Frame Effect Theories; Review and Assessment

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Abstract: - Framing effect is observed when representation of options in different terms of gains (positive frame) or losses (negative frame) provokes systematically different choices or decisions. Several theories were identified by empirical studies and explained the framing effect, which afterwards been categorized into four models of formal, cognitive, motivational and, metaphorical. In this paper we discuss the current theories and their principles, importance, weaknesses and strengths, in order to provide the better understanding about frame effect phenomenon. We also compare the proposed theories based on the finding of previous literature reviews.

Key-Words: - Frame Effect, Marketing Strategy, Decision Making, Framing Effect Theory

1 Introduction

Decades ago in mid eighties, an anonymous phenomenon has been received an enormous attention by researchers in psychology and decision making fields, which was the beginning of the empirical studies and investigation of the today's most well known concept of frame effect in decision contexts (Kühberger, 1998). The studies have been continued until today and will be continued in future to find a brighter aspect of frame effect in the modern world and society.

According to Entman (1993) and Scheufele (2009), frame effect has a selective function, induces ambiguity in a certain aspect of reality and emphasizes other aspects, selectively. Frame effect present the exact same scenario both positively and negatively in the form of particular choices, which leads to the different reaction in decision-making and judgment in individuals. Frame effect often uses incomplete or very complex information, in order to influence the individual's responses and make the decision makers to rely on simplifying heuristics processing.

Influence of frame effect is substantial in many areas such as: health, business, economic and marketing. In addition their significant impacts on individual's decision have been observed over the past years. However the process of frame effect is still not well defined in all aspect. Therefore, this concerns the researchers to focus on the process of frame effect and the magnitude of individual's susceptibility to frame effect (Nelson, Oxley, & Clawson, 1997). Thus, in order to have a better perspective about frame effect, theoretical ideas were brought forward, provided comprehensive information and finding about frame effect, which were very helpful in studies until today and will be significantly useful for future studies.

Framing effect theories provide an understanding (however still not very clear) about this phenomenon; offer much information and basic knowledge regarding how human processes the information in frame effect.

Therefore in this paper, by referring to the previous studies and findings, we will give an inclusive summary and justification about the basic and most important theories such as: Formal Model, Cognitive Model, Motivational Model and Metaphorical Model, in order to provide the rudimentary knowledge to people who are interested in this phenomenon. We will also specify the strengths and weaknesses of each. In addition the comparison in terms of their interpretation of the framing effect and types of responses will be made.

2 Theoretical Background

A Frame effect was first defined by Kahneman & Tversky (1979) as a tendency for people to avoid risk or pursue risk in an identical decision problem framing positively or negatively, in terms of gains or losses, respectively. Subsequently, frame effect, which sometimes referred as contexts effects, has

been also defined as the shifts of individual's preferences and decisions based on the presentation of the same decision scenario or choices in different way without a real change in expected output (Kühberger, 1998; Tversky & Kahneman, 1981).

Here we summarize one of the most popular and classical experiments of ''Asian disease problem'' to illustrate the framing effects in decision-making, which has been described by Tversky & Kahneman (1981). In the designed problem, people have been told to imagine that "United States is preparing for an outbreak of an unusual Asian disease that is expected to kill 600 people". Then they proposed two alternative programs to combat with this disease and decision makers were asked to choose between the two types of proposed programs (sure and risky). The choices were framed both positively (to save lives) and negatively (to minimize deaths) as presented in Table 1.

Table 1. Decision Makers Choices Frames

Positive frame	Negative frame
▪ If Program A is adopted, exactly 200 people will be saved.	▪ If Program C is adopted, exactly 400 people will die.
▪ If Program B is adopted, there is a 1 in 3 probability that all 600 people will be saved and a 2 in 3 probability that no people will be saved.	▪ If Program D is adopted, there is a 1 in 3 probability that nobody will die and a 2 in 3.

The statistical results of this experimental problem have been showed that people chose option A and D more than the other two options. In the positively framed program (72%) of the respondents chose option A and only (28%) preferred option B. And in negatively framed program (78%) and (22%) of respondent chose option 4 and 3 respectively. However all of the options in this experiment yield either 200 lives for sure or an expected value of 200 lives for the risky options, majority of the people tended to be risk averse in positively frame problems and risk seeking in negatively framed problems.

Generally, researchers find out that the positively framed programs provoke more certain responses whereas a negatively framed program provokes risky responses. "Asian disease problem" is just an example to demonstrate how frame effect influences people's choices and decision making in a certain task domain such as life-death (e.g. Fagley & Miller, 1997; Rönnlund, Karlsson, Laggnäs, Larsson, & Lindström, 2005; Wang, 1996)

According to Maniadis, et al (2014) framing effect can appears differently, with distinct size and anchoring effects, and people's response to this different types of frames are partially controlled by several factors such as: formulation of the problem, norms, training, habits, culture and personal characteristics (Tversky & Kahneman, 1981). These factors, afterwards, have been categorized by Kühberger (1998) into three features of risk, task and participant characteristics. Therefore, each individual responses are considerably different and in many cases unpredictable.

This findings have been extremely fascinated many investigator and researchers over the past years, thus, has been encourage them to examine frame effect biases in a different decision making problems such as medical and clinical treatment (Gallagher & Updegraff, 2012; Garcia-Retamero & Galesic, 2010; Peters et al., 2011), financial problems (Cassotti et al., 2012), political election context (Bizer, Larsen, & Petty, 2011), product evaluation and consumer choices (Levin, Johnson, Russo, & Deldin, 1985; Levin et al., 1985), especially in this century where there are a enormous varieties of products, and huge number of choices are available by many competitor in the market, which results in difficulty in making choices. For instance, Head and Shoulder as one of the famous companies in the world provides more than 30 varieties of products or there are more than 42 products offers by Crest toothpaste (Lehmann, Keller, & Farley, 2008).

Moreover the biases were examined in other subjects where framing effect was significantly sensible, like: advertisement, for instance increasing the consumers' willingness to pay for a target product (e.g., Wansink, 2001; Simonson & Drolet, 2004) or encouraging clients to buy a more expensive products/packages by strategically changing their choice sets (Simonson, 1999), business, economic setting (see e.g., Ariely & Simonson, 2003; Hossain & List, 2012), perceptual judgment, internet-based purchasing decisions (Tam & Ho, 2005), responds to social dilemmas, bargaining behavior and auditing evaluation.

Researchers also performed several experiments to understand the boundary conditions of framing effects as well as the factors influencing the strength of framing effects such as emotion, age and sex (e.g., Kühberger, 1998; Cullis, Jones, & Lewis, 2006; N. S. Fagley & Miller, 1990). Even though there have been many studies focusing on these

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factors like emotions, which increase the susceptibility of individuals to framing effect by driving heuristic information processing (Fagley, Coleman, & Simon, 2010; Seo, Goldfarb, & Barrett, 2010; Slovic, Finucane, Peters, & MacGregor, 2002; Gabaix, Laibson, Moloche, & Weinberg, 2003), but still there are many questions remained unanswered about how these factors influence individuals in different domains and which personal, behavioral and genetic characteristics are related to their susceptibility to frame effect.

Apart from this concern, there is an important fact in farming effect and decision-making that needs to be considered by researchers and interested users, which is, this phenomenon must be study separately in different areas within diverse approaches. Because the influence of framing effect in each fields and areas are unrelated to each other, and some of the effects in one areas are ineffective in other areas (Burger, Charness, & Lynham, 2011). The reason for this issue can partially be answered by identifying the processes of frame effect, which itself can be understood by referring to the multiple theories that has been proposed for frame effect (Kühberger, 1998; Burger, Charness, & Lynham, 2011).

3 Framing Effect Theories

3.1 Formal Model

Formal model is viewed as cognitive or perceptual illusion. Different subjective values and weighting functions play a role as two main factors in forming the structure of a problem for gain and losses. These two factors are highly relevant in this model, instead of content or the purpose. Presented information of a problem, as either gains or losses, brings different sets of psychological function that affects the individual's decision making.

Some of the more prominent and influential formal models are: Prospect theory, Cumulative prospect theory, Markowitz's utility theory, Venture theory and Advantage model (Hogarth & Einhorn, 1990; (Shafir, 1993). However in the following sections we present the most three most important of these theories including 'prospect theory', 'cumulative prospect theory' and 'Markowitz's utility theory', which has been used frequently by researchers in framing effect experiments.

3.1.1 Prospect Theory

Prospect theory (PT), the most famous and worthwhile used theory in formal model has been developed by Kahneman & Tversky in 1979

Prospect theory emphasizes that the individuals are intended to weight the potential values of either losses or gains from the reference point rather than the final outcomes in the frame effect problems (Kahneman & Tversky, 1979) and subsequently evaluate them using certain heuristics.

The value function in prospect theory has been described in S-shaped, which represents the subjective value of objective value levels in the domains of gains and losses. Value function in PT has three important characteristics, which made it the essential point in framing of this theory. First is that the value function has a reference point, which is an important level for determination of the outcome's values as losses or gains. Second is that the shape of the value function changes markedly at the reference point, the value function for gain is concave and the domain is located above the reference point, where as the function for loss is convex and its domain is located below the reference point.

Both loss and gain functions exhibit the diminishing sensitivity, which reflects the basic psychological principles. The example for this principle is that the difference between $10 and $20 seems bigger than the difference between $1000 and $1010, irrespective of sign. The third important characteristic is that the slope of the value function for losses is steeper than that for gains. This illustrates the principles of loss aversion. In another word, it explains the idea that why reaction to losses with a given magnitude is more intense in individuals than gains the same size.

Decision making processes in prospect theory has been then divided into three distinct phases of (1) Translation/Editing phase, (2) Combination phase and (3) Decision phase. In translation phase outcome of the decisions are coded according to the reference point, subjective values and decision weight are also assigned. People consider the lesser outcome relative to the reference point as losses and greater outcomes as the gains. Second phase combined the subjective value and decision weights and the last phase is devoted to the evaluation of the prospect value.

Here, we are again referring to the Asian disease problem, to illustrate how prospect theory predicts the result in frame effect. Remember the problem where four programs were suggested. Program A and B were gain options with a reference point of zero people dying. In option A the outcome was saving of 200 people with a probability of 1, whereas the option B outcome was saving 600 people with probability of 1/3. In this circumstances option A was more attractive for decision makers,

since 600 is subjectively less than 3 times 200 at the convex value function for gains. In contrast, program C and D were loss options, the negatively framed version with a reference point of zero people dying. Option C proposed the program that 400 people would die with a probability of 1 and option D offered a program that 600 people would die with the probability of 2/3,since 600 is subjectively more than 3/2 times 400 at the concave value function for losses. Likewise, prospect theory also illustrates the same principle of risk aversion in the gain domain and risk seeking in loss domain (A Tversky & Kahneman, 1981) and specifies how people weight probability in a non-linear fashion.

So in general, what was found by empirical studies on prospect theory showed that (1) the loss is more significant than the same equal gain (A Tversky & Kahneman, 1981), (2) sure gain is much attracted than a probabilistic gain, (3) inversely, probabilistic loss is favored over the definite loss and (4) decision makers often discard the components that has been shared by all concern prospects.

3.1.2 Cumulative Prospect Theory

Kahneman & Tversky in 1992 have been presented the modified and developed version of prospect theory for decisions under risk and crises, known as cumulative prospect theory, which has been particularly superior to PT by adopting the rank-dependent method for transforming probabilities (Quiggin, 1982; Lopes, 1984).

The theory has been also suitable to satisfy stochastic dominance (Starmer & Sugden, 1989; Luce & Fishburn, 1991), 'Transformed cumulative probabilities' is the main difference between the cumulative PT theory and the original version of prospect theory, which has been a result of applying weighting to the cumulative probability distribution function instead of probabilities of individual outcomes. This improvement leads to the different weighting functions for gains and losses, which itself results in overweighting of extreme events which occur with small probability, rather than to an overweighting of all small probability events.

Several findings about this theory has showed the relatively redefined patterns for risk attitude: "(1) risk aversion for gains and risk seeking for losses of high probability; (2) risk seeking for gains and risk aversion for losses of low probability" (Kahneman & Tversky, 1992).

According to these outcomes, it has been illustrates that the CPT is not only depends on the value function, but the combination of value function and cumulative weighting functions.

3.1.3 Markowitz's utility theory

Utility is an important concept in frame effect and decision-making. And Markowitz's utility theory, which has a value function, been known as the foundation of rational choice theory. In utility theory the risk attitude is slightly different, in a way that risk seeking and risk aversion are possible in both gains and losses domains. Risk seeking and risk aversion being predominant for 'large looses and small gains' and 'small losses and large gains' respectively (Burger et al., 2011).

3.2 Cognitive Models

Cognitive theories designed to identify and illustrate the details of information available in processing level from the beginning to the end of the process (stimulus to response), which has been assumed to be determined by the content and importance of the problem. In this paper we review four important theories that has been categorized in this model until today, including: Fuzzy-trace theory, Elaboration theory، Probabilistic mental model theory and Positive-negative asymmetry.

Moreover it is important to note that, not all the theories presented for this model is purely cognitive, some are hybrids and use cognitive in addition to formal concept. Therefore researchers labeled them as hybrid formal-cognitive models.

3.2.1 Fuzzy-Trace Theory

Fuzzy Trace Theory is the most recognized theory in cognitive models, which has been presented by (Reyna & Brainerd, 1991). Theory has four principles of pattern extraction, fuzzy-to-verbatim continua, the fuzzy-processing preferences and hierarchy of gist, which figure the explanation of framing effect. Based on the theory, it has been proposed that the frame effect is a result of the process of information simplification in a certain problem, using a mechanism to reduce the cognitive demands (Reyna & Brainerd, 1991).

In another word, frame effect only presents the extracted gist of information, thus decision makers relies only on the given information to make a decision or judgment (Reyna, 2004).

Once again we return to the Asian disease problem to clarify how does this theory works in frame effect. If the problem were framed according to the fuzzy-trace theory, then option A '200 people will be saved' in the positively framed program 'would have been changed to 'some people will be saved' and option B '1/3 probability that 600 people will be saved and 2/3 probability that no people will be saved' would have been changed to 'some people probably will be saved and some people probably

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will not be saved'. In this circumstance, since most of the people are satisfy and prefer the definite save of the human lives to the probability of saving some lives, thus this preference again leads to the risk-averse option. Subsequently in the negatively framed program the picture reverse, leads to the risk seeking option.

3.2.2 Elaboration Theory

Based on the empirical studies, it has been identified that in more important situations where more cognitive activity is invested, subjects tends to use more elaborated frames than a simple one (Maule, 1989, 1995). In general elaboration theory explained that any form of elaboration would reduce the effects of framing.

3.2.3 Probabilistic Mental Model Theory

Probabilistic mental model theory was developed by by (Gigerenzer, 1991), which later has been applied to framing by Kühberger, (1995). Probabilistic mental model theory claimed that people in response to the problem would construct the reference class, which can be different in each problem; in order to make frequency based inferences. Probabilistic mental model theory thus can predict a framing effect or not, depending on the respective problem content.

3.2.4 Positive-Negative Asymmetry

Based on the studies performed by (Anderson, 1981), it has been found that in a certain circumstances, target person display a different types of behavior (positive and negative), which could be detected by a participants. However, this behavior would weigh heavier when participant form one overall integrative judgment based on both types of behavior. Later, the study has been done by Peeters & Czapinski (1990), which made the previous findings reasonable by proposing the Positive-negative asymmetry model. According to Peeters & Czapinski, individuals evaluate positive and negative stimuli asymmetrically. The idea has been supported by the experiment that showed negative stimuli weighted heavier than positive stimuli when behavior and judgment are about mortality (loss) domain and inversely the positive stimuli weighted more than negative stimuli when behavior and judgment are about ability (gain) domain (Skowronski & Carlston, 1987; Wojciszke, 1994).

The theory also presented the informational negativity-effect, which implies that potentially harmful stimuli, results in extra attention and more cognitive work, thus the individuals strive to gain controls. This principle came up with two implications: (1) the losses domain in the frame effect has a greater information value, therefore it weighted more than the equivalent gains and (2) it is cognitively easier to frame the situation as gain than losses in the neutral presentation of a problem.

3.2.5 Motivational Modeling: Hopes and Fears

Framing effect has been described By Motivational Modeling based on difference in individual's reaction to motivational factors, such as fear, hopes and wishes, which are known as the core concepts of the theory. These concepts lead decision makers to be more receptive to either gains or losses. However, the model claimed that losses induced more emotion than gains in the frame problems.

Like cognitive models, not all theories in this model are pure, thus some are named as hybrid formal-motivational. In the two following section we present the most important theories of this model, which have been termed as security-potential/aspiration theory and self-discrepancy theory.

3.2.6 Security-Potential/Aspiration Theory

SP/A (security-potential/aspiration) theory, which has a significant potential to affect individual's risk attitude was first developed by Lopes' (1987). Years later it was applied to frame effect by some researchers as hybrid theory (Schneider, 1992). SP/A theory uses two factors such as (1) security potential or dispositional factor and (2) aspiration level or situational factor to explain individual risky preferences and decisions. First factor refers to the natural motives in each individual who has different attention to security and potential, and leads to appearance of different choices. When an individual desire for security, leads one to avoid the worst outcomes (loss aversion), whereas, the individual who desire for security and/or potential would go for best outcome (risk seeking). The second factor reflects the individual's needs, opportunities and hopes, which has been influenced by their situation when they making choices. It has been stated that these two factors act in the same direction and favors risk-avoidance in the gains domain, and act in opposite ways in the loss domain, because the certain alternative is often below the aspiration level.

3.2.7 Self-discrepancy theory

Among the various types of identified self-images over the years ((Markus & Nurius, 1987), self-discrepancy theory with the core concept of self-

belief illustrates three domains of these images, such as 'actual' (or current) self, which formed from individual's self-perceptions, 'ideal self' (representations of goals, ideals, wishes, hopes and aspirations) and 'ought self' (Higgins, 1987).
Self-discrepancy theory in frame effect has been described as the outcomes of self-state comparison, which could lead to emotional discomfort because of the existence of gap between two different self-representations (Vartanian, 2012). This comparison then orients people toward positive or negative outcomes where they tend to maximize the presence of positive outcome and maximise the absence of negative outcomes respectively.

3.2.8 Metaphorical Models

Metaphorical model has been described framing effect by using conceptual languages that arise from different scientific background. Most of the models that have been categorized in metaphorical models are out of the realm of psychology. Proposed models are behavioural models ((Rachlin, Logue, Gibbon, & Frankel, 1986), neural network models(Grossberg & Gutowski, 1987), and Catastrophe theory (Svyantek, Deshon, & Siler, 1991).

4 Discussions

Diversity of theoretical ideas, which have been revealed by many empirical works (Kahneman & Tversky, 1979; Ganegoda & Folger, 2015; Pelczer, Singer, & Voica, 2013; Iturbe-Ormaetxe, Ponti, Tomás, & Ubeda, 2011), facilitated the studies for describing the frame effect, by providing the findings about sources of frame effect, processes involved and the predicted outcomes of frame effect in variety of areas. Different theories that have been explained in this paper were grouped into four models of formal, cognitive, motivational and metaphorical models. Different concepts and predictions were identified for each, which has been summarized in Table 2.
Enormous number of empirical studies has been shown that, the most influential theory of all time is Prospect theory (PT), which as mentioned earlier upgraded into Cumulative prospect theory (CPT), (Jou & Chen, 2013; Gurevich, Kliger, & Levy, 2009; Gurevich et al., 2009; Li & Yang, 2013; Abdel-khalik, 2014; Zhou, Zhong, Ma, & Jia, 2014; Zhou et al., 2014). Both theories included two stages of: initial framing, which has been cognitively modeled and stage of valuation, which has been formally modeled. Therefore, neither of them are pure, but rather hybrid. CPT has been more valuable than original PT in some studies, since in addition to gives different empirical predictions, it also avoids some theoretical problems. The key feature of CPT is that it permits a satisfactory modeling of diminishing sensitivity by respecting to either outcomes or changes in probabilities, which has a central role in human decision-making.
Other than formal model, two other models of cognitive and motivational was proposed, because when the problem's contents and structure designed by researchers has been enriched, it reveals some short-comes of pure formal model. Such of those problems therefore illustrated the progress of frame effect from cognitive and motivational viewpoints. In addition, it has also been stressed that the pure formal models could not explain the framing phenomenon completely, especially when framing needs to be identified in natural decision processes. Thus cognitive and motivational model were brought up to provide the better understanding of frame effect at the psychological processes. Those findings have been shown that there is a fuzzy boundary between the identified models and most of them even shared their prominent concepts.
It has been found that theories in cognitive models are highly similar since they all predict framing to be content-specific. Most of cognitive theories centre around the elaboration's concept but with different elaboration (simplification or complication) influences on framing. Fuzzy trace theory suggested that people act on simplified structure because based on this theory processing system prefer to act on simple structures, whereas elaboration and probabilistic mental model theory implies they perform on richer structure than fuzzy trace theory, since these two theories claimed that processing system uses people's learning history or base knowledge, and finally positive-negative asymmetry implies that richer structures are elaborated but only for negative frames, since this theory argued that evolution shaped our cognitive system to be more susceptible to negativity (Ranyard et al., 1997).

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Table 2. Framing Effect Theories

	Theory	Prominent Concepts	Predictions
Formal Model	Prospect theory	Reference point Value function	Risk aversion for gains Risk seeking for losses
	Cumulative prospect theory	Reference point Value function Weighting function	High probabilities: risk Aversion for gain; risk seeking for losses Low probabilities: risk seeking for gains; risk aversion for losses
	Markowitz's utility theory	Reference point Value function Magnitude of payoff	Large payoffs: risk aversion for gains; risk aversion for losses Small payoffs; risk seeking for gains; risk aversion for losses
Cognitive Model	Fuzzy-trace theory	Gist extraction Fuzzy processing	Risk aversion for gains Risk seeking for losses
	Elaboration theory	Elaboration	Increasing inconsistency in risk attitude with increasing elaboration
	Probabilistic mental model theory	Reference class	Risk attitude depends on reference class
	Positive-negative asymmetry	Positivity bias Negativity effect	No related to risk attitude (mainly in message compliance studies)
Motivational Model	SP/A theory	Security-potential Aspiration	Risk aversion for gains Inconsistent risk attitude for losses
	Self-discrepancy theory	Actual, idea, ought self-guide	Individual difference in sensitivity to domains: risk aversion for gains (actual-idea) Risk seeking for losses (actual-ought)

The fuzzy-trace theory, as an example in this model, identified the different levels of processing in frame effect. Studies have been shown that degree of expertise, familiarity with problem or involvement does not influence on decreasing or disappearing the framing effect (Huber & Kühberger, 1996). But according to probabilistic mental model theory, 'problem content' is the first notion that is relevant and can influencing the framing effect. This content dependency has been demonstrated in numerous areas of psychology by (Kim, Goldstein, Hasher, & Zacks, 2005). Second notion, which is relevant in cognitive model, is domain-specificity, which, make up content specificity. In Fuzzy-trace and Elaboration theory, encoding and representation of information in frame effect, in Probabilistic mental model theory, rules for manipulating encoded information and finally in positive-negative asymmetry attentional mechanisms are domain specific of each ones.

As mentioned in previous sections, influence of hedonic factors such as hopes, fear, wishes and desires of individuals were highlighted by motivational model as a core concept in explaining frame effect, however researchers have been faced difficulties in relating those motivational concepts to framing findings (Lopes, 1987; Maule, 1995). In general this theory proposed as a result of traditional

tendency to overlook individual difference in decision-making and then significantly contributed to the framing effect understanding (Maule, 1995; Schneider, 1992; Tykocinski et al., 1994). Motivational theory made the same assumption as prospect theory and illustrate that the decision makers assigned the stronger value to feeling of displeasure other than pleasure, which was proportional to amounts of gain or losses involved in decision (Mellers, Schwartz, & Ritov, 1999). Researchers claimed that generally losses result in greater emotional reaction those gains. Furthermore, it has been recognize that the positive-negative asymmetry theory also has a motivational component similar to SP/A and Self-discrepancy theory.

Followed by developing the motivational theory, many personality characteristics have been studied in framing, however a large number of these studies were unsuccessful. It has been predicted that these personality characteristics influences the susceptibility to framing indirectly, therefore a large number of studies have been failed until today (Fagley & Miller, 1990; Tykocinski et al., 1994; Bier & Connell, 1994; Elliott & Archibald, 1989)

In summary, it has been identified that all these different theories for framing effect shared the common basic concepts. Researchers demonstrated that, however pure formal model, describes most findings of frame effect, but almost all these finding are at the level of behavioral products rather than psychological processes. Therefore two other cognitive and motivational models were proposed to extend these findings and offering interesting predictions even with much lesser empirical support. Cognitive models do this extension of information by highlighting the concept of elaboration and motivational models do this by stressing the hedonic motivational dynamics.

5 Conclusion

A frame effect has been significantly prominent in many areas such as health, business and politics. Therefore, this phenomenon has been attracted an enormous number of researcher's attraction, which subsequently lead them to work on the understandings of the frame effect over the years.

In order to provide the comprehensive information about frame effect, researchers have identified many theories. In this paper we first described each of these theories in details. Then the importance, applications, strength and weaknesses of each theory have been discussed. Followed by that, we made the comparison between the presented theories.

Combination of findings in this paper suggested that the present information about frame effects is not much enough to fulfill the requirements in different areas and problems. Therefore, as proposed by many researchers, the future study must necessarily focus to measure the concepts in motivational and cognitive model, in order to make the better prediction in frame effect. Moreover, since there is a significant interconnection between all these theories, researchers are required to identify the more hybrid model, even with new concepts and predictions in future, to improve the frame effect description.

We also highlighted the existence of many unanswered questions as well as various gaps in understanding of this phenomenon. The gathered information in this paper demonstrates that still there is a lack of sufficient information to explain the frame effect. Therefore we argued that greater researches are required to discuss the frame effect comprehensively in different area and to determine how the framing effect influences the individual's decision.

Future studies are necessary in order to improve the explanations, predictions about the outcomes of frame effects and its influence on individuals in various areas.

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References:

[1] Abdel-khalik, A. R. (2014). Prospect Theory predictions in the field: Risk seekers in settings of weak accounting controls. *Journal of Accounting Literature*, *33*(1-2), 58–84. doi:10.1016/j.acclit.2014.10.001

[2] Anderson, N. H. (1981). Foundations of Information Integration Theory. Retrieved from http://philpapers.org/rec/ANDFOI-2

[3] Ariely, D., & Simonson, I. (2003). Buying, Bidding, Playing, or Competing? Value Assessment and Decision Dynamics in Online Auctions. *Journal of Consumer Psychology*, *13*(1-2), 113–123. doi:10.1207/S15327663JCP13-1&2_10

[4] Bier, V. M., & Connell, B. L. (1994). Ambiguity seeking in multi-attribute decisions: Effects of optimism and message framing. *Journal of Behavioral Decision Making*, *7*(3), 169–182. doi:10.1002/bdm.3960070303

[5] Bizer, G. Y., Larsen, J. T., & Petty, R. E. (2011). Exploring the Valence-Framing Effect: Negative Framing Enhances Attitude Strength. *Political Psychology*, *32*(1), 59–80. doi:10.1111/j.1467-9221.2010.00795.x

[6] Burger, N., Charness, G., & Lynham, J. (2011). Field and online experiments on self-control. *Journal of Economic Behavior & Organization*, *77*(3), 393–404. doi:10.1016/j.jebo.2010.11.010

[7] Cassotti, M., Habib, M., Poirel, N., Aïte, A., Houdé, O., & Moutier, S. (n.d.). Positive emotional context eliminates the framing effect in decision-making.

[8] Cullis, J., Jones, P., & Lewis, A. (2006). Tax framing, Instrumentality and individual differences: Are there two different cultures? *Journal of Economic Psychology*, *27*(2), 304–320. doi:10.1016/j.joep.2005.07.003

[9] Elliott, C. S., & Archibald, R. B. (1989). Subjective framing and attitudes towards risk. *Journal of Economic Psychology*, *10*(3), 321–328. doi:10.1016/0167-4870(89)90027-5

[10] Entman, R. M. (1993). Framing: Toward Clarification of a Fractured Paradigm. *Journal of Communication*, *43*(4), 51–58. doi:10.1111/j.1460-2466.1993.tb01304.x

[11] Fagley, N. ., & Miller, P. M. (1997). Framing Effects and Arenas of Choice: Your Money or Your Life? *Organizational Behavior and Human Decision Processes*, *71*(3), 355–373. doi:10.1006/obhd.1997.2725

[12] Fagley, N. S., Coleman, J. G., & Simon, A. F. (2010). Effects of framing, perspective taking, and perspective (affective focus) on choice. *Personality and Individual Differences*, *48*(3), 264–269. doi:10.1016/j.paid.2009.10.008

[13] Fagley, N. S., & Miller, P. M. (1990). The Effect of Framing on Choice: Interactions with Risk-Taking Propensity, Cognitive Style, and Sex. *Personality and Social Psychology Bulletin*, *16*(3), 496–510. doi:10.1177/0146167290163008

[14] Gabaix, X., Laibson, D. I., Moloche, G., & Weinberg, S. E. (2003). The Allocation of Attention: Theory and Evidence. *SSRN Electronic Journal*. doi:10.2139/ssrn.444840

[15] Ganegoda, D. B., & Folger, R. (2015). Framing effects in justice perceptions: Prospect theory and counterfactuals. *Organizational Behavior and Human Decision Processes*, *126*, 27–36. doi:10.1016/j.obhdp.2014.10.002

[16] Garcia-Retamero, R., & Galesic, M. (2010). How to reduce the effect of framing on messages about health. *Journal of General Internal Medicine*, *25*(12), 1323–9. doi:10.1007/s11606-010-1484-9

[17] Gigerenzer, G. (1991). How to Make Cognitive Illusions Disappear: Beyond "Heuristics and Biases." *European Review of Social Psychology*, *2*(1), 83–115. doi:10.1080/14792779143000033

[18] Grossberg, S., & Gutowski, W. E. (n.d.). Neural dynamics of decision making under risk: Affective balance and cognitive-emotional interactions.

[19] Gurevich, G., Kliger, D., & Levy, O. (2009). Decision-making under uncertainty – A field study of cumulative prospect theory. *Journal of Banking & Finance*, *33*(7), 1221–1229. doi:10.1016/j.jbankfin.2008.12.017

[20] Hogarth, R. M., & Einhorn, H. J. (1990). Venture Theory: A Model of Decision Weights. *Management Science*, *36*(7), 780–803. doi:10.1287/mnsc.36.7.780

[21] Hossain, T., & List, J. A. (2012). The Behavioralist Visits the Factory: Increasing Productivity Using Simple Framing Manipulations. *Management Science*, *58*(12), 2151–2167. doi:10.1287/mnsc.1120.1544

[22] Huber, O., & Kühberger, A. (1996). Decision Processes and Decision Trees in Gambles and More Natural Decision Tasks. *The Journal of Psychology*, *130*(3), 329–339. doi:10.1080/00223980.1996.9915014

[23] Iturbe-Ormaetxe, I., Ponti, G., Tomás, J., & Ubeda, L. (2011). Framing effects in public goods: Prospect Theory and experimental evidence. *Games and Economic Behavior*, *72*(2), 439–447. doi:10.1016/j.geb.2010.10.004

[24] Jou, R.-C., & Chen, K.-H. (2013). An application of cumulative prospect theory to freeway drivers' route choice behaviours. *Transportation Research Part A: Policy and Practice*, *49*, 123–131. doi:10.1016/j.tra.2013.01.011

[25] Kahneman, D., & Tversky, A. (n.d.). Choices, values, and frames.

[26] Kim, S., Goldstein, D., Hasher, L., & Zacks, R. T. (2005). Framing Effects in Younger and Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *60*(4), P215–P218. doi:10.1093/geronb/60.4.P215

[27] Kühberger, A. (1995). The Framing of Decisions: A New Look at Old Problems. *Organizational Behavior and Human Decision Processes*, *62*(2), 230–240. doi:10.1006/obhd.1995.1046

[28] Kühberger, A. (1998). The Influence of Framing on Risky Decisions: A Meta-analysis. *Organizational Behavior and Human Decision Processes*, *75*(1), 23–55. doi:10.1006/obhd.1998.2781

[29] Lehmann, D. R., Keller, K. L., & Farley, J. U. (2008). The Structure of Survey-Based Brand Metrics. *Journal of International Marketing*, *16*(4), 29–56. doi:10.1509/jimk.16.4.29

[30] Levin, I. P., Johnson, R. D., Russo, C. P., & Deldin, P. J. (1985). Framing effects in judgment tasks with varying amounts of information. *Organizational Behavior and Human Decision Processes*, *36*(3), 362–377. doi:10.1016/0749-5978(85)90005-6

[31] Li, Y., & Yang, L. (2013). Prospect theory, the disposition effect, and asset prices. *Journal of Financial Economics*, *107*(3), 715–739. doi:10.1016/j.jfineco.2012.11.002

[32] Lopes, L. L. (n.d.). Risk and distributional inequality.

[33] Luce, R. D., & Fishburn, P. C. (1991). Rank- and sign-dependent linear utility models for finite first-order gambles. *Journal of Risk and Uncertainty*, *4*(1), 29–59. doi:10.1007/BF00057885

[34] Maniadis, Z., Tufano, F., & List, J. A. (2014). One Swallow Doesn't Make a Summer: New Evidence on Anchoring Effects †. *American Economic Review*, *104*(1), 277–290. doi:10.1257/aer.104.1.277

[35] Markus, H., & Nurius, P. (n.d.). Possible selves: The interface between motivation and the self-concept.

[36] Mellers, B., Schwartz, A., & Ritov, I. (n.d.). Emotion-based choice.

[37] Nelson, T. E., Oxley, Z. M., & Clawson, R. A. (n.d.). Toward a Psychology of Framing Effects. *Political Behavior*, *19*(3), 221–246. doi:10.1023/A:1024834831093

[38] Peeters, G., & Czapinski, J. (1990). Positive-Negative Asymmetry in Evaluations: The Distinction Between Affective and Informational Negativity Effects. *European Review of Social Psychology*, *1*(1), 33–60. doi:10.1080/14792779108401856

[39] Pelczer, I., Singer, F. M., & Voica, C. (2013). Cognitive Framing: A Case in Problem Posing. *Procedia - Social and Behavioral Sciences*, *78*, 195–199. doi:10.1016/j.sbspro.2013.04.278

[40] Peters, E., Hart, P. S., & Fraenkel, L. (2011). Informing patients: the influence of numeracy, framing, and format of side effect information on risk perceptions. *Medical Decision Making : An International Journal of the Society for Medical Decision Making*, *31*(3), 432–6. doi:10.1177/0272989X10391672

[41] Quiggin, J. (1982). A theory of anticipated utility. *Journal of Economic Behavior & Organization*, *3*(4), 323–343. doi:10.1016/0167-2681(82)90008-7

[42] Rachlin, H., Logue, A. W., Gibbon, J., & Frankel, M. (n.d.). Cognition and behavior in studies of choice.

[43] Ranyard, R., Crozier, W. R., & Svenson, O. (1997). *Decision Making: Cognitive Models and Explanations* (p. 257). Psychology Press. Retrieved from https://books.google.com/books?hl=en&lr=&id=x39x4seYwswC&pgis=1

[44] Reyna, V. F. (2004). How People Make Decisions That Involve Risk. A Dual-Processes Approach. *Current Directions in Psychological Science*, *13*(2), 60–66. doi:10.1111/j.0963-7214.2004.00275.x

[45] Reyna, V. F., & Brainerd, C. J. (1991). Fuzzy-trace theory and framing effects in choice: Gist extraction, truncation, and conversion. *Journal of Behavioral Decision Making*, *4*(4), 249–262. doi:10.1002/bdm.3960040403

[46] Rönnlund, M., Karlsson, E., Laggnäs, E., Larsson, L., & Lindström, T. (2005). Risky decision making across three arenas of choice: are younger and older adults differently susceptible to framing effects? *The Journal of General Psychology*, *132*(1), 81–92. doi:10.3200/GENP.132.1.81-93

[47] Scheufele, D. A. (2009). Agenda-Setting, Priming, and Framing Revisited: Another Look at Cognitive Effects of Political Communication. *Mass Communication and Society*, *3*(2-3), 297–316. doi:10.1207/S15327825MCS0323_07

[48] Schneider, S. L. (n.d.). Framing and conflict: Aspiration level contingency, the status quo, and current theories of risky choice.

[49] Seo, M.-G., Goldfarb, B., & Barrett, L. F. (2010). Affect and the Framing Effect within Individuals over Time: Risk Taking in a Dynamic Investment Simulation. *Academy of Management Journal*, *53*(2), 411–431. doi:10.5465/AMJ.2010.49389383

[50] Shafir, E. (1993). Reason-based choice. *Cognition*, *49*(1-2), 11–36. doi:10.1016/0010-0277(93)90034-S

[51] Simonson, I. (1999). The effect of product assortment on buyer preferences44The paper has benefited from the comments of Ran Kivetz. *Journal of Retailing*, *75*(3), 347–370. doi:10.1016/S0022-4359(99)00012-3

[52] Simonson, I., & Drolet, A. (2004). Anchoring Effects on Consumers' Willingness‐to‐Pay and Willingness‐to‐Accept. *Journal of Consumer Research*, *31*(3), 681–690. doi:10.1086/425103

[53] Skowronski, J. J., & Carlston, D. E. (n.d.). Social judgment and social memory: The role of cue diagnosticity in negativity, positivity, and extremity biases.

[54] Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2002). Rational actors or rational fools: implications of the affect heuristic for behavioral economics. *The Journal of Socio-Economics*, *31*(4), 329–342. doi:10.1016/S1053-5357(02)00174-9

[55] Starmer, C., & Sugden, R. (1989). Violations of the independence axion in common ratio problems: An experimental test of some competing hypotheses. *Annals of Operations Research*, *19*(1), 79–102. doi:10.1007/BF02283515

[56] Svyantek, D. J., Deshon, R. P., & Siler, M. T. (1991). The illusion of certainty: A catastrophe model of decision framing. *Current Psychology*, *10*(3), 199–209. doi:10.1007/BF02686775

[57] Tam, K. Y., & Ho, S. Y. (2005). Web Personalization as a Persuasion Strategy: An Elaboration Likelihood Model Perspective. *Information Systems Research*. Retrieved from http://pubsonline.informs.org/doi/abs/10.1287/isre.1050.0058

[58] Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453–458. doi:10.1126/science.7455683

[59] Tversky, A., & Shafir, E. (1992). CHOICE UNDER CONFLICT: The Dynamics of Deferred Decision. *Psychological Science*, *3*(6), 358–361. doi:10.1111/j.1467-9280.1992.tb00047.x

[60] Vartanian, L. R. (2012). *Encyclopedia of Body Image and Human Appearance*. *Encyclopedia of Body Image and Human Appearance* (pp. 711–717). Elsevier. doi:10.1016/B978-0-12-384925-0.00112-7

[61] Wang, X. T. (1996). Framing Effects: Dynamics and Task Domains. *Organizational Behavior and Human Decision Processes*, *68*(2), 145–157. doi:10.1006/obhd.1996.0095

[62] Wansink, B. (2001). Descriptive menu labels' effect on sales. *The Cornell Hotel and Restaurant Administration Quarterly*, *42*(6), 68–72. doi:10.1016/S0010-8804(01)81011-9

[63] Wojciszke, B. (1994). Inferring interpersonal attitudes: Hypotheses and the information-gathering process. *European Journal of Social Psychology*, *24*(3), 383–401. doi:10.1002/ejsp.2420240307

[64] Zhou, L., Zhong, S., Ma, S., & Jia, N. (2014). Prospect theory based estimation of drivers' risk attitudes in route choice behaviors. *Accident; Analysis and Prevention*, *73*, 1–11. doi:10.1016/j.aap.2014.08.004