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Decision-Making Biases in Insurance Purchasing

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ABSTRACT

This study discusses and explains behavioural and psychological factors influencing decision-making under uncertainty, i.e. outcome of the decision is uncertain as in insurance purchasing. The contributions of this study to insurance purchase decision-making are two-folds. First, it contributes to improve insurance companies understanding on their customers' decision-making behaviours and biases. Therefore, they can better market their products. Second, it contributes to improve insurance buyers understanding on decision-making biases influencing their judgement when they make decision under uncertainty. Therefore, they can make better decision when purchasing insurance products and the amount of coverage. Insurance purchase decision is complex and difficult. The complexities arise from issues such as evaluating the likelihood and magnitude of risks, assessing financial needs and choosing an insurance package. The difficulties arise because insurance buyers face difficulties to predict the likelihood and magnitude of highly unlikely and largely unfamiliar future events. The buyers also face difficulties in understanding risks. They fail in properly evaluate the extent, frequency and probabilities of risks, and in interpreting them correctly. They also face difficulties in choosing and evaluating insurance price, quality, and benefits, and in comparing different insurance products provided in the market. Studies have shown that insurance purchase decision is influenced by emotions such as affection, love, fear and anxiety. The emotions created decision-making biases. The biases can be the result of cognitive limitations, information processing and perception, problem organizing and cognitive styles. This study groups decision-making biases influencing insurance purchase decision in two: biases in heuristic judgement and decision framing. Detail explanation of both biases are given. The biases occur because of the interactions between the two human thinking systems, which is also discussed.

Keywords:
Insurance purchasing, insurance demand, insurance decision-making, decision biases, heuristic judgement, decision-making under uncertainty

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1. Introduction

Existing research on insurance decision-making consider the decisions as only pure monetary decisions, and assumes the decisions depend on specified quantitative factors, such as premium, probability of loss, and size of compensation [1]. Huber [2] argued recent studies starts to investigate the underlying processes of consumers' decision-making, such as information-processing, emotions, attitudes or risk perceptions. However, research stream in the areas are still at its infancy, particularly in the area of consumer financial decision-making regarding insurance products. Research in this area includes study on consumers' perceptions of financial risk [3], the role of affect on investors' behaviour [4] and the influence of the familiarity heuristic on the risk perception of financial products [5].

Do emotions decision-making biases such as love, fear and anxiety play a role in people's decisions to purchase insurance [6]? Hsee and Kunreuther [6] conducted a series of controlled experiments investigating whether people's love of an object, such as a vase or painting, influence how much they are willing to pay for coverage or spend time collecting a claim payment if the object is damage or destroy. The study finds that people are willing to pay considerably more for insurance and exert much more time to collect a claim payment for the exact same object if they are inform that they love the object rather than being inform they have no special feeling for it. In addition, the study finds that people are willing to pay more for insurance if they fear a specific event. For example, stolen car or painting, or a house damaged from an earthquake. Compare to if they are not concern about the event occurring. People focus on the badness of the outcome rather than on its probability when they have strong emotional feelings attach to the event [7, 8]. Zimmer et al. [9] states, people buy insurance for to achieve “a peace of mind" and to reduce concerns about the occurrence of potential loss. According to [10], past experience and emotions attach to the experience generates the concerns. For example, in the case of terrorism risk, a national field survey conducted in November 2001 reveals that Americans living within 100 miles of the World Trade Centre feel a greater personal risk from terror than if they live further away [11]. The experience and emotion attach to the attack, explain the large demand for terrorism insurance coverage immediately after September 11 even at extremely high premiums [10].

Consumers make three types of mistake when making decisions about whether to purchase insurance at a given point of time. First, insured consumers continue to renew an insurance policy even when circumstances such as premiums or expected losses change over time [12, 13]. Second, insured consumers incline to drop their insurance policy if the risk event does not occur, even when circumstances (such as premium or expected losses) do not change. They view insurance as an investment and feel it is not paying off [14]. Kunreuther and Pauly [6] stated that, an individual regrets paying premiums for insurance if the risk events do not materialised. The person regrets wasting money and may avoid insurance in order to avoid feeling disappointed. Conversely, if the person does not buy insurance and the risk event occurs, then the person regrets not having an insurance policy. Third, uninsured consumers who suffer a loss may regret not having an insurance policy. Then, they decide to buy insurance even though the occurrence of the loss does not imply any change in future loss probabilities [14]. Kunreuther *et al*., [10] divided insurance buyers into three categories (i) individuals at risk who should have insurance but do not, (ii) individuals at risk who have less (under purchase) or more (over purchase) insurance than they require and (iii) individuals at risk who do not need insurance but have insurance.

This study is motivated by [2] and [10]. The aims of this study to discuss and explain decision-making biases influencing insurance purchase decisions. Specifically, it discusses and explain behavioural and psychological factors influencing decision making under uncertainty, i.e. the

outcome of the decision is uncertain as in insurance purchasing. According to the Oxford English Dictionary, the term bias is originally use to describe a slanting line, like the diagonal in a square. Keren and Teigen [15] stated that biases are often used to describe deviations from a norm. In more neutral sense, bias is define as a tendency to slant in one way rather than another, like the diagonal. Keren and Teigen [15] further explained that in the psychology of judgement, biases are originally conceived as effects rather than causes. Biases can be the result of cognitive limitations, processing strategies, perceptual organizing principles, an egocentric perspective, specific motivations, affects, and cognitive styles. This study has two contributions to the field of insurance purchasing. First, it improves insurance companies understanding about their customers' decision-making behaviours and biases. Therefore, they can better market their products. Second, for insurance buyers to improve their understanding on decision-making biases influencing their judgement when they make decision under uncertainty. Therefore, they can make better decision when purchasing insurance products and the amount of coverage.

2. Insurance and Personal Risk

According to [16], insurance is called a business of uncertainty. On one hand, insurance is possible in the presence of uncertainty. On the other hand, insurance is supplies by organisations seeking to make profits out of the uncertainty. However, insurance is not the only tool to cope with risk or uncertainty. There are other tools to cope with risk and uncertainty which falls under the area of risk management. However, insurance is useful for risks with negative consequences. Risks define as the danger of incurring losses, such as loss of an asset, loss of limbs and loss of life. Insurance is a formal contract between two parties. One of the parties (the insured) purchases an insurance policy from another party (the insurer). The policy can be redeem for money if certain risk events state or cover in the policy occur. The cost of the insurance policy is the insurance premium. Insurance contract is made prior to specific risk events occurring. Insurers pay the insured in the event of losses suffer from risk events state or cover by the policy.

People are exposed to risks. The followings outline three types of risks that can be insured.

i. Mortality. Death is certain. However, the timing is not. Mortality risk refers to insuring against early or premature death, particularly for breadwinners or main income earners. On the other hand, living too long is also mortality risk. In this case is insuring or guarding against outliving one's assets.
ii. Health. Health risk is health conditions requiring medical treatments that are expensive. Health risks can be divided into two categories: short-term and long-term. Short-term health risks are variable medical expenses in a year that generally cover by health insurance. Long-term health risks are expenses incur to sustain daily living activities, such as nursing home care. Generally long-term health care risk is cover by long-term health care insurance. The purpose of the insurance is to pay for nursing home care expenses that a person could incur in the future.
iii. Property and liability. People own houses, cars, and valuable items that may burn, collide, break or stolen. Property and liability insurance provides coverage for personal physical assets against various damages. Home-owners or mortgage insurance is require by mortgage lenders, and auto insurance is mandatory.

As a tool to reduce risk and uncertainty, insurance provides the following benefits to individuals and society. The followings outline the benefits [16]:

i. Insurance reduces or eliminates losses hidden in life's uncertainty. Insurance alleviate losses in the following ways. It provides financial means to make up the incurred losses.

For example, when an individual falls ill, part of income is loss to pay medical expenses. Insurance provides a financial mean for making up the loss incurred. It covers the cost of medical expenses.

ii. Insurance provides stability for wealth planning. It levels out an individual income stream by shifting income from the productive to the retirement phase of life. Similarly, health insurance is design in a way that premiums do not increase with age.

iii. Insurance serves as capital or wealth accumulation. Certain life insurance contains a savings component and is views as a combination of insurance and precautionary savings. For example, an insurance paying a capital benefit to an insured surviving up to a given age, such as 60 years. The savings mark-up and investment income are used to build up the insured capital during the life of the contract.

iv. Insurance provides financial relief to the society. By purchasing insurance, individuals protect themselves against the risks of daily life. Without insurance, the consequences of the risks will often be borne by the community. By the principle of solidarity, community cannot refuse to help its members in adversity. People could be suffering a loss such as ill health, accident or death of a breadwinner. They could be victims because of negligence such as failure to operate an effective public fire department. They could also be victims of natural disasters such as flood. Insurance provides an efficient way for individuals to cope with risks rather than having the society to make up for the losses.

3. Insurance and Purchase Decision

Adair [17] stated that decision-making is about deciding what action to take. It involves choice between options. Huber and Schlager [18] argued that decision-making under uncertainty was one of the most challenging task. Risky decisions involve uncertainty. Difficulties arise when one alternative was best in one future, while another alternative was best in another. An example of a risky decision problem is deciding whether or not to take an umbrella. The difficulty was that, if it rains, it was better to have taken the umbrella. If it does not rain, it was better to have left it at home. Investment decisions fall under decision-making under uncertainty. If the market goes up, it is better to have invest in it. If it goes down, it is better not to have. Risky decision requires trade-off. However, in risky decisions the trade-off is across futures rather than present values. Kunreuther *et al*., [10] stated that insurance is a much more complicated financial product than a bank account or loan. Even for a bank account people do a poor job at making decisions involving simple mathematical concepts such as the interest rates compounding. Therefore, [10] argued that there is very little reason to be confident that consumers are making optimal insurance purchasing decisions.

Showers and Shotick [19] discussed the complexities of insurance purchasing. The study argues issues such as evaluating financial needs and choosing an insurance package is confusing to consumers. Kunreuther and Pauly [6] stated, due to the time, effort and costs associate with obtaining the information and the decision-making process, people whom insurance can be a financially attractive investment may be reluctant or unable to collect, process, or both collect and process the information necessary to make purchasing decisions. According to Schwarcz [20], insurance purchase decision is among the most difficult task face by consumers. To make the decision, they have to be able to predict the likelihood and magnitude of highly unlikely and largely unfamiliar future events. Ulbinait *et al*., [21] pointed to the fact that insurance purchase decision is not a trivial process. Ulbinait *et al*., [21] argued that for providers, insurance are difficult to sell and for consumers, insurance are difficult to purchase. The reasons being consumers face difficulties in

understanding risks. They fail in properly evaluate the extent, frequency and probabilities of risks, and in interpreting them correctly. They also face difficulties in choosing and evaluating insurance price, quality, and benefits, and in comparing different insurance products in the market.

4. Heuristic Biases

Kahneman [22] defined heuristic as a simple procedure for answering a difficult question. Gigerenzer [23] defined heuristic as a conscious or unconscious strategy that ignores part of information of a problem to make better judgements and fast decisions. People generally use heuristic to evaluate risks. People use heuristic in uncertain situations where not all information or data are known. In the situations, experience and knowledge are translate into preferences and beliefs regarding the importance or the likely occurrence of uncertain events. However, heuristic judgements in an uncertain environment are expose to judgement biases, and interfere with rational judgements. The following section discusses heuristic judgement biases.

4.1 What You See Is All There Is

What you see is all there is (WYSIATI) is failure to consider critical evidence of a problem is missing [22]. It occurs when a problem's information was scarce. The consequent, people make decisions based on limited information. Instead of asking what they need to know before forming an opinion, insurance buyers make decision based on a limited information. Consider the question: Will Mary be a good leader? She is intelligent and strong. According to [22], people will quickly answer yes. They answer based on the two available information - intelligent and strong. Changing intelligent and strong to corrupt and cruel quickly change people's answer. People should ask the following question, what I need to know before I formed an opinion about the qualities of someone's leadership.

Decision to buy insurance is influence by information available. One way an individual heard about a particular product is from informal conversations such as family and friends. The information is consider to be more reliable and has a greater impact than promote by the media or insurance agents. However, insurance products are complex and many people may not fully understand how a product benefits them. WYSIATI make insurance buyers based their decision on information of poor quantity and quality, and on evidence at hands. Instead of jumping into conclusions, insurance buyers need to ask what they need to know and consider all range of plausibility before they accept or reject an insurance product.

WYSIATI decision-making biases can be aggravated by cherry-picking - showcasing the most attractive features and hiding the unattractive ones [24]. According to [25], people do cherry-picking in all areas, from philosophy, economics, medicine to politics, even in academics. People tell what they do instead of what they do not. If they achieve their goals or objectives they talk them up. If people falter in achieving the goals and objectives, they are not even mentioned. To control WYSIATI decision-making biases, [24] suggested asking about the leftover cherries, i.e. the omitted information. Dig dipper into the situation. The omitted information may be one piece of information that completes the whole story or a situation. Knowing the whole story give insurance buyers a complete understanding and help in making better insurance purchase decision.

Chabris and Simons [26] conducted an experiment on humans' failure to consider or blindness to important information. The experiment shows the limited capacity of human attention. It demonstrates that people are blind to the obvious. The study construct a short film of two teams passing basketballs. One team wear white shirts and the other team wear black. The experiment requires participants to count the number of passes make by the white team and ignore the black

team. The task is difficult and absorbing. Halfway through the video, a woman wearing a gorilla suit appears, crosses the court, thumps her chest and moved on. The gorilla is in view for nine seconds. The video is shown to thousands of viewers, and half of the viewers watching the video do not see the gorilla walking through the middle of the game. However, viewers watching the video without the task see the gorilla. The experiment shows people's attention becomes narrow when concentrating on a task. The counting task and the instruction to ignore the other team causes the narrow view. The viewers are focusing on counting the passes between the players and ignoring other things happening in the video. People's attention can be move away from an unwanted focus. The instruction requires the viewers to focus intently on a target - counting the number of passes. To achieve the target, they had to focus on the game. They do not expect anything unusual to happen. This experiment is relevant to insurance purchase decision. First, an insurance buyers focusing on managing a particular risk (e.g. death) may ignore other important risks (e.g. health or ageing). Second, insurance buyers' expectations and assumptions on a particular insurance product or an insurer may influence what they do and do not see.

4.2 Representativeness

Representativeness is evaluating the likelihood of an uncertain event by its degree of similarity to its parent population or by its ability to reflect the prominent features of the process generating the event [27]. For example, a tall and thin athlete is judge to be more likely to play basketball than football. Young men are more likely to drive aggressively compared to elderly women. People with a Ph.D. are more likely to subscribe to The New York Times. The examples show cases of stereotypes that governed judgements of representativeness. Another type of representativeness is looking only to the recent past to predict the future. For example, a financial analyst with four years' above-average performance is more likely to be a talented analyst. In reality, a four-year record of accomplishment reveals little about the performance of the analyst in the next four years [22].

Representativeness also make people see pattern that is not there. For example, faces in the clouds, outlines of animals in rocks or words on trees. According to [24], it is normal for human brains to seek patterns and rules. If the brains finds no familiar patterns, it invents a pattern. Seeking patterns and making causal relationships between events, create a decision-making bias called associative activation [28]. For example, simultaneously seeing the words 'banana' and 'vomit' causes the brain to make a causal connection between the banana and vomit. In this scenario, the banana is causing the sickness. The associative activation occurs automatically and effortlessly. Decision-makers make the connection as logical as possible from completely unexpected or unrelated events. The causal connection between the banana and vomit causes decision-makers to think that they understand the past, and use the information to prepare for the future. The associative activation bias affects insurance purchase decision. Insurance buyers may perceive certain risks to exist or did not exists by examining past experiences. Even though, past experiences are not accurate predictions of future events. Insurance buyers may be making a causal connection between past and future risk events, even when an associative connection or a pattern did not exist. The consequence of representativeness bias is an excessive willingness to predict the occurrence of an unlikely event [22]. Representativeness results in a less rigorous assessment of risks in the current situation, arising from reliance on perceived similarity with a situation previously experience.

4.3 Availability

Availability heuristic is assessing the frequency or probability of an event by the ease the instances or occurrences of the event comes to mind [29]. Easily retrieves or familiar events are judge to have a high frequency compare to events with equal frequency but are less retrievable. Factors influencing availability bias are personal experience, actual experience and imagination. For example, the effect of witnessing a house burning causes an individual to judge high frequency to risk of fire compares to reading about a fire in a newspaper. Vivid and easily imagine causes of death (e.g., tornadoes) often receives high estimates of probability compare to less vivid causes (e.g., asthma attacks). Even though more deaths are cause by asthma attacks than tornadoes by a factor of 20 [30]. The risk associates with terrorism in the aftermath of September 11 is consider more serious and dangerous compare to unfamiliar risks such as risks associate with sun bathing. The risk of a terrorist attack is given a higher probability compare to the risk of skin cancer. Availability causes insurance buyers to overestimate the likelihood of spectacular or loud events. Silent or invisible events are downgraded in the brain. According to [24], people think dramatically instead of quantitatively. The availability heuristics can be used to explain insurance purchasing decisions. According to [29], in the aftermath of earthquake, purchase of earthquake insurance increases sharply. However, purchases decline steadily as vivid memories recede. People living on flood prone areas are less likely to purchase flood insurance if floods have not occurred in the immediate past. On the other hand, people who know someone who has experience a flood are more likely to buy flood insurance for themselves. Regardless of the flood risk they actually face.

Different people interpret problems differently depending on the available information or stimulus given before decision-making. The information or stimulus given to decision makers has a priming effect on judgement. Hans-Peter Erb and Hilton [31] showed how priming affect people risk attitudes and consequently their decision-making between risky and safe options. The study investigates whether exposing participants to risk-related content would affect risk preferences. The first part of the study requires the participants to judge the frequency of occurrence of two sets of 15 words. The first set comprises risk- seeking words, and the second set comprises risk-averse words. Both the risk-seeking and risk-averse sets consists of 15 words. For each set, eight out of 15 words are associates with risk-seeking and risk-averse behaviour. The remaining words are random words that have no association with risk behaviour. For the risk-seeking set, four words have positive connotations for risk-seeking behaviour, such as 'enterprising', and four words have negative connotations for risk-averse behaviour, such as 'fear'. Similarly, for the risk-averse set, four words have negative connotations for risk-seeking behaviour, such as 'thoughtless', and four words have positive connotations for risk-averse behaviour, such as 'responsible'. The second part of the study requires the participants to read four risk scenarios and decide between a safe or risky option. The results, priming affects risk preference. Risk-seeking priming induces risk seeking behaviour. Risk-averse priming induces risk-averse behaviour. Furthermore, the participants are unaware of the priming effect. Only one respondent is aware of the relationship between the first and second part of the study. Priming affects insurance purchase decision. Priming causes insurance buyers who had a certain prior belief, or who are expose to a certain environment, to be influence by their beliefs or environment.

4.5 Affect

Affect heuristic is people let their like and dislike to determine their beliefs or preferences. In people's minds, risk and benefit are inversely related [31]. People refer to affective feeling in

judging the risks and benefits of an activity. If an activity is like, it is judge as having low risks and high benefits. If an activity is dislike, the risks is high and the benefits is low. Affect causes people to avoid, reject or distort any information or opinion that conflict with their beliefs or preferences. If an insurance buyer favours a certain product or companies, the product is judge as having high benefits compare to its costs or risks. Affect simplifies insurance buyers' mind by creating a world much tidier and simpler than reality, and reject any information that conflict with their beliefs.

Affect heuristic is influences by halo effect - favourable first impressions influence judgements. For example, if a person think a baseball pitcher is good-looking and athletic, the pitcher is likely to be rated better at throwing balls (positive halo). If a person think a player is not good looking, the player's athletic ability is underrated (negative halo). If a risk manager think a financial model is complex and sophisticated, the model is perceive to be more trusted to produce an accurate result (positive halo). If a risk manager think a model is simple, the model's ability to produce a reliable result is underrated (negative halo). Psychologist Edward Lee Thorndike discovers halo effect nearly 100 years ago [24]. Halo effect causes people to look at a single quality such as beauty, social status or age to produce a positive or negative impression. It obstructs people's view of true characteristics of a person, product or an organisation.

Affect heuristic produces another heuristic call substitution. Substitution means replacing a difficult question with an easier question [22]. For example, a difficult question, such as 'what do I think about an insurance product?' is replace by an easy question, 'how do I feel about the product?' 'How should insurance agents who prey on the elderly be punished?' is replace by 'how much anger do I feel when I think of unscrupulous insurance agents?' 'How happy are you with your current life these days?' is replace by 'what is my mood right now?' People use their emotional reactions to answer the difficult questions.

People hate losing. Losing make people twice as miserable as gaining the same things that made them happy. According to consolation hypothesis, people having a great affection for an object are willing to pay more for an insurance policy for the object compare to people having less affection for the object [1]. According to the consolation hypothesis, the more affection an individual has for the object, the more pain she anticipates experiencing in the event of a loss. Therefore, the more she anticipates the need for consolation. Insurance provides the anticipate consolation. The more an insurance buyers anticipate the need for consolation, the more valuable the insurance appears, and the more the insurance buyer are willing to pay for it. Buying insurance is an investment for future consolation. Affect, substitution and halo causes insurance buyers to consult their feelings instead of rational judgement to make complex decision. They need to dig deeper and invest time to do serious research before deciding to purchase insurance products.

4.6 Conformity Effect

The conformity effect is the tendency of an individual to follow groups' judgement [33]. Asch [33] conducts a series of experiments to investigate factors influencing independent and independent failure judgement. In the study, the experimenter inform the participants they are participating in a vision test. Unknown to some participants, most of the other participants are the experimenter's assistants. The experiment requires the participants to match the length of a given line (called a standard line) with one of three other lines. One of the three comparison lines is equal to the standard line, and the other two lines differ from the standard line and from each other. The assistants first choose the correct answer, but eventually begin to purposely choose the wrong answer. The unknowing participant is either the last or second last to be call to give an answer. The result, 75 per cent of the participants follow group's decision at least once. In contrast, the control

group participants write their judgement on a form. The control group's choices are free of errors, with 35 out of 37 participants making correct judgements. The findings, people conform to group decisions even though they know the decision is incorrect, and people are more likely to conform if they are require to express their decisions verbally in front of others. Asch [33] conformity experiment is replicated and tested in more than 130 countries [30], with results showing that 20-40 per cent of the participants conform to group's decisions.

Dobelli [24] termed conformity effect as social proof or herd instinct. Insurance buyers feel they are making correct decisions by following the decision of the majority. They choose to believe majority could not be wrong. According to [24], advertising industry benefits from people's weaknesses to social proof. Particularly in an unclear situations having ambiguous advantages and disadvantages. For example, deciding on various car makers, cleaning, beauty and insurance products. Hence, there is tendency for insurance buyers to buy products from a company claiming its product is better because it is the most popular. From personal interviews after the experiment, [33] finds that many of the participants are reluctant to question the accuracy of the majority. Even though, they are confident of their own judgement. They do not want to be left out or ridicule. Few participants push aside their doubts. They choose to believe that the majority is making the correct judgement because they thought that the majority could not be wrong. For insurance buyers to avoid conformity effect or following the herd, they can question how a product is better simply because it sold the most units or the most popular or purchase by majority.

5. Decision Framing Biases

The section discusses the effect of decision framing on rational judgement. Tversky and Kahneman [34] stated that rational choices should not change by changing the framing of the problem. However, studies show that different problem framing impaired rational judgement. The information of a particular problem is the same. However, the structure and presentation of elements of the problem can influence people's perspective and their decisions. Different people interpret the problem differently and made different choices based on their perspectives. According to [35], a decision frame refers to a mental model of a problem used by individuals to solve a problem. It include details about the elements and contexts of the problems. The purpose of this section is to show that framing is spontaneous and subconscious. However, individuals or insurance buyers can also be deliberative in creating their own frames based on their interpretation and perspectives of a problem. In addition to creating their own frames, individuals or insurance buyers can also be framed. The problem is presented to them in a specific structure by clever experimenters or sellers.

5.1 Mental Accounting

Thaler [36,37] defined mental accounting as the processes use by individuals to record, summarize, and analyse their expenses and consumption with the objective of making a decision. Bernstein [38] defines mental accounting as a process in which people separate the components of the total picture. In doing so people fail to recognise that a decision affecting each component had an effect on the shape of the whole. Mental accounting is like focusing on the hole instead of the doughnut [38]. Mental accounting is a study of the mental representation of information. According to mental accounting, a decision whether or not to make a particular purchase is not made in isolation [39]. The decision depends on the availability of budgets [40], the nature of the expense and amount of similar expenses incurred [39], the presentation of prices [41] and the mental

categorization of expenses [39]. For example, expenses can be divide into different spending categories such as food, entertainment, utilities and transport. Spending in each category is constrain by availability of budgets.

Thaler [36] stated one reason people may not buy insurance is they allocate their plan expenditures of income into different mental accounts. The mental accounts constrain how much they are willing to spend on certain activities. If a family has an account label "expenditures on protective activities" and is already committing to spending considerable funds on required insurance such as home owners, auto mobile, life and medical. Mental accounting bias make them feel that they had exhaust their insurance budget and will not want to buy coverage for risk events such as future heath care, retirement, earthquake or flood. Or the family limits the amount they spent on required coverage by taking the cheapest policy or not taking the highest limits of catastrophic coverage, or both. According to [36], the budget constraints or mental accounting biases for investing in protective products or mechanisms extended to higher income individuals as well. As long as they set up separate mental accounts for different expenditures. Bundorf and Pauly [42] showed that people who do not have health insurance do have sufficient income and assets to buy coverage, and still have enough left over to pay other expenses. They fall for mental accounting bias in insurance purchase decision process and avoid buying a health care policy. Thaler [37] argued the reason people divide their spending into categories is to facilitate making rational trade-off between competing uses of funds and act as a self-control device.

5.2 How Many Versus How Likely

Kahneman [22] stated that reasoning is impair when information is presented in terms of percentage versus frequency. A low-probability event describes in relative frequency is given more weight than an event describes in abstract terms of chance or probability. The following presents examples of different styles of framing a problem of percentage versus frequency [22]:

i. A vaccine protecting children from a fatal disease carries 0.001 per cent risk of permanent disability.
ii. 1 of 100,000 vaccinated children is permanently disable.

The risk appears to be small in the first statement. However, the second statement causes people to imagine a permanently disable child. The other 99,999 safely vaccinated children fade from their mind. Kahneman [22] stated that presenting risk statements in terms of relative frequencies causes the risks to be heavily weighted compares to abstract terms such as probability or chance.

Consider the following statements [43]:

i. A disease kills 1286 people out of every 10,000.
ii. A disease kills 24.14 per cent of the population.

The first statement is judges more threatening, although twice as many people die in the second statement compare to the first. The vividness of presenting 1286 actual people rather than an abstract percentage causes suboptimal judgement.

5.3 Loss versus Gain

Kahneman and Tversky [44] showed that a person becomes risk averse in problems frame as gains and becomes a risk seeker in problems frame as losses. Suppose an individual is suffering from a chronic heart disease and a doctor suggested a major operation [30]. The individual asks the doctor the chances of surviving the operation. The followings are two ways the answers can be frame:

i. Of one hundred patients having this operation, ninety are alive after five years.
ii. Of one hundred patients having this operation, ten are dead after five years.

The first sentence is frame in terms of gains and the second in terms of lost. According to [30], people are incline to go through the operation based on the first sentence compare to the second sentence.

Consider the following sentences:

i. 99% fat free.
ii. 1% fat.

The first sentence sounds healthier compare to the second sentence.

Huber [2] examined the effect of ratings on financial decision-making, particularly on product evaluation and risk perception. The study uses the product ratings rather than company credit ratings. Results show participants' product evaluations and risk perceptions differ if the investment product is frame by a positive versus negative versus no rating. Products are evaluated significantly higher for those with a positively framed rating and significantly lower for products with negatively frame rating compare to unrated products. Furthermore, risk perception is lower for the positively frame and higher for the negatively frame products. Huber [2] further examined the moderating role of participants' expertise with the financial products and their susceptibility to information influence. The study finds significant difference in product evaluations between the groups with high versus low expertise for the negative-rating condition and no significant difference for the positive-rating condition. Less-expert participants react stronger to downgrading than do the high-expert participants for negative-rating financial products.

6. Human Thinking Systems

This section discussed the two types of human thinking systems: System 1 and System 2, and how the systems create decision-making biases. The decision-making biases discusses previously are the products of the interactions between the two thinking systems. Humans had two modes of thinking: fast and slow. Stanovich and West [44] refered to the modes as System 1 and System 2. Table 1 presented the characteristics, strengths and weaknesses of Systems 1 and 2. System 1 operates automatically and quickly, with little or no effort. It is uncontrolled, effortless, associative, fast and unconscious. In contrast, System 2 requires attention, effortful mental activities, concentration and complex computations. It is control, effortful, deductive, slow, self-aware and rule following. System 1 is automotive and System 2 is reflective. Examples of the automatic activities of System 1 are calculating 2+2, driving a car on an empty road, understanding a simple sentence and reading words on a billboard. Examples of the effortful activities of System 2 are

parking in a narrow space, filling out a tax form, comparing two washing machines for overall value, deciding whether to enrol in business or law school, focusing on the voice of a particular person in a crowd and noisy room, and deciding which route to follow. Several activities perform by System 1 are involuntary. For example, automatically understanding simple sentences or automatically knowing that 2+2 is four. Activities perform by System 2 require attention. System 2 is ineffective or less effective if it is not ready or if attention is not directed at the activities. The phrase 'pay attention' is appropriate for the activities of System 2.

Table 1
Comparisons between System 1 and System 2 Thinking

	System 1	System 2
Characteristics	Fast	Slow
	Effortless	Effortful
	Unconscious	Conscious
	Associative	Logical
	Pattern seeker	Deliberate
	Emotional	Abstract
	Causation seeker	Calculative
	Explains event by creating story	Frames decision broadly
	Frames decision narrowly	
Strengths	Quick response	Able to handle logic, mathematics and statistics
	Easy completion of routine tasks	Reflection and consideration for bigger picture
	Easy completion of repetitive tasks	Able to evaluate options, pros and cons, and consequences
	Creative in making associations	Good for reductive thinking
	Good for expansive thinking	
Weaknesses	Jumps into conclusion	Slow-requires time
	Emotional responses	Requires effort and energy
	Wrong assumptions	Decision fatigue
	False judgement	
	False causal link	

Decision-making bias occurs because of interactions between the two thinking systems [22]. Kahneman [22] stated that, System 1 runs automatically and is bias and gullible, whereas System 2 in in charge of doubting and unbelieving. However, System 2 is normally in a comfortable low-effort mode. Only a fraction of its capacity is engage. System 1 generates suggestions for System 2, such as impressions, intuitions, intentions and feelings. If endorse by System 2, impressions and intuitions turn into beliefs, and impulses turn into voluntary actions. System 2 adopt the suggestions of System 1 with little or no modification. System 1 calls on System 2 when it faces difficulties, or when problems or questions arise that it cannot answer, or when it needs the support of detailed and specific processing to solve problems. System 2 is also activated when an event violates the model of the world maintain by System 1. For example, lamps do not jump, cats do not bark and gorillas do not cross basketball courts. The thinking of System 2 originates from System 1. System 2 takes over only when problems or questions are difficult. System 1 and System 2 complement each other. System 1 generates suggestions and System 2 endorses and transforms the suggestions into actions. System 1is generally good at what it does, the accurate modelling of familiar situations, accurate short-term prediction and appropriate reactions to simple problems or questions. Unfortunately, System 1 has biases; it made systematic errors in specific situations, such as substituting a difficult question with an easy question and lacking an understanding of logic and statistics. Since System 1 operates automatically, errors are difficult to prevent. Although System 2

is in charge of controlling and is activates when System 1 runs into difficulties, System 2 is generally unaware of the presence of an error.

6. Discussion and Conclusion

Insurance purchasing is a complex process and among the most difficult decisions face by consumers. The complexity of insurance purchasing is cause by issues such as evaluating the likelihood and magnitude of risks, assessing financial needs, evaluating insurance price, quality, benefits, comparing different insurance products provided in the market, and choosing an insurance package. Consumers face difficulties in understanding risks. They fail in properly evaluating the extent, frequency and probabilities of risks, and in interpreting them correctly. For providers, insurance products are difficult to sell and for consumers, insurance products are difficult to purchase. Furthermore, insurance purchasing is influence by emotions. This study discusses behavioural and psychological biases influencing insurance purchasing. The biases are categorise into heuristic and decision framing. The biases occur because insurance buyers rely on System 1 thinking to make decisions. The biases are failure to consider critical information is missing before making decision, looking at previous experience to judge the likelihood of future events, making decision based on feelings (likes or dislikes), making decision based on first impression, failure to understand problems presented in frequencies versus probabilities and considering insurance purchasing budget as representing the whole budget instead of a specific account with availability limit. Insurance purchasing decision is difficult and insurance products are complex. Therefore, to make an optimum insurance purchasing decision, a person needs to have a deep understanding of decision-making under uncertainty. Deep understanding of decision-making under uncertainty requires the ability to identify biases in decision-making under uncertainty, how the biases influence insurance purchasing, causes of the biases and actions to mitigate or prevent the biases. The in-depth understanding benefits both insurers and consumers. It contributes to better understanding on each party motivation to sell and purchase. Insurers can understand why their products are difficult to sell. On the other hand, purchasers can understand why they find it difficult to decide whether to purchase insurance products.

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