

Research Status of Framing Effect

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Abstract: The framing effect is ubiquitous in people's life, which is an important research in decision-making field and a hot research spot in psychology field. It reveals the psychological phenomenon that people tend to be risk-averse under a positive frame and risk-seeking under a negative frame. This paper first sorts out the annual trend of framing effect research; then summarizes the research influencing factors of framing effect. Finally, the article puts forward the problems existing in the current research and puts forward some suggestions for future research.

1. Introduction

Framing effect is an important research in decision-making field. Tversky & Kahneman's study on "Asian disease Problem" found that for the same quality of decision making problems, people tend to avoid risks when using positive language to describe them, while people tend to seek risks when using negative language to describe them [1]. Tversky & Kahneman defines the phenomenon that decision makers change their preference for a choice with the same logical meaning due to different language description methods as framing effects. Subsequent studies in many fields have verified this phenomenon, that is, people tend to avoid risk under a positive framework, while people tend to seek risk under a negative framework.

2. The Research Progress of Framing Effect

Since Tversky & Kahneman proposed the framing effect, researchers have conducted a lot of confirmative studies on its universality from various perspectives. Through the China National Knowledge Infrastructure (CNKI) database, using the topic of "frame effect" search conditions for professional search, the time span is not limited, the relevant literature search in Chinese and other

languages. As shown in Figure 1, literature retrieval through comparative databases shows that it was not until 20 years after the framing effect was proposed that scholars began to pay attention to it. In the past five years, the amount of research is relatively high, indicating that the influence of framing effects are also growing.

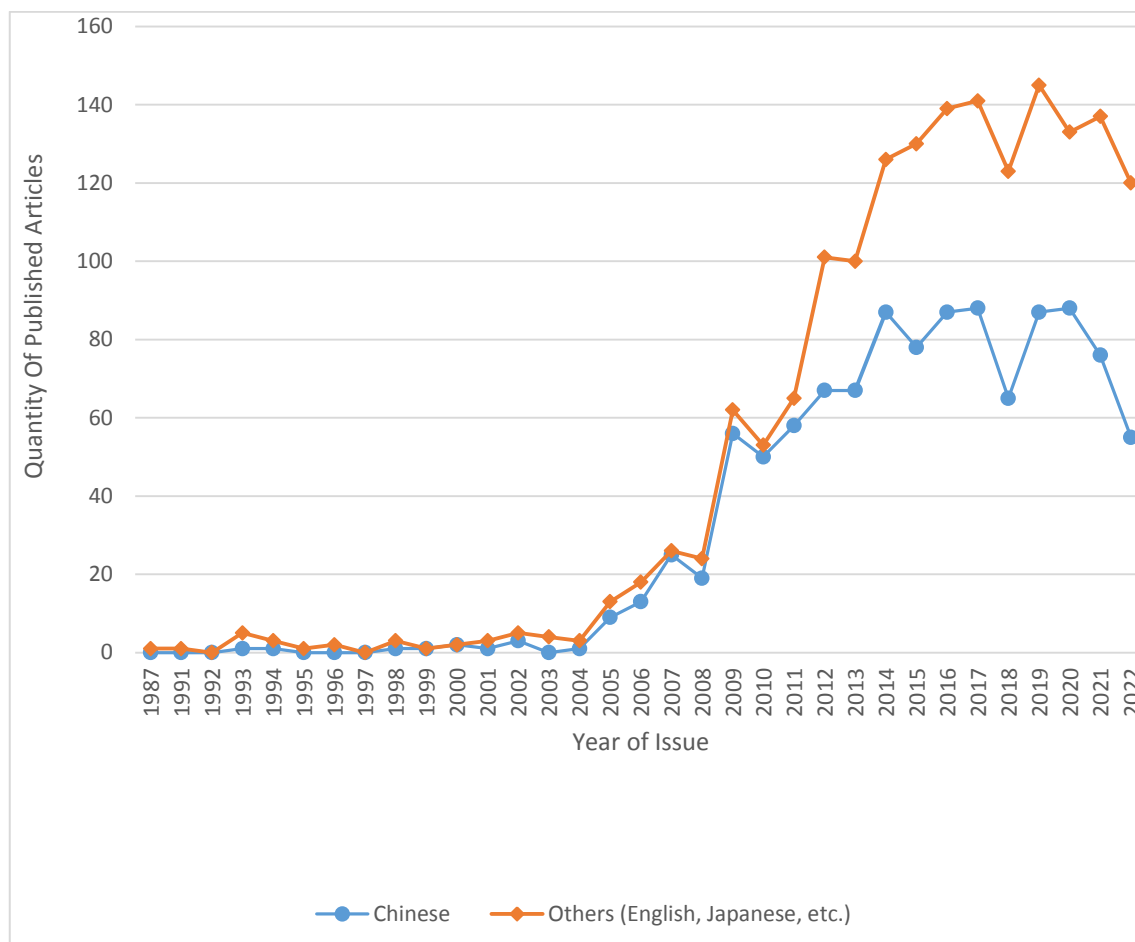


Figure 1. Comparison of the framing effects study in the year of publication both China and abroad

As shown in Figure 2, the research on framing effect covers a wide range. Currently, the research on framing effect mainly focuses on the fields of psychology, economics and management, while there is still a large gap in the fields of medicine and administrative jurisprudence. However, the research on the application of framing effect in the field of health started relatively late in China [2]. Among them, there is a larger research gap in the fields of medical health, advertising marketing and environmental protection [3-5]. The change trend of the research results of framing effect is as follows: the problem presents a change from verbal representation to graphical representation; The study of transition from single time to intertemporal time; The decision-making background expands from individual to collective culture; The role of genetic factors in decision making is concerned. More and more researches have been conducted on the neural structure and neural mechanism of the framing effect. In addition, other studies have attempted to explain the framing effect from the perspective of evolutionary psychology and cultural orientation [6-7].

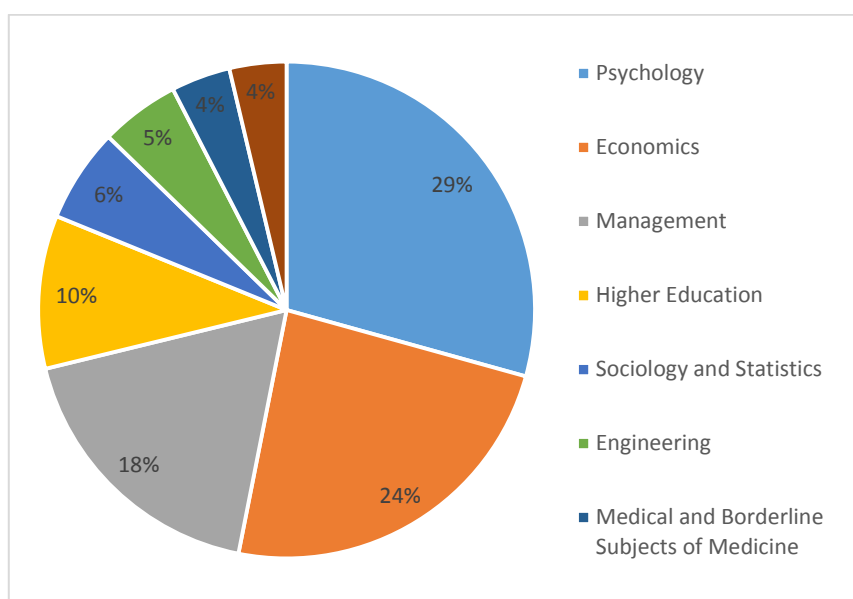


Figure 2. Disciplinary field distribution of framing effects research

3. Research on Influencing Factors of Framing Effect

The framing effect can be explained by the prospect theory proposed by Kahneman and Tversky [8]. The theory takes "maximization" as the guiding principle. Under the neutral reference point, gain and loss are relative rather than absolute concepts. The decision-maker pays attention to the difference when choosing, and under the given risk coefficient, the decision-making is analyzed by the value function (preference function) of the occurrence of the event and the decision-making weight of the subject's choice. The function expression as follow:

$$v(x_i) = \begin{cases} (\Delta x_i) & \Delta x_i \geq 0 \\ -\lambda(-\Delta x_i)^\beta & \Delta x_i < 0 \end{cases} \quad (1)$$

The process of the framing effect is that under the specific decision-making task, by imposing a positive or negative decision-making frame, under the influence of the individual's cognitive strategy, different decision-making results of risk seeking or risk avoidance are produced, as shown in Figure 3. In this process, researchers conducted in-depth research by manipulating the individual's external decision-making tasks and the factors related to the individual's cognitive strategy.

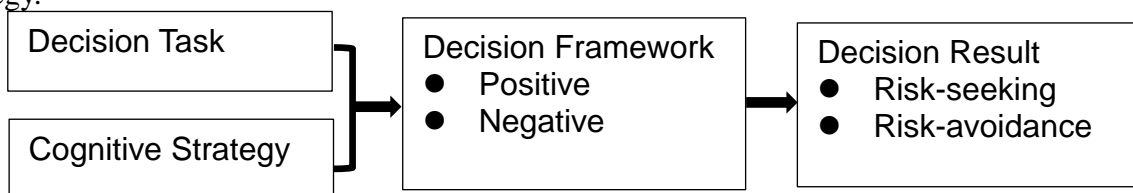


Figure 3. The process of framing effect

3.1. Individual Internal Psychological Factors of Framing Effect

3.1.1. Age and Sex

The older the age, the more obvious the framing effect is. The research results of Liu Hanhui et

al. using medical decision task show that the older people show stronger framing effect than the younger people, which is manifested as one-way framing effect of risk seeking [9]. Primary school students of different ages are affected by the framing effect differently in different task fields. In the field of life, the younger students are affected by the framing effect more, and the degree of preference reversal is greater. In the property field, older students are more likely to be influenced by framing and have framing effect; In the field of entertainment, junior students tend to avoid risks [10]. The difference of framing effect between the elderly and the young in medical and economic decision-making is mainly manifested in intensity and type [11]. Compared with young people, older people have less bias towards positive frames and more bias towards negative frames [12]. Framing effects also affect gender differences. In the risk decision-making of "life issues", female subjects showed obvious framing effect, while male subjects showed no obvious framing effect, and female subjects were more likely to show framing effect than male subjects [13-14].

3.1.2. Psychological Factors

Individuals' reactions to the outside world are affected by their own cognitive and emotional psychological factors. Cognitive reappraisal strategies can affect individuals' risk propensity and reduce their risky behaviors in the loss framework [15]. In the process of risk decision-making, there is an effect consistent with emotion, that is, in the positive emotional state, subjects tend to take risks, while in the negative emotional state, subjects tend to avoid risks. However, a further study of the unconscious emotions found that, under the unconscious anger emotions, individuals' risk preference is not obvious under the framework of self-positive and self-negative [16-17]. However, some studies have reached inconsistent conclusions. Feng Yayou's research shows that the framing effect is not significant in positive emotional states. The framing effect is enhanced in neutral and negative emotional states [18]. Loss or gain of frame reflects negative or positive emotional information [19]. Researchers believe that such emotional information affects individual cognition and thus enhances or weakens the framing effect [20]. Framing effect does not always exist. Chang Shuzhi et al. investigated the influence of cognitive load and emotion on decision making and believed that emotion affects framing effect of individual risk decision making and is regulated by cognitive load [21].

3.1.3. Personality Characteristics

Personality traits are an important factor influencing framing effect. Personality variables can also induce experience of emotional behavior and thus influence people's decision making. For example, neurotic individuals adopt risk-taking behavior as a way to cope with aversive emotional states. Extroverted, intuitive and emotional individuals are more likely to show obvious framing effect [22]. Individuals with neurotic personality are more prone to risk seeking [23]. Extroverted subjects tend to seek risk, while introverted subjects prefer risk avoidance [24]. In the negative frame, positive perfectionists showed more risk taking tendency; In the positive frame, negative perfectionists have an obvious risk avoidance tendency [13]. Possibly influenced by the differences in cognitive processing styles and behavioral motivations of individuals with different attribution styles, researchers have found that individuals with negative attribution styles under the positive framework show the strongest risk seeking, while those with positive attribution styles under the negative framework are the most adventurous [25].

3.2. Individual Neurophysiological Characteristics of Framing Effect

From the analysis of framing effect, it is found that a large number of neuroscience research

results show that the nerves associated with positive framing are the ventral striatum, anterior cingulate gyrus, dorsal striatum and ventromedial prefrontal cortex. The nerves associated with the negative frame are the anterior cingulate gyrus, amygdala and dorsal striatum [26]. The cognitive neural research of framing effect has verified that one-sided framing may occur in framing effect [27]. In the further study of left and right brain function, the activation of the right brain leads to a more pronounced framing effect, while the activation of the left brain leads to a weaker framing effect. In the application study of the framing effect, the unilateral brain activation has a moderating effect on the framing effect of fairness judgment. The fairness judgment of subjects activated by the right brain is significantly affected by the framing effect, that is, the fairness judgment of subjects under the no-gain frame is significantly higher than that under the loss frame [28]. In the ERP study, researchers found that field independents are more rational in the decision-making process, and the decision-making process is not easily affected by the expression of the decision problem. Moreover, the decision-making process mainly occurs in the right hemisphere of the brain, which is consistent with the conclusions of previous studies using EEG technology [29-30].

3.3. Individual External Situational Factors of Framing Effect

Decision-making task material is the carrier of framing representation and one of the factors that directly affect framing effect. With the development of research, the research of decision-making materials of the framework has been continuously enriched and expanded, and the decision-making task has expanded from the original single life decision-making problem to economic management, stock investment, medical treatment, tax, interpersonal communication, interview, education and other aspects. The framing effect is influenced by the types of tasks. Researchers' research on the decision-making task of life and property issues shows that people will be affected by the framing effect when making decisions on "life issues" and "property issues", and different framing decision-making tasks have a dynamic moderating effect on the framing effect. It is shown that people have a stronger risk bias towards "life problem" than "property problem" [9]. However, in different groups, primary school students have a framing effect in the field of life and property, but not in the field of entertainment [31]. For college students, only the decision results in the field of entertainment have significant differences under the negative framework, while the decision results in various fields (entertainment, career and scholarship) have no significant differences under the positive framework [32]. For different difference phenomena, researchers believe that framing effect will be affected by decision-making tasks, and the more important the results involved in decision-making, the more likely individuals are to be affected by framing effect [33].

With the development of the research on frame effect, the research methods and means have also been enriched from single text representation to graphic representation. The research paradigm is enriched from the construction of commonly used situations to the gambling paradigm and balloon paradigm. The research task is also constructed by focusing on different situations, and goes deep into the task material itself. Such as probability, profit and loss value, decision-making span, etc. At the same time, decision-making is no longer limited to itself, but extends to making decisions for others.

4. Insufficiency of Previous Research

Based on the existing studies, it is found that although the research on the framing effect has achieved a lot of results, which provide us with empirical and theoretical basis, there are still some different research conclusions. Research on individual subconsciousness and decision-making experience is still relatively lacking, which requires further exploration. Common probabilistic words are "chance", "probability" and "possibility". In the study, the change of the description of the

frame is mainly due to the change of the situation, while the text probability words are not changed. Subsequent researchers also adopted this model in similar studies. In China, researchers mainly translate "chance" and "probability" in three ways: "chance", "probability" and "possibility". Chinese researchers' construction of frames in risk decision making also changed the description of the situation, just like foreign studies. For example, the positive frame was "98% chance (probability/possibility) of being saved", the negative frame was "2% chance (probability/possibility) of dying", and the literal probability words themselves did not change. However, according to Chinese language and culture, these three words will show different emotional colors, as shown in Table 1 and Figure 4. However, previous studies do not distinguish between the three. Therefore, it is necessary to test the standardization of probabilistic words in materials.

Table 1. Affective attributes of Chinese vocabulary

Project	Positive	Neutral	Negative
Chance	86.67%	12.50%	0.83%
probability	15.83%	76.67%	7.50%
Possibility	15.83%	45.00%	39.17%

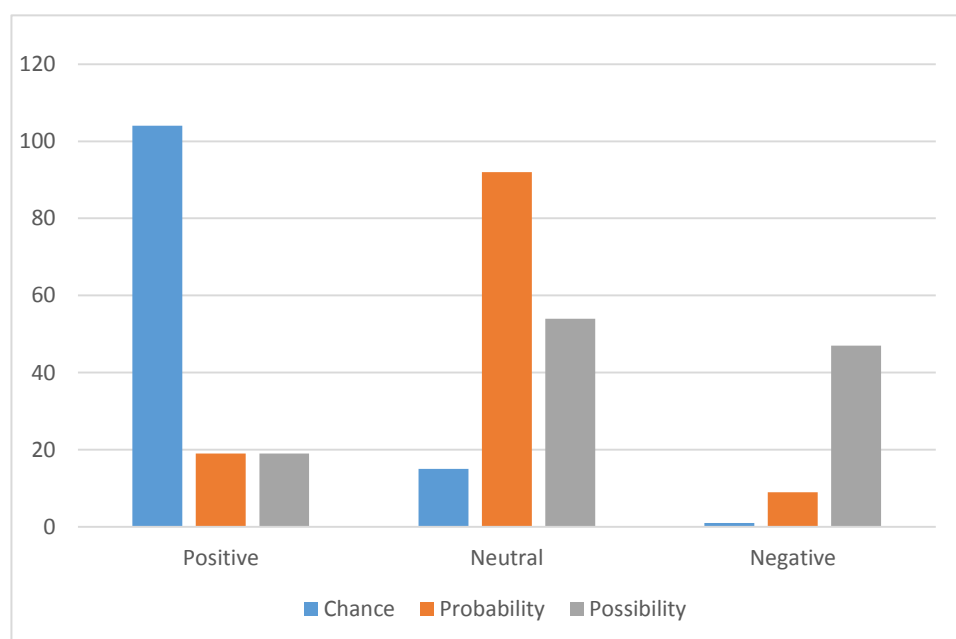


Figure 4. Comparison of Chinese emotional attributes of probability words

5. Conclusion

The framing effect points out that people are often affected by language description in many daily decisions. A large number of research results show that under different gender, age, occupational field and knowledge background, the decision-making framing effect is widespread, and people have different degrees of risk avoidance when they gain and risk seeking when they lose in the decision-making process. However, there are many factors that restrict people's decision-making in real life, including individual internal psychological factors, neurophysiological

characteristics and external social situation factors, etc. Although researchers have done a lot of research in various fields, the conclusions are not always consistent. In fact, decision-making is everywhere in our life. In many cases, it is individuals who give decision-making a frame, and then the frame will react on decision-making behavior. Decision-making behavior and framing effect are a two-way dynamic process. Therefore, from the perspective of dynamic decision making, the application of this field is worthy of further exploration.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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