to play the role as auditors where their CPA firms had been engaged to audit the financial statements of the Amalgamated Manufacturing Incorporated (AMI) Company for the current year. They were asked to read a case of the AMI, which is a high-tech equipment company. The participants were informed that the legal department has indicated to them that the risk of their CPA firm being sued as a result of this engagement is very high should the financial statements be materially misstated. Specifically, their legal department has evaluated the likelihood of their company being sued at 95%. If their firm was sued, the likelihood of the plaintiffs winning the suit is 90%. If the suit was successful, the fine and penalties imposed on their firm would be extremely high (we provided such information to make the participants more serious when finishing their task[1]). We also provided the company's key ratio of the current year and previous year, the financial position summary, and the income statement summary for the current year. In the reading, participants were told that the management has estimated the difference of the receivable write-off per 31/12 was at Rp600,000. The audit committee and the directors' board agreed on the estimation, but they were reluctant to revise their estimation. On the other hand, the participants who were given a receivable in five years, and the write-off histories were told to assume the role of the auditor of a public accounting firm. They were to review the history of the accounts receivable; hence it was expected that they would come to their estimations. Participants were also required to propose a year-end adjustment (if any) to the estimates provided by the management for Rp600,000.

The case material was designed in such a way that it would bring the participants to a certain amount of the allowance, which was Rp700,000. Participants were told to offer their initial estimation of

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[1] We pilot tested the experiment several times and we discussed the results with several academicians and accounting professionals. We did not find in our pilot test the information about "Your legal department has evaluated the likelihood of being sued at 95% … the fine and penalties imposed on your firm would be extremely high" to be a problem. However, to make sure this information did not disturb our result, we conducted a new experiment again without this information. There were 30 students with the same criteria in our pilot-test experiment before participating in the actual experiment. We compared the results using the t-test and found no differences. We also ran the data to test the framing effect and the effect of no warning, weak warning and strong warning on the relationship between framing and decision aids reliance. The results were consistent with our previous results. Therefore, we suggest that the problems did not matter.

allowance for the uncollectible accounts, which should be set at 31/12, and to propose a year-end adjustment. After that, the participants were directed to read about the decision aids assistance provided by their accounting firms. This aids decision used historical information as well as the company's accounts receivable in the current economic condition to predict the allowance for the uncollectible accounts receivable. The aids tool has been frequently used by the firm, and has proven to be very helpful. The aids recommended the allowance of Rp750,000, giving the correct estimates for bad debts in every X of 10 cases. For positive framing conditions, the participants were informed that decision aids were correct 8 times out of 10 cases (80% accurate), and for a negative one, they were told that decision aids were not correct 2 times out of 10 cases (20% inaccurate). After reading this information, the participants were allowed to change their initial estimates, and to propose a year-end adjustment, if desired. They were made fully aware that they do not have to change their initial estimates, and they do not have to propose adjustments. Otherwise, they could change their estimates and adjustments in every direction and magnitude. However, it has also been emphasised that the estimation accuracy is very important because it concerns the reputation of the firm and any possible risks faced by the firm.

For participants who received a warning message, there was a warning message before they made the final decision to estimate the allowance for the receivables and final adjustments. For those getting a weak warning, the instruction was given as follows:

> *Warning! The information described in different ways can affect your judgment and lead to biased decisions. So please take note of the decision bias and make sure to avoid unintended effect in terms of the information conveyed, before you determine your final estimate.*

For participants who received a strong warning, the instruction was given as follows:

> *Warning! Information about the reliability of the decision aids is presented in a way that is positive (or negative), and it may affect your choice of the grant. Therefore, please note that the reliability of information can help you or affect your final estimate.*

As for the participants with no warning, no additional instruction of warning of potential biases was given.

3.3 Variable Measurement

The dependent variable in this study is the level of reliance on decision aids. This variable is measured by looking at the extent to which participants change their initial predictions to the suggestion of tool making (Gomaa et al., 2011). The formula for calculation is as follows (participants' answers will be in the range of (0.00 to 1.00):

Reliance = Final adjustment – Initial adjustment/((Decision
aid recommendation – Management estimation) –
Initial Adjustment)   (1)

The example for this equation is illustrated as follows. Participants are given an initial adjustment at Rp700.000 and a final adjustment of Rp750.000. Meanwhile, we know in the material experiment that decision aids' recommendation is 750.000 and management estimations is 600.000. Therefore, the reliance level can be calculated as follows: (750.000–700.000)/ ((750.000–600.000) –700.000) = 1.00. The results show that participants completely follow the decision aids reliance. In other words, they have full reliance. Most of the answers are close to 1.00, i.e. more participants relied on decision aids; and if their answers are closer to 0, let's say 0.02, it means they don't rely much on decision aids.

The independent variables contain two treatments – framing effects and warning messages. The framing effect of the decision aids reliability is presented in two ways: positively and negatively framed. Participants who received the warning messages would also receive additional instructions on the warning of the possibility of bias.

3.4 Participants

A total of 78 subjects participated in this experiment. The participants comprised 65 undergraduates (80.77%) and 13 individuals from the Accounting Profession program (19.23%), both were from the Gadjah Mada University, Indonesia. The average age of the participants was 21.21 years old. RÖnnlund, Karlsson, Laggnäs, Larsson and Lindström (2005) had implied that age has no impact on the framing effect. The participants consisted of 29 males (37.18%) and 49 females (62.82%). In this study, we used an independent sample t-test to compare gender and academic background. The results showed no significant difference between males (n=29, SD=0.23) and females (n=49, SD=0.22), (p>0.05) and between undergraduates (n=65, SD=0.23) and accounting

professionals (n=13, SD=0.20), (p>0.05). Although a majority of the participants were females, the framing effect was not likely to vary in terms of gender (Bateman, Fraedrich, & Iyer, 2002). Participants who were involved in this experiment had also completed and passed a financial accounting subject. This selection criterion was used to ensure that the students have enough comprehension to do the tasks of the receivables for the main experiment. Due to this criterion, we can assume that all participants have the same understanding level as a professional accountant if such tasks were given, and the decision that they would make may be similar to the decision of accountants.

Participants were given several questions and statements as a manipulation check. The first to third statements showed whether the participants understood the tasks. On average, the participants felt that the experimental task was quite difficult ($\bar{Y}$=5.27), but they were motivated enough to follow this experiment ($\bar{Y}$=5.38). The fourth and fifth statements asked the participants about the reliability of decision aids. The participants had given their answers according to their treatment conditions. Statement six inquired about the reliability of decision aids, in which the participants answered that they would get the appropriate treatment. Statements seven, eight and nine showed that participants had understood the management's estimates, decision aids' recommendations, and the difference between management's estimates and the decision aids' recommendations. Statement ten asked the participants how strong was the warning that they felt. In this study, we used the 7-point Likert-scale to measure, and a cut-off point of 3.5 was used to show the differences between weak and strong warnings. Participants under the strong warning manipulation had scored up to 3.5.

The result showed that the average mean in the weak warning was ($\bar{Y}$=3.48), and the average mean in the strong warning was ($\bar{Y}$=6.23). We also used the median as a cut-off point between the weak and strong warning messages. Cheng and Wu (2010) had used this approach to ensure the measurement's validity and reliability. Besides this, we also used the manipulation check to ensure that the participants had received the weak or strong warning messages. The number of participants who had taken this experiment earlier was 104 students. However, after the manipulation check, only 78 participants were found to have passed and qualified for data analysis. We also did the independent t-test to compare participants who had passed the manipulation check with those who did not. The results showed that no difference was found (p>0.05).

4. Results and Discussion

4.1 Descriptive Statistics

Table 2 shows the number of participants (n), the mean (Ȳ), and standard deviations (SD) for each group. The table shows the number of participants in each group: 14 (cell 1), 13 (cell 2), 13 (cell 3), 14 (cell 4), 12 (cell 5) and 12 (cell 6). It can be seen that at the no warning condition column, the mean of the participants who had positive framing was 0.42 (SD=0.19), which was higher than that of the participants who had negative warning, 0.13 (SD=0.18). In the weak warning condition, the mean of the participants who had positive framing was 0.19 (SD=0.24), which was higher than that of the participants who had negative warning, 0.17 (SD=0.23). Finally, the strong warning condition showed that the mean of the participants who had positive framing was 0.20 (SD=0.20), which was higher than that of the participants who had negative warning, 0.15 (SD=0.19). Table 2 also shows that the mean difference between positive and negative framing from the no warning message to the weak warning message until the strong warning message is reduced. The results indicated that the participants may have to consider the warning message before making their decisions.

Table 2: Descriptive Statistics

Framing	Warning messages		
	No	Weak	Strong
Positive	n=14	n=13	n=13
	Ȳ=0.42	Ȳ=0.19	Ȳ=0.20
	σ_y=0.19	σ_y=0.24	σ_y=0.20
Negative	n=14	n=12	n=12
	Ȳ=0.13	Ȳ=0.17	Ȳ=0.15
	σ_y=0.18	σ_y=0.23	σ_y=0.19

4.2 Test of Hypotheses

We tested our hypotheses with the analysis of variance (ANOVA) by using planned comparison through contrast analysis. The control group is compared with the experimental group. In Table 3, Panel A shows the ANOVA results of the between subject's effect. The analysis indicates a difference between the two framing conditions (positive and negative).

Table 3: ANOVA and Contrast Analysis

Panel A					
Independent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	0.773[a]	5	0.155	3.730	0.005*
Intercept	3.453	1	3.453	83.265	0.000*
Framing	0.260	1	0.260	6.275	0.015*
Warning message	0.176	2	0.088	2.119	0.128
Framing * Warning message	0.307	2	0.154	3.703	0.029*
Error	2.986	72	0.041		
Total	7.322	78			
Corrected Total	3.759	77			

Panel B				
Contrast	Value of contrast	SE	df	Sig.
Framing positive + No warning vs. Framing negative + No warning	0.2893	0.077	72	0.000*
Framing positive + Weak warning and Framing positive + Strong warning vs. Framing negative + Weak warning and Framing negative + Strong warning	0.0286	0.058	72	0.617
Framing positive + Weak warning vs. Framing negative + Weak warning	0.0129	0.082	72	0.875
Framing positive + Strong warning vs. Framing negative + Strong warning	0.0450	0.082	72	0.582

Notes: [a] R Squared = .206 (Adjusted R Squared = 0 .151).
$\quad$ * Significant at the 0.05 level (one-tailed).

The ANOVA results in panel A of Table 3 shows that the main effect of the framing on decision aids reliance is significant ($p<0.05$). This indicates that there is a framing effect on the way decision aids reliability is presented. In the same table, it can also be seen that there is an interaction effect between framing and warning ($p<0.05$).

$\quad$ The research hypothesis tested the effects of the interaction between warning message and framing effect on decision aids reliance. Warning

messages were expected to be the debiasing framing effect. Before we tested the main hypotheses, the effect of framing in the no warning message condition (cell 1 vs. cell 4) was performed. This was meant to ensure that the framing effect would occur. Participants in the positive framing condition (cell 1) were found to have a higher level of reliance than participants in the negative framing condition (cell 4). The contrast results shown in Panel B of Table 3 showed the mean distance of the two groups (0.2893), thereby confirming the statistically significant difference (p<0.05). Thus the hypothesis was supported, which is that framing effect occurs in our experiment.

Our hypothesis states that the effect of framing on decision aids reliance is reduced by a warning message. Positive framing causes high levels of reliance, to the extent of causing overreliance. In contrast, negative framing would cause participants to have a very low level of reliance, or even no reliance. However, giving a warning message should probably influence the effect of the reliance. The results of the contrast test shown in Panel B of Table 3 showed the mean distance of the two groups, positive framing and warning message (cell 2 cell 3), and negative framing and warning message (cell 5 cell 6) is (0.0286). These were not statistically significant (p>0.05). The results showed that warning messages may affect auditors' decisions. The framing effect would be reduced when warning messages occurred, thus the hypothesis in this study was supported.

To see deeper into the relation between warning message and framing effect on decision aids, we developed hypotheses H_{1a} and H_{1b}. In both hypotheses, we tested the effect of the weak and strong warning messages separately. The results showed the mean distance of the two groups, one which was given the positive framing and weak warning (cell 2), and one which was given the negative framing and weak warning (cell 4), to be 0.0129. This difference was not statistically significant (p>0.05), hence the results supported H_{1a} – that weak warning reduces the framing effect on decision aids. The result was the same for the two groups, one getting the positive framing and strong warning (cell 3), and one getting the negative framing and strong warning (cell 6), whereby the mean distance was 0.0450. It was also not statistically significant (p>0.05). This result confirms H_{1b}, which states that strong warning reduces the framing effect on decision aids. Our findings revealed that weak and strong warning messages both reduced the framing effect on decision aids reliance.

4.3 Discussion and Implications

The purpose of this study was to test the role of warning messages in reducing the framing effect on decision aids reliance. Based on the purpose, hypotheses were formulated to test the interaction effects, and the simple effects of the debiasing techniques to reduce or eliminate the framing effect bias on decision aids reliance.

The framing theory states that the way information is framed, positively or negatively, can cause the individual to take a different decision. The framing theory is supported by the prospect theory, which states that in a favourable situation, the individual tends to choose the more profitable option. Otherwise, under unfavourable situations, the individual tends to choose the decision that has a small amount of losses (to minimise losses). In this way, the information showing the decision-making, which can be gains or losses, would produce the difference in decisions, including the information, which contains no difference. The results of this study showed that decision aids reliability that is presented negatively causes lower reliance than positive reliability. This supports the findings of Lowe et al. (2002) who also followed the theory of framing (Tversky & Kahneman, 1981).

The framing effect produces a heuristics bias. According to the prospect theory, this bias occurred because individuals did not carefully process all the information that exists. To reduce this bias, we suggest using the warning debiasing technique. In the warning theory, giving individuals some instructions would make them rethink their decisions which they had made before. Our finding supports that the warning messages were effective for reducing the framing effects on decision aids bias in the audit context. The analysis also showed that the average difference between the participants who were given positive framing with participants who were given negative framing had reduced when they were given instructions or warning messages. These results were consistent with previous studies discussing the use of warning messages in terms of bias, including Block and Harper (1991), Cheng and Wu (2010), Clarkson et al. (2002) and Reimers and Butler (1992).

Nevertheless, previous studies had also uncovered some in-consistent results about weak warning and strong warning. Cheng and Wu (2010), and Clarkson et al. (2002) found that strong warning was effective and weak warning was less effective as a debiasing technique. According to Zhen and Yu (2016), individuals' framing effect would differ in different task contexts. In this study, our argument is built

on this theory, that both weak and strong warning messages would effectively reduce the framing on decision aids in the audit context. Most of the past studies, such as Almashat et al. (2008), Cheng and Wu (2010) and Clarkson et al. (2002) had tested the debiasing technique in the context of business but the current study focused on the auditing context. The audit environment is stricter than other industries; hence, we expected that both warnings would be effective as debiasing techniques for this domain. Our finding confirmed that either the weak or the strong warning messages would be equally effective in reducing the framing bias. In fact, the framing effect could even be eliminated by just giving a warning message. The test results of this study also showed that the mean distance between the positive framing condition and the negative framing condition was not significantly different, after being given a warning message. This effect had occurred for two models of the warning messages – weak and strong warning messages. In Table 3, Panel B shows the contrasting results. It indicates that both the weak and strong warning messages can effectively eliminate the framing effects on decision aids, especially in the audit context. These results confirmed our previous expectations, that is, auditors would be more careful, and they would really consider all the information when making decisions as compared to those individuals examined in the business areas. Auditors in the audit process also coped with different judgmental bias unlike the business area, online shopping and other contexts. Cheng and Wu (2010) suggested that the nature of judgmental bias would influence the effect of warning messages on cognitive bias, especially framing bias. The judgment on audit decision needs higher efforts, and can be very complicated. The decision that the auditors have made would have a broader impact on other decision makers, and this condition gives high pressure to the auditors.

5. Conclusion and Implications

Several conclusions can be drawn from this study. First, in the absence of a warning message, positive framing would cause a higher reliance on decision aids than negative framing. This argument is consistent with the prospect theory and previous research done by Cheng and Wu (2010) and Cheng et al. (2014). Second, the finding is consistent with previous research, which noted that the use of warning messages could reduce cognitive biases. The use of the warning messages can also reduce or even eliminate bias as a result of the framing effect. One

important finding noted in the context of audit task is that both the weak and strong warning messages can effectively work as a debiasing technique. The reason is because in this study, the participants were faced with real audit decisions. They could also feel that the instructions given were important information to consider. Additionally, the participants who were asked to make a decision in the audit domain may have perceived greater risks as compared to others in a different domain.

The results of this study have several implications. First, the results confirmed the interaction effects occurring between the framing effect and the warning message. Second, the results confirmed some previous studies looking at the use of techniques for debiasing warning messages (warning message), in terms of bias. The important finding of this study is that both the weak and strong warnings can reduce the framing effect in the audit task context. Previous studies only found that strong warning was effective. These results can serve as an input or a reminder that the bias dependence may occur in the use of decision aids. The warning message can be used as the best tool to assist auditors in producing the best decision while they are using aids reliance. Decision aids is only one of the inputs of decision-making, which can help the decision-makers. There are still many other inputs that can be used to help auditors to decide on the right decision.

Second, the results can serve as a reminder to managers, especially those in public accountant firms. The result can be broadly used to help them in many audit problems and judgements. They must understand that the aids tool can assist them in making a biased decision. Giving the warning messages to the decision aids users or placing the warning messages in the aids systems may help the auditors to reach their good judgment. The warning messages could enable the auditors to think twice before making a decision. The warning messages would attract the auditors' attention to other information, thereby leading to better decisions.

However, there are some limitations in the study. First, this study was conducted by laboratory experiments with students acting as the participants. Hence, it has to be handled with caution when looking at generalisations. Second, the study did not use a specific measure of overreliance. This is a weakness since overreliance cannot be differentiated with reliance. It is hoped that future research can verify the result of the current study by doing a more extensive laboratory or field experiment by involving auditors who are using reliance aids as participants. This can strengthen the external validity of the

research. Third, future research should compare some of the areas (example: business, audit, online marketing and other) so as to capture the differences in the different domains. Finally, it is hoped that future research can find a specific measure for overreliance since in the current study we had adopted and modified the reliance measure which did not distinguish between overreliance and reliance measures. Thus, future research can strive to develop a benchmark which can measure the normative degree of reliance and overreliance.

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Appendix

Case Material
Part 1

Amalgamated Manufacturing, Incorporated

Amalgamated Manufacturing, Incorporated (AMI) is a manufacturing corporation that is involved in the production and selling of high tech equipment. Your CPA firm is engaged to audit the financial statements of the company for the current year, 2016.

Your legal department has indicated to you that the risk of your CPA firm being sued as a result of this engagement is very high should the financial statements be materially misstated. Specifically, your legal department has evaluated the likelihood of being sued at 95%. If your firm is sued, the likelihood of the plaintiffs winning the suit is 90%. If the suit is successful, the fine and penalties imposed on your firm would be extremely high.

AMI's key ratio for the current and preceding years are as follows:

Ratio	Preceding Year	Current Year
Current ratio	2.19	1.69
Quick ratio	1.07	0.72
Cash ratio	0.35	0.24
Operating cash flow ratio	0.74	0.30
Debt-to-equity ratio	0.45	0.71

AMI's Summary Balance Sheet and Summary Income Statement are as follows:

Amalgamated Manufacturing, Incorporated Summary Income Statement For the year ended December 31st 2016	
Sales	Rp32,993,606
Less cost of goods sold	19,736,302
Gross margin	13,257,304
Less operating expenses:	
Selling and administrative expenses	39,927,017
Income from operations	9,330,023
Other revenues and expenses	830,287
Net income	Rp 8,500,000

Amalgamated Manufacturing, Incorporated		
Summary Balance sheet		
As of December 31st 2016		
ASSETS		
Cash, cash equivalents, and investments		
In marketable debt securities		Rp 7,525,300
Account receivable, gross	15,500,000	
Less: Allowance for uncollectible accounts	(600,000)	14,900,000
Materials inventory		14,355,250
Finished goods inventory		16,050,330
Property, plant and equipment, net		119,954,370
Intangible assets, net		4,504,005
Other assets, net		4,159,951
Total assets		Rp181,449,206
LIABILITIES AND OWNERS' EQUITY		
Liabilities:		
Accounts payable		Rp 31,146,250
Long-term liabilities		44,192,310
Total liabilities		75,338,560
Stockholders' equity		106,110,646
Total liabilities and stockholders' equity		Rp181,449,206

Management estimates the allowance for uncollectible accounts to be Rp600.000, which is calculated as follows:

	Age of Accounts Receivable Schedule for 2016				
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	10,000,000	3,000,000	2,000,000	500,000	15,500,000
Est. Rp of Uncollectible	50,000	150,000	200,000	200,000	600,000
Est. Percent uncollectible	0.5%	5%	10%	40%	3.9%

Management and the audit committee of the board of directors at AMI believe that the amount of Rp600.000 fairly represents the expected amount of uncollectible accounts as of December 31st, 2016.

Both management and the audit committee are reluctant to change the allowance amount.

You have gathered the following information pertaining to AMI's accounts receivable and actual write-offs for the preceding five years:

Age of Accounts Receivable Schedule for 2012					
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	9,032,258	2,709,677	1,806,452	451,613	14,000,000
Actual Write-off	64,000	96,000	128,000	160,000	448,000
Percent	0.7%	3.5%	7.1%	35.4%	3.2%

Age of Accounts Receivable Schedule for 2013					
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	9,354,839	2,806,452	1,870,968	467,742	14,500,000
Actual Write-off	71,714	107,571	143,429	179,286	502,000
Percent	0.8%	3.8%	7.7%	38.3%	3.5%

Age of Accounts Receivable Schedule for 2014					
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	9,612,903	2,883,871	1,922,581	480,645	14,900,000
Actual Write-off	79,000	118,500	158,000	197,500	553,000
Percent	0.8%	4.1%	8.2%	41.1%	3.7%

Age of Accounts Receivable Schedule for 2015					
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	9,741,935	2,922,581	1,948,387	487,097	15,100,000
Actual Write-off	85,429	128,143	170,857	213,571	598,000
Percent	0.9%	4.4%	8.8%	43.8%	4.0%

Age of Accounts Receivable Schedule for 2016					
	0-30 days	31-60 days	61-90 days	Over 90 days	Total
Account Receivable	9,870,968	2,961,290	1,974,194	493,548	15,300,000
Actual Write-off	92,429	138,643	184,857	231,071	647,000
Percent	0.9%	4.7%	9.4%	46.8%	4.2%

1. What is your estimate of the allowance for uncollectible accounts as of December 31st, 2016? December 2016?

2. How much confidence do you have in your estimate of the allowance for uncollectible accounts?
    (1=Very Low Confidence, 5=Moderate Confidence, 9=Very High Confidence)

3. What is the difference between your estimate and management's estimate of the allowance for uncollectible accounts?

4. How much of the difference (above), if any, would you recommend to management as an adjustment to the financial statements?

Part II

For Positive Framing

Your firm has provided you with a computerised decision aid to assist you during the audit of AMI. The output of the decision aid is intended to be advisory only, as the ultimate decision regarding the estimate of the allowance for uncollectible accounts is your judgment call.

In addition to analysing AMI's historical financial records, the decision aid incorporates current economic condition in its estimate of uncollectible accounts. In the past, the decision aid has been correct 8 out of every 10 times, yielding an 80% reliability score.

The decision aid has just estimated AMI's allowance for uncollectible accounts as of December 31st, 2016 at Rp800.000.

At this point, please answer the following question: you may go back and review AMI's case materials.

If you wish to stick with your initial response, please answer the following questions the same way you did on the previous page. Else, you may answer the following questions differently than you did earlier.

1. What is your current estimate of the allowance for uncollectible accounts as of December 31st, 2016?

2. How much confidence do you have in your current estimate of the allowance for uncollectible accounts?
   (1=Very Low Confidence, 5=Moderate Confidence, 9=Very High Confidence)

3. What is the difference between your current estimate and management's initial estimate of the allowance for uncollectible accounts?

4. How much of the difference (above), if any, would you recommend to management as an adjustment to the financial statements?

For Negative Framing

Your firm has provided you with a computerised decision aid to assist you during the audit of AMI. The output of the decision aid is intended to be advisory only, as the ultimate decision regarding the estimate of the allowance for uncollectible accounts is your judgment call.

In addition to analysing AMI's historical financial records, the decision aid incorporates current economic condition in its estimate of uncollectible accounts. In the past, the decision aid has been incorrect 2 out of every 10 times, yielding a 20% in-reliability score.

The decision aid has just estimated AMI's allowance for uncollectible accounts as of December 31st, 2016 at Rp800.000. At this point, please answer the following question: you may go back and review AMI's case materials. If you wish to stick with your initial response, please answer the following questions the same way you did on the previous page. Else you may answer the following questions differently than you did earlier.

1. What is your current estimate of the allowance for uncollectible accounts as of December 31st, 2016?

2. How much confidence do you have in your current estimate of the allowance for uncollectible accounts?
   (1=Very Low Confidence, 5=Moderate Confidence, 9=Very High Confidence)

3. What is the difference between your current estimate and management's initial estimate of the allowance for uncollectible accounts?

4. How much of the difference (above), if any, would you recommend to management as an adjustment to the financial statements?

Warning Message Manipulations

For participants who received a warning message, there was a warning message before they made final decision to estimate the allowance for receivables and final adjustments. For those getting a weak warning, the instruction is given as follows:

> *Warning! The information described in different ways can affect your judgment and lead to biased decisions. So please take note of the decision bias and make sure to avoid unintended effect in terms of the information conveyed, before you determine your final estimate.*

Then for the participants who got a strong warning, the instruction is given as follows:

> *Warning! Information about the reliability of the decision aid presented in a way that is positive (or negative) may affect your choice of the grant. Therefore, please note that the reliability of information can help you read affect your final estimate.*

As for the participants with no warning, no additional instruction of warning of potential biases was received by them.

Post Task

1. Have you completed and passed a financial accounting subject?

2. Gender?

3. Age?

Manipulations Check

1. Did you understand the task? (Yes/No)

2. How difficult this task for you?
   (1= Less difficult, 5=Moderately difficult, 9=Very difficult)

3. Do you feel be motivated to follow this experiment?
   (1=Less motivated, 5=Moderately motivated, 9=Very motivated)

4. How reliable was the decision aid?

5. I feel the decision aid is:
   (1= Not very reliable, 5=Moderately reliable, 9=Very reliable)

6. Point 6 inquires about the reliability of decision aids which the participants answered that they got the appropriate treatment.

7. What is the Rupiah amount of the allowance for uncollectible account initially estimated by AMI's management?

8. What is the Rupiah amount of the allowance for uncollectible account indicated by the decision aid?

9. What is the difference between management's estimate of the allowance for uncollectible accounts and the amount indicated by the decision aid?

10. How strong is the warning that did you feel?
    (1= Not very strong, 5=Moderately strong, 9=Very strong)