

**THE REFERENCE POINT
MATTERS**

Non-Technical Report

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**THINK FORWARD
INITIATIVE**

1. Introduction

On 29 June 2017, Warsaw was hit by strong winds. The wind easily knocked trees over. One of them fell on a car driving on Rozbrat Street. The car was driven by a man who, surprisingly, escaped from the accident relatively unhurt. Fortunately, he was the only person in the car. The police, other emergency services, and journalists appeared on the scene. One of the latter asked the driver how he felt. He shouted out with glee: 'I'm feeling as if I had won a million dollars in the lottery!' Someone who has miraculously escaped death or serious injury feels like the winner of a million dollar jackpot or like someone who has been given a second chance at life. Why? After all, nothing has objectively changed in his or her life compared to the situation before those events.

In the 1970s, two psychologists - Daniel Kahneman and Amos Tversky (1979) - proposed a descriptive theory of decision-making, based on the results of empirical research. They called it the prospect theory. From a motivational point of view, the prospect theory comes down to demonstrating the utility function. The utility function (called in this case a value function) takes three important empirical observations into account (Fig. 1).

Firstly, the sphere of gains is separated from the sphere of losses by a reference point, the location of which depends on a number of different factors. The most important of these factors is a hedonic adaptation which shifts the reference point to a location reflecting the new

circumstances. The standard reference point location is the status quo, i.e. the current situation of the decision-maker. Sometimes it is the decision-maker who sets reference points as his or her goals or aspirations. During the European Athletics Championships held in Barcelona in 2010, shot-putter Tomasz Majewski won a silver medal, but he was devastated for that reason. Why? His goal was to win the gold medal, but he lost to Andrei Mikhnevich, coming off second-best. Majewski set his reference point at winning the gold medal. Generally, the silver medalist focus on almost winning gold, whereas the bronze medalist focus on almost not winning a medal at all (Medwee et al., 1995). In the case of investing, the reference point may be the status quo, the historically highest or lowest price of the asset held or a purchase price.

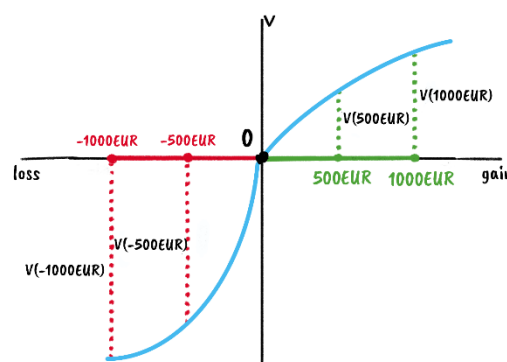


Fig. 1 The prospect theory utility (value) function. 1). Losses loom more than gains. 2). People are less than twice as happy from getting 1000 euros than from getting 500 euros. People are less than twice as unhappy losing 1000 euros than losing 500 euros. The horizontal axis represents gains and losses. The vertical axis represents the utility.

Secondly, the value function is assumed to be concave in terms of gains and convex in terms of losses, resulting in risk aversion when it comes to gains and risk-seeking behaviour when it comes to losses. Additionally the decision-maker perceives the difference between a gain of 10 euros and a gain of 20 euros as greater than the difference between a gain of 110 euros and 120 euros. The very same applies to losses. People are less than twice as happy from getting 1000 euros than from getting 500 euros. People are less than twice as unhappy losing 1000 euros than losing 500 euros (Fig. 1).

Thirdly, losses loom greater than gains. The utility function is steeper for losses than for gains, which means loss aversion. It is assumed that the resulting losses hurt people approximately 2.5 times more than which gains of an equivalent value would please them (compare the length of $v(-500 \text{ EUR})$ to the length of $v(500 \text{ EUR})$ on Fig. 1). Therefore, a person who has accidentally smashed a bottle of red wine worth 100 euros would have to receive an unexpected gift worth about 250 euros to feel that the losses have been covered. Evil in general affects human perception more substantially than good. Bad stereotypes are formed faster and are more resistant to erasure from our memory than positive experiences. Events that are negatively perceived (e.g. pecuniary loss, being abandoned by one's friends or facing critical remarks) have a greater impact on an individual than positive events of the same type (e.g. pecuniary profit, gaining new friends or receiving praise from people around them). Friendship can develop for years and be destroyed by a single, unfortunate action. This does not mean that evil triumphs over good, but

it is the accumulation of positive experiences which is needed to possibly overcome the psychological effects of a single negative experience. A person who ignores the possibility of a positive outcome when making a decision may later feel considerable regret about the loss of money or another pleasure. On the other hand, those who ignore possible danger at least once may be injured or lose their lives in extreme cases. Everyday life requires us to focus on threats and not on positives. Therefore, evolution has made us react more strongly to losses (evil) than to gains (good) (Baumeister et al., 2001)

As has already been stated, this is the reference point which differentiates gains from losses. Let us imagine two scenarios. Today John and Margaret have 5 million euros each. Are they both equally satisfied? In other words, is the utility of the current holding the same for both of them? Let us add that yesterday John had 1 million and Margaret had 10 million euros. It is clear that the original (previously possessed) holding has a significant impact on the perception of the current holding, which can be seen as a gain or a loss. The reference point for John is 1 million euros, and for Margaret 10 million euros (Kahneman, 2011).

A man expected a rise of 5000 euros, but eventually received 3000 euros. Such a rise can, of course, be regarded as a gain or loss, depending on whether it is compared to 0 or to 5000. A rise of 3000 can be compared to a single reference point, which is the average of the two reference points. This idea seems not to be correct because it assumes the existence of a neutral rise, the amount of which would fluctuate

between 0 and 5000 euros, and any higher value would automatically be considered a gain, while any lower value would automatically be considered a loss. It turns out that such a phenomenon does not exist in reality. It seems that a rise of less than 5000 euros will be considered by the employee either as a gain or as a loss at various times. This phenomenon has been called the mixed feelings frequency effect (Kahneman, 1992).

Since people are risk-averse when it comes to gains, risk-prone when it comes to losses and additionally exhibit a strong loss aversion, a crucial thing is to examine the role of the reference point, which differentiates gains from losses. The reference point may move due to the hedonic adaptation or other factors. Moreover, one does not have to shift the reference point in order change someone's risk attitude. It is enough to redirect a decision maker's attention from gains to losses.

2. Framing

A message stresses either a gain or a loss

It is essential to discern whether the very emphasis of the message is put on loss or on gain. The emphasis on loss discourages recipients from taking advantage of the option presented and makes them take excessive risk in order to avoid it. On the other hand, the emphasis on gain encourages people to take advantage of the option presented and causes risk aversion. Logically equivalent wordings of the message, highlighting losses or gains, may lead to different behaviour of the recipients. The definition of framing or framing effect refers to putting the emphasis in a message either on a gain or a loss. There are three types of framing.

2.1. Risky choice framing

Let us imagine the following situations:

The threat version

A large car manufacturer intends to shed 6000 jobs due to losses previously incurred by the company. It comes forward with two restructuring plans. In the threat version with an emphasis on gain, plan A means saving 2000 out of the 6000 jobs, while plan B means saving 6000 jobs with a probability of 1/3 and not saving 6000 jobs with a probability of 2/3. In the threat version with an emphasis on loss, plan C means losing 4000 of the possible 6000 jobs, while plan D means the avoidance of any job losses with a probability of 1/3 and losing 6000 jobs with a probability of 2/3.

The opportunity version

Thanks to a company's good financial standing, the manufacturer intends to create 6000 new jobs. In the opportunity version with an emphasis on gain, plan A includes creating 2000 jobs out of 6000, and plan B means the emergence of 6000 jobs with a probability of 1/3 and no new jobs at all with a probability of 2/3.

In the opportunity version with an emphasis on loss, plan C means losing 4000 out of the 6000 new jobs, while plan D means avoiding the loss of new jobs with a chance of 1/3 and losing 6000 new jobs with a probability of 2/3.

The threat version ultimately leads to losses for the decision-maker, and the opportunity version leads to gain, regardless of the way it has been framed. It turns out, however, that the very emphasis on loss or on gain in the message determines the framing effect, regardless of the objective end state. In the case of putting emphasis on gain, it does not matter whether the end state is a gain or a loss – in both cases, respondents demonstrate risk aversion. Similarly, when stress is put on loss, it does not matter whether the end state is a gain or a loss – respondents are risk-prone (Highhouse & Paese, 1996). Thus, the very stress put on gain or loss is much stronger in determining a given respondent's attitude to risk than objective end states (Kühberger et al., 1999).

2.2. Attribute framing

In a study carried out by Levin & Gaeth (1988), respondents were asked to assess the taste of beef. Participants in the experiment were divided into two groups. People from the first group received a positively framed message, while people from the second group received a negatively framed message. The positive version of the message presented the tested beef as 75% lean meat, and the negative version as 25% fat meat. It turned out that, in the first case, the respondents assessed the taste of the tested meat sample as significantly better than in the second case. The emphasis of the message was put on the positive aspect in the first case and on the negative aspect in the second case.

The impact of a message on the assessment of a given product is called an attribute-framing effect. It manifests itself in the differentiation of assessments of an object depending on whether its attribute is presented either in a positive or in a negative way.

2.3. Goal framing

Meyerowitz and Chaiken (1987) carried out an experiment in which female participants were informed in two ways about the beneficial effects of breast self-examinations. In the first case, it was stressed that regular examinations increase the chance of the early detection of breast cancer and, consequently, recovery from the disease. The second case pointed out that abandoning regular breast examinations reduces the chance of the early detection of cancer and, consequently, recovery from the disease. It was found that women were more willing to undertake breast self-examination in the case of

receiving the second type of message, thus demonstrating greater motivation for avoiding losses than for achieving gains. The effect is called goal framing.

Depending on the type of framing, the recipient's attention is focused either on achieving a positive goal – when the task is completed (programme implementation) or on the negative effect of failure to complete the task (abandonment of participation in the programme). Human choices are more often motivated by the desire to avoid loss than by the pursuit of gain. The message: 'Fastening seat belts in your car increases driving safety' seems to have a weaker effect on recipients than the message: 'Not fastening seat belts results in a threat to the health or lives of the travellers.'

3. Shifting the reference point

The reference point is not set once and forever. Since the concavity of the utility function for gains represents risk aversion, and its convexity for losses means risk-seeking behaviour, shifting the reference point may result in making a different decision. Shifting a reference point can be done in several ways, such as a threat or a promise. As has already been stated, the most important is the process of hedonic adaptation to new conditions.

Hedonic adaptation is a process of adapting to new circumstances: gains or losses. It is responsible for shifting the reference point along the horizontal axis. When the reference point is shifted, the entire S curve is displaced as well. For a person who received a prize of 500 euros and has adapted to the new situation, the reference

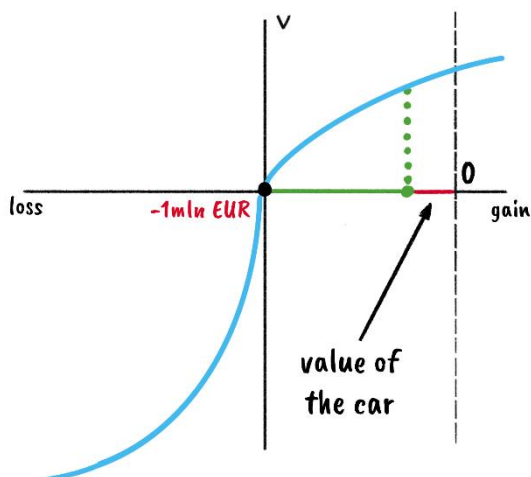


Fig. 2 Shifting the reference point to minus one million euros due to the narrow escape effect. A person affected by a narrow escape effect is much happier after a traumatic situation than before it. The horizontal axis represents gains and losses. The vertical axis represents the utility.

point shifts along the horizontal axis from zero to 500 euros (Fig. 3.1). The process of adaptation to a loss of 500 euros is similar (Fig. 3.2). If someone has adapted to a gain, they stop enjoying it. A loss of this gain makes them less happy than they were before the occurrence of the gain. If you receive a watch as a gift, become used to it and then lose it, you will be less happy than you were before receiving this gift. Your utility level ends below horizontal axis (Fig. 3.1). The fisherman's wife from the famous fairy-tale of the Grimm brothers is a case of instant adaptation to gains. The hero of the fairy tale is a poor fisherman who, together with his wife, lives in a mud hut on the seashore. One day a fisherman catches a goldfish which in a human voice begs him to be released. The fisherman lets the fish go, but his wife tells him to ask the fish for a reward in the form of a more comfortable house. The fish fulfils this wish. However, the wife's contentment is short. She announces to the fisherman that she wants to live in the castle. When she gets a castle, she adapts quickly to this. She wants to become a queen, then an empress and a pope. None of these things bring her lasting happiness. Finally, she wants to be as powerful as God. However, after hearing this wish, the goldfish sends the fisherman home without a word. There the fisherman finds his wife in their original small hut.

If someone has adapted to a loss, they stop worrying about it. A recovery of the loss makes them happier than they were before the loss had

occurred (Fig. 3.2). If you lose your wallet and come to terms with this situation, and then subsequently find your wallet, you will be happier than you were before losing your wallet. Your utility level ends above horizontal axis (Fig. 3.2). The initial story about a man who, surprisingly, escaped from the accident (a narrow escape effect) resembles this case (Fig. 2).

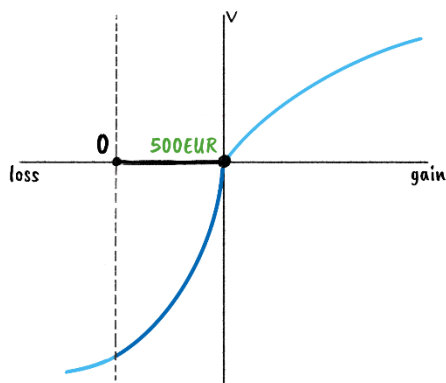


Fig. 3.1 Adaptation to a gain of 500 euros by shifting the reference point to the right, along the horizontal axis. The horizontal axis represents gains and losses. The vertical axis represents the utility function.

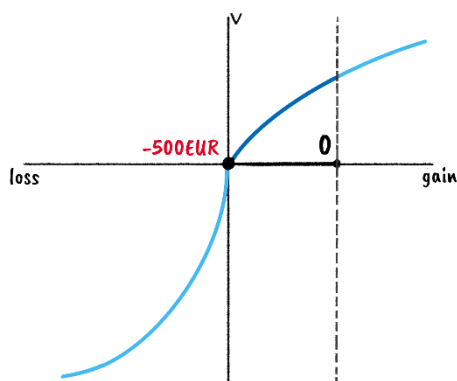


Fig. 3.2 Adaptation to a loss of 500 euros by shifting the reference point to the left, along the horizontal axis. The horizontal axis represents gains and losses. The vertical axis represents the utility.

People may try to manipulate the location of their reference point. However, they cannot shift their reference point at will so as to perceive every event in their lives as a gain. If someone gets a parking fine, they do not usually realize that they could die in a car accident and therefore perceive the fine in terms of a gain. In order for a reference point to be shifted, a traumatic situation must not only be possible, but also plausible (a narrow escape effect). The driver described in the beginning of the paper shifted his reference point towards minus infinity because he almost lost his life. Therefore, he perceived the fact that he got off unscathed as a huge gain. (Fig. 2)

Imagine a world in which an impoverished, person with no friends is almost as happy as a billionaire who has supportive relationships. Or imagine that people living in a cruel dictatorship are as satisfied with their lives as people living in a stable democracy. Finally, imagine that no matter how much effort someone put into being happy, the long-term effects were meagre. Implausible? This is a world we live, since every desirable experience: passionate love, the pleasure of a new possession, the joy of success is transitory due to the hedonic adaptation process (Diener et al., 2006, Myers, 1992).

Brickman, Coates and Janoff-Bulman (1978) studied the adaptation process in people who had won a large amount of money in the lottery (from \$50,000 to \$1,000,000). It turned out that within twelve months of winning the lottery, the winners had completely adapted to the new situation, not experiencing any greater level of happiness compared to the period before winning. Their reference point shifts permanently to a higher

level of affluence. Human expectations keep rising as people grow richer. People do not so much want to be rich as to constantly become richer (in relation to the previous month or to the status of their neighbour). Therefore, by falling into a trap known as the hedonic treadmill, they keep working harder and harder to maintain their current level of satisfaction with life (Diener et al., 2006)

In some situations, hedonic adaptation processes do not occur at all. Despite changes taking place, the reference point invariably remains in the same place. For example, in the case of people who have had successful plastic surgery, there are almost no processes of adaptation to their increased physical attractiveness (resulting from the surgery). Their sense of satisfaction is maintained for many consecutive years and sometimes it even increases (Wengle, 1986). In general, people find it more difficult to adapt to negative events than to positive ones. This means that they adapt more slowly to the acceptance of losses than gains. The Russian emigrants who lost all their possessions when fleeing from the 1917 revolution suffered from a sense of poverty for the rest of their lives. This was because they were constantly evaluating their financial standing through the prism of their former prosperity, never adapting to the new reality. As is known, lottery winners adapt even to large winnings in the blink of an eye (Frederick & Loewenstein, 1999).

Lakshminarayanan et al. (2011) showed that the location of the reference point influences the attitude to risk not only in humans, but also in animals. Capuchin monkeys learned to choose

between two options after proper training: certain and uncertain. The payoff was apples. In the loss variant, two experimenters A and B simultaneously presented plates with three apples on each of them to a monkey. The ape's task was to choose a plate of apples from Person A or B. When the monkey approached experimenter A, she removed one apple from the plate, and the remaining two apples were handed to the monkey. If the monkey approached experimenter B, she randomly (with a probability of 50%) either handed the monkey three apples or removed two and gave the monkey only one. The reference point was three apples (Figure 4.1). Over the course of several attempts, the monkeys decided to choose experimenter B more often: they proved to be risk-prone.

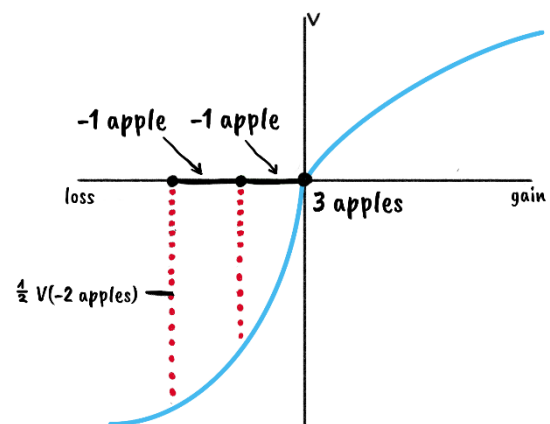


Fig. 4.1 Variant of loss. The reference point was set by the experimenters at "receiving three apples". When making a choice, the monkey strives to feel the least possible dissatisfaction (the shortest vertical line). The monkey is prone to risk because half of the utility of the loss of two apples out of three is smaller than the utility of a loss of one apple out of three. The horizontal axis represents gains and losses. The vertical axis represents the utility.

In the gain variant, two experimenters A and B simultaneously presented plates with one apple on each of them to a monkey. The monkey's task was to choose a plate of apples from Person A or B. If the monkey approached experimenter A, she added one apple and handed two apples to the monkey. If the monkey approached experimenter B, she randomly (with a probability of 50%) handed the monkey either only one or three apples. The reference point in this case is one apple (Fig. 4.2). Over the course of several attempts, the monkeys chose experimenter A more frequently; they revealed risk aversion.

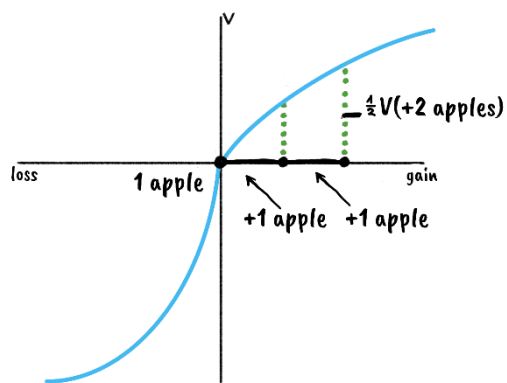


Fig. 4.2 Gain variant. The reference point was set by the experimenters at: "getting one apple". When making a choice, the monkey strives to achieve the greatest satisfaction (the longest vertical line). The monkey shows risk aversion because half of the utility of gaining two additional apples is larger than the utility of obtaining one additional apple. The horizontal axis represents gains and losses. The vertical axis represents the utility.

4. Applications of the reference point

4.1 The role of the reference point in credit card payments

In the spring of 1984, the U.S. Congress considered lifting the ban on surcharges on credit card payments. If that ban was lifted, traders could set a higher price for their products for credit card customers than for cash payers. In connection with the planned session of the Congress, American Express – an enterprise which issues and services credit cards – asked several million of its customers in the United States to protest against a possible change in the law by sending a relevant petition to the members of the Congress. Interestingly, the law at the time allowed businesses to reduce prices for cash payers. American Express expressed acceptance of the existing regulations, although – from an economic point of view – there was no difference between a surcharge on card payments and an equivalent discount on cash payments. American Express managers assumed, however, that people's behaviour may be different in each of those cases (Kitch, 1990). Indeed, they were correct. Let us imagine two petrol stations where it is possible to pay both in cash and by credit card. The task of the managers of both stations is to encourage their customers to pay in cash. The first station sells petrol for \$1.30 per litre, but offers a discount of 10 cents for payment in cash. The other station sells petrol for \$1.20 per litre, but there it collects a surcharge of 10 cents for card payment. As you can see, at both the first and the second petrol station, customers using a credit card pay \$1.30 per litre and the ones using

cash pay \$1.20 per litre. However, the customers perceive these prices differently at each of the stations. In the first station, the reference point was set at \$1.30 per litre, and in the second station at \$1.20 per litre. Purchases at a price above the reference point are treated by customers as a loss, and at a price below that point as a gain (Nagle & Holden, 1995). Therefore, credit card holders will be more willing to buy petrol at the first petrol station because they will not feel punished for paying by card – they just will not receive a reward in the form of a price reduction. If they were to buy petrol at the other station, they would feel punished by the required surcharge and suffer a loss that we are all trying to avoid. Meanwhile, people are hurt by a loss to a far greater extent than by an unrealized gain of the same amount.

4.2. The role of the reference point in negotiations

Negotiators bargaining for their losses are more risk-seeking, make fewer concessions, achieve a smaller number of constructive solutions and, consequently, are more likely to fail in finding a consensus than negotiators bargaining for gains (Bazerman, Magliozzi and Neale, 1985; Neale and Bazerman, 1985). Moreover, concessions that expose negotiators to greater losses are much more painful than the concessions, as a result of which the negotiators refrain from increasing their gains.

The analysis of the phenomenon of concession aversion has direct normative consequences. It points out that the most effective way to reach a compromise is through concessions that reduce or completely eliminate the losses incurred by the other party to the negotiations; on the other hand, concessions that increase the opponent's position in an area in which they have already won prove the least effective. Reduction of losses is assessed on the steep part of the utility function, and their complete levelling obtains the most positive mark. The growth of gains usually adds little subjective value.

Often one party to the negotiations wants to reduce its goal as little as possible, forgetting that the other party has a similar need. It is therefore not uncommon to reach a deadlock. Such a deadlock can also be caused by the very framing of the goal itself. Negotiators may behave differently when they define their goal as maximising gains than they would if they defined it as minimising losses. Neale and Bazerman (1985) carried out an experiment to test the impact of the framing effect on the negotiation process. Let us imagine the problem of negotiating an hourly rate at a company. The current rate is \$10 per hour. Trade unionists demand that this rate be increased to \$12 per hour. It was suggested to the respondents that they took part in a negotiation game in which they were to represent the company's management board. The other parties to the negotiations were representatives of the trade unions, the role of which was played by the experimenters' assistants. The latter were tasked with applying the 'tit-for-tat' strategy, i.e. reciprocating the last move of the other party to the negotiations. The respondents were informed

that in the absence of agreement with the trade unions, i.e. in a situation of negotiation deadlock, the case would be referred to an arbitration court, the judgment of which was unknown and entailed additional administrative costs to be incurred by the company. The court may have set the hourly rate anywhere between \$10 and \$12. Members of the first group were presented with a negative version of the negotiation task – which emphasised the losses. A fragment of the message they received was as follows: 'Please remember that your overarching aim is to minimise the company's losses. Any concession to the trade unions above the current hourly rate of \$10 will be a loss to the company.' The predetermined reference point is an hourly rate of \$10. The respondents from the second group were presented with a positive version of the negotiation task – with emphasis placed on gains. A fragment of the message they received was as follows: 'Please remember that your overarching aim is to maximise the company's profits. Any concession on the part of the trade unions below their currently demanded hourly rate of \$12 will be a profit for the company. The reference point in this case is an hourly rate of \$12.'

5. Conclusions

People pay attention to what is visible. They usually do not use their cognitive resources to guess what is beyond the message they receive. Framing is the effect of putting emphasis in a message either on negative or positive aspects. It is essential to discern whether the emphasis of the message is put on losses or on gains, since people are risk-averse when it comes to gains and risk-prone when it comes to losses. The emphasis on losses discourages recipients from taking advantage of the option presented and makes them take excessive risk in order to avoid it. On the other hand, the emphasis on gains encourages people to take advantage of the option presented and causes risk aversion.

Three types of framing are described: risky decisions, feature and purpose. All of the above can be explained by loss aversion. People avoid losses to such an extent that even a small loss makes them sad, and that means they are able to take a risk to avoid potential losses or get out of the loss they have already suffered.

In the case of risky choice framing, loss aversion is expressed by the reluctance of decision-makers to choose the option related to the inevitable loss. If the message stresses a loss, recipients will be willing to take a risk, whereas if the emphasis is put on gain, then recipients will be reluctant to take a risk.

Feature framing happens when people evaluate the object described either with negative or positive stress. A good example is a glass of water,

which combines two perspectives: in the first, the glass is half-full, and in the second it is half-empty. In the first case it seems more attractive than in the second. Recipients perceive the message "a half-empty glass" in the loss category, while the "half-full glass" represents a gain. A plate of grapes with one cockroach looks completely unattractive, while one grape added to the plate of cockroaches hardly improves the reception of the image at all (Kahneman, 2011).

In the case of goal framing, loss aversion causes message recipients to be more strongly affected by the negative consequences of not completing the task than the positive effects of its implementation. Therefore, the emphasis on negative rather than the positive consequences motivates people to implement the program.

The sphere of gains is separated from the sphere of losses by a reference point, the location of which is not fixed once and forever but depends on a number of different factors. The most important of these factors is a hedonic adaptation which shifts the reference point to a location reflecting the new circumstances. Shifting the reference point may result in making a different decision. In the case of price formation, the reference point may be the previous price of the same product or the price of a similar product manufactured by a competitor. Consideration should be given as to how the consumer's reference point should be positioned so that he or she perceives the current price in terms of gain. A similar problem occurs if the price of the product

differs depending on the payment method. The consumer chooses a payment method that he or she associates with gain and not with loss. Negotiators may demonstrate more risk aversion when they define their goal (reference point) as maximizing gains than they would if they defined it as minimizing losses.

Information communicated directly affects the recipient more than one that remains in the

sphere of conjecture. So if the message says that a special diet program results in weight loss in 90% of cases, the recipient concludes that they have a good chance of losing weight. If, however, the message stresses that in 10% of cases the patient's body weight has not decreased, then the remaining 90% of cases remains in the sphere of conjecture and understanding it requires larger cognitive resources.

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