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Framing Effects

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Introduction to Framing Effects

The way that information is presented systematically changes perceptions of and reactions to that information, even when the details remain objectively equivalent. These perceptual shifts subsequently alter judgments and decisions. Traditional models of decision-making suggest that people make rational choices based on showing consistency and coherence in their decision making (cf. Kahneman and Tversky, *Journal of the Econometric Society*, *47*(2), 263–291, 1979; Tversky and Kahneman, *Science, 211*(4481), 453–458, 1981). In other words, rational models propose that people will select the same choice option across different contexts. However, a vast literature has shown that *framing effects*, where different message frames change and even reverse people's judgments and decisions about equivalent choice problems, aid in our understanding of the decision process (cf. Kahneman and Tversky, *Econometrica: Journal of the Econometric Society*, *47*(2), 263–291, 1979; Kahneman and Tversky, *American Psychologist*, *39*(4), 341–350, 1984; Levin et al., *Organizational Behavior and Human Decision Processes, 76*(2), 149–188, 1998; Tversky and Kahneman, *Science, 211*(4481), 453–458, 1981).

Much of the literature on framing effects has dealt specifically with people's evaluations of risky choice options (e.g., gambles) and how differences in the framing of these options influence the way that risk is evaluated in decision-making. Risky choice problems require the decision maker to choose between either a sure outcome (i.e., certain to win or lose a specific amount) or a risky gamble where the outcome is uncertain (i.e., there is a chance you could either win or lose). When faced with a risky choice context, individuals evaluate the available information relative to a reference point. Individuals systematically become more risk-averse or risk-seeking based on whether the decision problem is framed as a gain or loss, relative to that reference point. However, other judgment and choice contexts that do not necessarily involve risk are also susceptible to the influence of framing (cf. Levin et al., *Organizational Behavior and Human Decision Processes, 76*(2), 149–188, 1998).

This entry outlines some of the essential literature on framing effects in judgment and decision-making. In doing so, it explores how framing influences risky decisions, explores the influence of emotions on framing effects, examines the neural correlates of framing effects and how framing effects have been demonstrated in nonhuman animals, addresses framing beyond risky choice problems, and discusses real-world situations in which people may be susceptible to framing effects.

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Framing Effects in Risky Choice: Gain and Loss Frames

Framing effects have traditionally been studied in the context of gain and loss messages. A message is believed to be in a "gain frame" when an outcome is portrayed in terms of benefits (e.g., number of lives *saved*), whereas a "loss frame" describes when that outcome is portrayed in terms of costs (e.g., number of lives *lost*). For example, in a traditional risk task known as the Asian disease problem (cf. Kahneman and Tversky 1979, 1984; Tversky and Kahneman 1981), people are presented with the following scenario:

> Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:
>
> Half of subjects are presented with a *gain frame:*
> • If Program A is adopted, 200 people will be saved. *(Sure gain)*
> • If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. *(Risky gamble)*
> Half of subjects are presented with a *loss frame:*
> • If Program C is adopted, 400 people will die. *(Sure loss)*
> • If Program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die. *(Risky gamble)*

Note that the proportion of lives saved versus lives lost is equivalent in both the gain and loss frame scenarios (i.e., the expected value of selecting either option is the same). However, people who view the Asian disease problem in the "gain frame" become more risk averse because they focus on how many lives will be saved (Kahneman and Tversky 1984). In other words, viewing the problem in a gain frame increases the likelihood that the decision-maker will select Program A, where 200 people will be saved for sure. On the other hand, individuals who view this problem in the "loss frame" tend to focus on the sure losses incurred and consequently become more risk seeking. That is, the decision-maker in the loss frame is more likely to select the risky gamble outlined in Program D, where there is a 2/3 probability that nobody will die but also a 1/3 probability that all 600 people will die (Kahneman and Tversky 1984).

This choice reversal, termed the "reflection effect," is also observed in simple numeric gambles involving risk (cf. Kahneman and Tversky 1979). These seemingly counterintuitive effects arise because people exposed to a loss frame are more willing to gamble in order to avoid a sure loss (i.e., become more risk seeking) (cf. Kahneman and Tversky 1979). This also highlights the concept of loss aversion, whereby people tend to prefer avoiding a loss over acquiring equivalent gains. Consequently, in a gain frame, people will avoid the gamble to ensure that they gain something (i.e., become more risk averse).

Emotion and Framing Effects

Emotion interplays with decision-making to influence behavior in a variety of ways (cf. Lerner et al. 2015), and several behavioral studies have shown that emotions modulate framing effects. Research examining the relationship between affective valence (i.e., positive or negative feelings) and framing effects suggests that inducing positive feeling states reduces loss aversion, and this ameliorates framing effects such that people no longer change their choice based on whether the decision problem is framed as a loss or a gain (Cassotti et al. 2012).

Other work examining discrete emotions suggests that distress (Druckman and McDermott 2008) and fear (Lecheler et al. 2013) increase framing effects, whereas anger decreases framing effects (Druckman and McDermott 2008; Lecheler et al. 2013). Contentment has also been found to reduce framing effects (Lecheler et al. 2013), and enthusiasm produces mixed results where for some scenarios it decreases framing effects (Druckman and McDermott 2008; Lecheler et al. 2013) and for others it does not (Druckman and McDermott 2008). Thus, to gain a more complete understanding of the interplay between emotion and framing effects, it is critical

to study not only positive or negative valence but to also investigate how discrete emotions differentially influence people's reactions to message frames.

Future behavioral examinations will be critical as discrete emotions often vary based on perceptions of situational certainty. For example, fear is marked by low situational certainty appraisals, and anger is marked by high situational certainty appraisals (cf. Lerner and Keltner 2001). Seeing a snake can make people feel uncertain about the safety in the situation and thus lead them to experience fear. On the other hand, when encountering a rude person, an individual may feel certain that the rude person's behavior was unjust and consequently experience anger. The "cognitive appraisal" of certainty is especially useful in the assessment of risk (cf. Lerner and Keltner 2001), as fear has been shown to systematically increase risk aversion (e.g., run away from the snake) and anger to systematically increase risk-seeking behavior (e.g., yell at the rude person). Examinations of the influence of emotional states on the framing of risky choice options warrant additional research.

Neural Correlates of Framing Effects

A growing literature within the field of decision neuroscience has sought to uncover the neural mechanisms underlying framing effects. Consistent with behavioral findings, neural regions associated with emotion and reinforcement learning have also been implicated in framing effects (De Martino et al. 2010; Deppe et al. 2007; Windmann et al. 2006; Zheng et al. 2010). For instance, De Martino and colleagues (2006) found that framing effects were associated with amygdala activity. The amygdala is a region of the brain commonly associated with salience, value-related prediction and learning, and the processing of emotional information (cf. De Martino et al. 2006), and so this finding supports a link between the framing of risky choices and neural systems related to emotion. However, more recently, a study found that lesions to the bilateral amygdala did not significantly alter framing effect behavior (Talmi et al. 2012). These inconsistent findings suggest that the relationship between amygdala activation and framing effects warrants further exploration.

Greater activity of the orbital and medial prefrontal cortex (OMPFC), associated with reward processing and the integration of emotional information into decisions, was linked to lower susceptibility to framing effects (De Martino et al. 2010). Further, activation of the ventral medial prefrontal cortex (vmPFC), another region associated with the use of emotion in decision behavior, was correlated with people's susceptibility to message frames (Deppe et al. 2005). A similar pattern was found in activation of the anterior cingulate cortex (ACC), a neural region associated with the processing of information about positive and negative reinforcements (Deppe et al. 2007). Deppe et al. (2007) revealed that greater activation in the anterior cingulate cortex (ACC) predicted increased susceptibility to framing effects, suggesting a critical role for reinforcement learning in our understanding of framing effect biases. Taken together, these findings further support the importance of emotion systems in the processing of risky choice frames.

Other work has suggested that framing effects rely on a trade-off between the cognitive effort required to calculate expected values and the affect (e.g., emotion) associated with a particular choice option (Gonzalez et al. 2005). Results indicate that the cognitive effort required for participants to select a sure gain (e.g., in the Asian Disease problem described above, the 200 lives saved for sure) was less than for a risky gain (e.g., 1/3 chance of saving 600 lives, 2/3 chance of saving 0). However, the effort expenditures were equivalent for sure losses (e.g., 400 lives lost for sure) and risky losses (e.g., 1/3 chance nobody will die, 2/3 chance 600 will die). Gonzalez et al. (2005) further described neural associations between regions of the prefrontal and parietal cortices while people were making decisions involving framing, which are brain regions typically involved in working memory and imagery processing.

Windmann et al. (2006) also examined the link between the medial and lateral orbitofrontal

cortex (OFC) and sensitivity to information frames. Activation of the medial OFC has been associated with the detection of positive and negative affective valence, whereas activation of the lateral OFC is believed to represent the extent to which outcomes change (e.g., a gamble where lives are either saved or lost) or stay the same (e.g., lives are always lost or always gained). The lateral OFC was indeed found to be sensitive to the steadiness of outcomes and showed effects above and beyond activation of the medial OFC. These data indicate that both the processing of valence and outcome steadiness are important to our understanding of the neural mechanisms underlying framing effects (Windmann et al. 2006).

Risky Choice Framing Effects in Nonhuman Animals

One consideration in understanding framing effects is whether the observed behaviors are specific to humans. For instance, it could be that cultural influences have led to an increased sensitivity to framing effects. It is, however, also plausible that contextually sensitive framing effect biases have more of a biological basis. One way to address this problem is to examine whether similar behaviors exist in nonhuman animals. Initial investigations suggest that framing effects are not limited to humans and can be observed in nonhuman primates (i.e., capuchin monkeys; Chen et al. 2006; Lakshminarayanan et al. 2008, 2011) and in birds (i.e., starlings; Marsh and Kaecelnik 2002).

For example, in a recent demonstration, Laskhminarayanan et al. (2011) presented capuchin monkeys with tokens that could be traded for apple slices. Monkeys in the loss frame condition were presented with three apple slices as a reference point. Experimenter 1 always deducted one apple slice when given a token (i.e., sure loss), whereas Experimenter 2 either deducted two apple slices or deducted no apple slices, at an equal rate (i.e., risky loss). Monkeys in the loss frame condition showed a preference for giving a token to Experimenter 2 (the risky loss), indicating risk-seeking decision behavior that parallels that of humans in a loss frame condition. In the gain frame condition, monkeys were presented with one apple slice as the reference point. Experimenter 1 always added one apple slice when given a token (i.e., sure gain), and Experimenter 2 either added two apple slices or added no apple slices, at an equal rate (i.e., risky gain). As with humans, monkeys in the gain frame showed a preference for giving the token to Experimenter 1 (the sure gain), indicating risk-averse decision behavior for gains.

Framing effects have also been observed in research on European starlings. Marsh and Kacelnik (2002) demonstrated that training birds to peck a symbol in exchange for food led to more risk-seeking behavior in the loss treatment. The starlings were more likely to peck the risky loss symbol that resulted in a loss of either one or five (out of a total of seven) pellets at an equal rate, over pecking the sure loss symbol where three (out of seven) pellets were always lost. Like the research on capuchin monkeys described earlier, the loss frame results parallel that of human choice behavior. In the gain frame treatment, however, where pecking one symbol always led to receiving three pellets (sure gain) and pecking an alternative symbol led to a gamble of receiving either one or five pellets, with equal chance (risky gain), there were no significant differences in the amount that starlings pecked one symbol over the other. Thus, unlike humans and capuchin monkeys, European starlings faced with a gain treatment were not more risk seeking.

Despite the lack of strong evidence for framing effects in the gain condition, starlings' response in the loss frame condition still suggests that a sensitivity to loss is present across species. Thus, changes in risk preference, particularly for losses, are indeed observable in nonhuman animals. Future mechanistic accounts of framing effects would benefit from continuing to explore this and other decision biases using both animal and human models.

Framing Effects Beyond Risky Choices

While framing is critical to decisions involving risky choice probabilities, other information in a decision problem is also susceptible to framing effects. Levin et al. (1998) presented a taxonomy of framing manipulations organized into three distinct categories: risky choice framing, attribute framing, and goal framing.

Risky Choice Framing. As described throughout this entry, risky choice framing involves the consideration of choice options that differ in their level of risk. Risky choices include the comparison of simple monetary gambles or other risk scenarios, like the Asian disease problem, where framing the message to highlight gains or losses influences how risk averse or risk seeking the individual becomes.

Attribute Framing. In this type of framing, components of a decision (i.e., an attribute or feature) become the focus of the frame rather than the level of risk. For example, Levin and Gaeth (1988) showed that framing the quality of a ground beef as 75% lean (positive frame) versus 25% fat (negative frame) changed how positively or negatively people evaluated the beef on the attribute of its quality. Attribute framing highlights specific attributes as relatively "good" or "bad" and can be applied either to risky or to non-risky attributes in a decision problem (Levin et al. 1998).

Goal Framing. In this category, the goal of an action or behavior becomes the focus of the frame, and goal framing is commonly used in persuasion attempts. Goal framing becomes most relevant in contexts where the persuader aims to encourage people to engage in a behavior. The message of the goal can either take a positive frame and focus on the benefit of the action (e.g., women who do regular breast self-examinations (BSEs) have an increased chance of finding a tumor early; cf. Meyerowitz and Chaiken 1987) or take a negative frame and focus on its potential to prevent or avoid a loss (e.g., women who fail to do regular breast self-examinations (BSEs) have a decreased chance of finding a tumor early). Meyerowitz and Chaiken (1987) found that the negative goal frame is often more influential than the positive goal frame in critical contexts, such as those often encountered when making healthcare decisions.

All three types of framing effects systematically influence decision behavior. Goal and attribute framing are distinguishable in that goal framing typically focuses on achieving the action or behavior (e.g., BSE), whereas in attribute framing, the attribute is framed as either good (75% lean) or bad (25% fat).

It should be noted, however, that framing effects have been shown to be more reliable for risky choice and attribute framing than for goal framing (Levin et al. 2002). Levin et al. (2002) suggest a plausible explanation that different processes underlie goal framing, such that goal frames will be less effective in cases where the goal is less critical or self-relevant to the decision maker.

Framing Effects in Other Translational Settings

Framing effects also lead to differences in how people navigate decisions involving healthcare, politics, and financial decisions. Within the framing of risky medical decisions, gain-framed persuasion appeals are more effective when the message targets behaviors that prevent the onset of some disease, whereas loss-framed appeals are more effective when targeting behaviors that detect the presence of an existing disease (Rothman et al. 2006). Thus, the framing of risky health information critically depends on whether the decision is framed as being about prevention or detection of a health condition.

Politics are another critical choice domain in which a variety of message frames are used. Framing effects in political settings are important because the way a message is framed can influence long-term political candidate and policy voting decisions. In an investigation of the difference between message framing and persuasion in mass political communication, Nelson et al. (2001)

provided empirical evidence of how framing and persuasion messages are differentially effective, depending on whether the goal is to activate or alter a person's belief system. Specifically, framing was shown to function mostly by activating pre-existing cognitions and beliefs. Persuasion appeals, on the other hand, seek to add to or change something about a person's beliefs. Distinctions such as these are important to our understanding of how message framing affects decisions above and beyond basic persuasion attempts.

Choice diversification (i.e., diversifying across several choice options) in financial decision-making is also susceptible to the effects of framing. For example, Fox et al. (2005) examined the implications of choice diversification using a framing technique called "partition dependence." In partition dependence, if the choice/option sets are subjectively partitioned in different ways, then choices and allocations will vary systematically with those partitions. For example, when an individual donates to a charity that is grouped (i.e., partitioned) by domestic and international, they might diversify by allocating half of their charitable contributions based on this grouping. If, however, these same charities are grouped by local, national, and international, a person who allocates their money evenly across the three groups will consequently donate more to domestic than to international causes. Fox et al. (2005) found that partition dependence occurs across domains, particularly when decision-makers lack expertise or strong intrinsic preferences. These partition effects are observed even in competitive prediction markets (i.e., financial, sports, weather), including when informed traders are incentivized to bet on their beliefs about events (Sonnemann et al. 2013).

Conclusion

In sum, framing effects systematically influence judgments and decisions across a variety of contexts. The findings described in this entry, although not comprehensive, are meant to provide an overview of research on framing effects within the literature. Framing effects have consequences not only for hypothetical monetary gambles and risky choice scenarios but can have very real outcomes for how people make judgments and decisions in daily life. Future research should continue to explore when and how framing effects influence behavior and provide more evidence for how translational contexts like healthcare and political decisions are influenced by message framing.

Cross-References

- ▶ Cognition
- ▶ Cognitive Bias
- ▶ Decision-making
- ▶ Experimental Psychology
- ▶ FMRI
- ▶ Judgment Bias
- ▶ Non-human Primates
- ▶ Primate Cognition
- ▶ Rationality

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