Countering Biases in Risk Analysis

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Learning Objectives
When you have finished studying this chapter, you should be able to:

- know the different biases in risk analysis
- understand the importance of biases in risk analysis
- recognise the need to counter biases throughout the risk process
- understand the limitations of debiasing strategies
- establish some real examples for your management and employees

> There is always an easy solution to every human problem — neat, plausible, and wrong. (Henry Louis Mencken)

Throughout the whole ERM process, it's crucial to recognise that many risks do not manifest themselves by exogenous events, but rather by people's behaviour and choices. Only by applying the intellectual capacity to question our current future prospects and long-lived assumptions, we can obtain the means to manage the real risks to which companies are exposed (Wolf 2012). As already explained, the primary objective of ERM is to increase the quality of decisions by systematically analysing opportunities and risks. Such risk analyses should make decision-making situations in companies more transparent and help to present uncertainties more realistically. Paradoxically, however, the input factors for risk analyses are just as subject to biases as the decision situation itself. This means that risk analyses only contribute to the quality of a decision if the risk manager is aware of the most important motivational, cognitive and group-specific biases and can reduce them by taking appropriate countermeasures.

Identifying and quantifying risks are two of the most important ERM activities in which risk managers and related personnel engage. Behavioural decision research over the last 50 years has found that these two risk management process steps are prone to many motivational and cognitive biases. People usually overestimate some risks and their corresponding probabilities and underestimate others. Biases are an inherent challenge to all decisions and deeply rooted in human behaviour. Thus, the question in ERM activities is not whether biases exist, but rather how these distortions within the risk management decision-making process can be effectively managed.

In the following, a distinction is made between cognitive and motivational biases. The former refer to false mental processes that lead to deviant behaviour from socially well-accepted normative principles (however, it is strongly believed that this type of bias is important for evolutionary reasons). The latter include conscious or unconscious distortions of opinions due to different incentives like social pressure, organisational environment and self-interest (Montibeller and von Winterfeldt 2015, p. 1230).

Unfortunately, the vast amount of literature has dealt only with cognitive biases and has neglected motivational biases which are harder to account for in an ERM programme. In many cases in literature, motivational biases are mistakenly classified as

cognitive biases. Some of the biases of both groups can be alleviated or amplified in group decision-making processes. To account for the importance of group-specific activities in ERM processes (e.g. risk management workshops), a separate chapter particularly covers group-specific biases.

After the explanation of each bias, specific measures are suggested which the risk manager can apply or propose to mitigate or eliminate the negative effects. These procedures and attempts to counter biases are known as "debiasing techniques".

2.1 Motivational Biases

Let us first look at motivational biases. These biases are judgments that are influenced by the desirability or undesirability of events, consequences, outcomes or decisions in a company. This includes, for example, the deliberate attempt by experts to provide optimistic forecasts for a preferred action or outcome. Another example is underestimating the cost of a project to deliver bids that are more competitive. Selected motivational biases which are believed to severely impact risk analysis are presented below.

2.1.1 Affect Heuristics

Affect heuristics are a sort of mental abbreviation in which people make decisions that are strongly influenced by their current emotions. Essentially, everyone's personal affect (a psychological term for emotional reaction) plays a crucial role. Emotions influence all kinds of decisions, large and small ones. After all, it seems obvious that someone is more likely to take risks or try new things when he or she feels happy. Likewise, individuals are less likely to make difficult decisions when they are depressed. If someone relies on his "gut feeling" to make an important decision, this is typically an example of affect heuristics (Montibeller and von Winterfeldt 2015, p. 1235).

Affect-based assessments are more pronounced when people do not have the resources or time to think. Rather than looking at risks and rewards independently, people with a negative attitude, e.g. towards an internationalization strategy of a company, may assess their benefits (opportunities) as low and their risks as high. This leads to a more negative risk-benefit correlation than would be observed under conditions without time pressure (Finucane et al. 2000).

One study for example found that tobacco, alcohol and food additives are all perceived as high-risk and low-reward topics. In contrast, X-rays, vaccines and antibiotics are considered low-risk and high-reward (Fischhoff et al. 1978). The important aspect of this result is that the positions have always been classified as both low-risk and high-reward (or vice versa), even if some positions are actually high-risk/high-reward or low-risk/low-reward. This result occurs because smoking, drunkenness and food additives trigger negative emotional reactions, while the other activities trigger positive emotions.

Therefore, we do not really consider the true risks and opportunities; we automatically choose the more positive option (low risk and high reward) for concepts with positive associations and do the opposite for those with negative associations (The Decision Lab n. d.).

Various approaches can help to reduce the negative consequences of affect heuristics. Risk managers can check whether decision-makers focus too much on a single risk assessment proposal. They can bring critical decisions to a panel with alternative viewpoints to discuss risks and opportunities. In this way, it is possible to avoid underestimating the risks of an idea that somebody is very attached to. Companies can also use decision-making tools that allow various factors to be weighted and evaluated. Within the scope of risk identification, risks and potential risk scenarios should be formulated as neutrally as possible. In risk assessments, it may be necessary to have risk scenarios to be assessed by different people with different backgrounds, interests and incentives.

For example, this could be supported by an ERM committee. Such a committee usually consists of specialists and experts from different divisions and business units. This means that the assessment of losses or financial consequences resulting from a potential occurrence of risk should be much more well-founded and complete than the assessment by individual, possibly unrelated employees.

2.1.2 Attribute Substitution

Attribute substitution is an attempt to solve a complex problem with a heuristic attribute that is a false substitution. Concretely, people involved in risk analysis may substitute a difficult problem for an easier one incorrectly and without being aware of it. Attribute substitution is a generic model that is applicable in many different areas and can be easily remembered. Essentially, attribute substitution is the collapse of attention from a broader, complex question to one that is narrower, but more easily answered (Smith and Bahill 2009, p. 2). Attribute substitution may take many forms. Examples include the substitution of an emotion such as fear. The problem of attribute substitution is that it often causes inaccurate (risk) assessments of emotional themes such as dread risks (terrorism, plane crash, pandemic situation).

For example, when individuals are offered insurance against their own death in a terrorist attack while on a foreign trip, they are willing to pay more for it than they would for insurance that covers death of any kind on that trip, although the latter risk obviously includes the former risk. Kahneman concludes that the attribute of fear is being substituted for an assessment of the total risk exposure of being abroad. Fear of a terrorist attack is perceived as more significant risk than fear of dying on a trip (Kahneman 2007).

Kahneman and Frederick propose three conditions for attribute substitution (2002):

- It is not expected that substitution will take place when answering factual questions that can be retrieved directly from memory or about current experiences.

- An associated attribute is easily accessible, either because it is automatically assessed in normal perception or because it has been primed.
- Substitution is not recognised and corrected by the reflective system. For example, when asked, a bat and a ball cost CHF 1.10 together. The racket costs CHF 1 more than the ball. How much does the ball cost? Many respondents erroneously answer with CHF 0.10. One explanation regarding attribute substitution is that instead of working out the sum, respondents split the sum of CHF 1.10 into a large and a small amount, which is easy to do. Whether they think this is the correct answer depends on whether they check the calculation with their reflective system.

There is unfortunately no simple solution for the substitution attributes in the ERM process. First of, it is important to become aware of the fact that people tend to substitute simpler but related risk assessments in place of more complex risk assessments. Subsequently, examples of this bias can be presented to managers and decision-makers to demonstrate their own behaviour. Some suggestions made by Smith and Bahill (2009) in the context of ameliorating attribute substitution in systems engineering might be adapted to risk analysis (pp. 15–16): To counter the risk to mistakenly replace a complex risk phenomenon with an easier, but wrong one, is to deliberately create risk analogies of greater complexity in addition to the current (easy) risk scenario. The idea behind this is that the development and discussion of risk analogies of greater complexity can be useful because they offer new perspectives on the same risk and reduce the risk to come to quickly to a too simple, substituted solution.

A second (partial) remedy of attribute substitution is to draw on subject matter experts in risk analysis processes. A subject matter expert is characterised by long lasting practical experience that positively impacts perceptual abilities, recognition skills and enables faster decision-making. In addition, experts have stronger self-monitoring capabilities which allows them to recognise when they make for example false and too easy judgements on risks. As Smith and Bahill (2009) point out, “such noncollapsing situational awareness should serve to prevent erroneous attribute substitution” (p. 16).

2.1.3 Confirmation Bias

Confirmation bias is one of the most common cognitive biases for decision-makers. This type of bias tends to interpret information based on an earlier assumption rather than letting the data speak for itself (Wolf 2012). It shows the tendency to select and consider only (risk) information that confirms our existing beliefs and assessments. For example, suppose a manager believes that men will respond positively to a new service and sends surveys to men who have tested the service. Confirmation biases can lead him to interpret this survey in a way that confirms his preconceived notion. On an organisation-wide level, the data that underlie a decision process can be flawed. Without conscious, systematic probing, data selection is prone to confirmation bias (Baer et al. 2017).

The confirmation bias can occur in different stages of the ERM process. During the risk identification process, there is a risk that only factors that confirm an initial preselection will be taken into account. For example, cyber risk exposure can be confirmed due to the high media presence. This is despite the fact that a company has no online presence at all and is already very well prepared when dealing with the Internet. The distortion can also occur during risk analysis and quantification. Once an assessment has been carried out, facts are sought that support it.

As a manager or risk manager, it is a rare luxury to have all the relevant data before making an informed decision. More often, we have to deal with incomplete information, which leaves us open to confirmation bias. To avoid this trap, it is recommended to take some time before making important decisions and ask ourselves what would have happened if we had made the opposite choice. One approach to effectively counter that bias is to collect specific data to defend an opposite view of specific risk scenarios and then compare it with the data that supported the first risk assessment. Next, risk managers can reassess the decision against the larger record. Still, the perspectives may be incomplete, but the risk assessment will be much more balanced (Redman 2017).

To further reduce the confirmation bias, risk managers should review the following countermeasures. It is highly recommended that different subject matter experts on the same topic are involved when making decisions on risks. For example, when it comes to probability assessments, it is worth having the same risk scenario assessed independently by different experts. It is also advisable to remove the time pressure from decisions and to deal intensively with an important risk/reward decision that have considerable consequences on business objectives. Finally, a corporate culture that allows for different views and opinions supports the critical engagement with risks.

2.1.4 Desirability of Options and Choice

Desirability bias refers to the tendency to give socially desirable answers instead of choosing answers that reflect true views. The distortion of responses due to this personality trait becomes an important issue when, for example, unwanted risks or risks that may jeopardise a project are being discussed. If a person knows that he or she is being monitored, it is more likely that he or she will primarily indicate the risks that are known or easy to manage. This obviously distorts the risk relevant data (Grinnell and Unrau 2018, p. 488). Accordingly, the bias leads to over- or underestimating of probabilities, consequences, values, or weights in a direction that favours a desired alternative (Montibeller and von Winterfeldt 2015, p. 1235).

Precautions should be taken to mitigate the negative effects of the desirability of options. Basically, it helps (again) to involve different stakeholders in decision-making situations (Montibeller and von Winterfeldt 2015, p. 1235). With regard to ERM, for example, opinions of experts from other departments or business units can be consulted during risk assessments. The collected risk scenarios and associated risk data can also

be validated by experts. It is advisable to implement incentives and responsibilities that fundamentally reduce this bias. Those people who are responsible for achieving business objectives are basically more focused on a comprehensive identification and analysis of the risks.

In addition, it is a crucial task to ask the right questions in the consciousness of this bias. Thus, suggestive questions should be consistently avoided. It is also important to create a corporate culture in which risks can be discussed openly. This includes ensuring that the disclosure of risks has no negative impact on employees. This means that the level (impact) of the risks would play only a minimal or no role when it comes to remuneration. Rather, the far-sighted management of relevant risks intentionally accepted in order to pursue business objectives should be assessed. Presenting concrete examples of such biases at the beginning of decision-making processes can also increase awareness.

2.1.5 Optimism

This cognitive bias occurs when the desirability of a result leads to an increase in entry expectations. It is often referred to as "wishful thinking" or "distortion of optimism". The bias is particularly evident when people assess the impact or consequences of a risk scenario. It is the tendency to judge positive results too optimistically or the tendency not to identify the potentially negative results or to not see them completely (Emmons et al. 2018, p. 58). Unwanted optimism can therefore lead to unnecessary risks being taken.

For example, we usually underestimate the risk of being involved in a car accident or falling ill. At the same time, we expect to live longer than is indicated by objective data. We also think that we are more successful in our job than we are (Sharot 2011, p. R941). The same distortion can also be seen in everyday business or in projects. Many large projects are budgeted far too low because decision-makers face an optimism bias. This often has negative financial consequences. Despite this, some of today's elementary buildings would hardly have been realised if cost truth had prevailed right from the start. Accordingly, this distortion can also have positive effects.

The following factors make the optimism bias more likely to occur (Cherry 2018a).

- Infrequent risk scenarios are more likely to be influenced by the distortion of optimism. People tend to think that they are less likely to be affected by events such as floods just because they are usually not everyday events.
- People experience the distortion of optimism more when they think that the events are under direct control of the individual. It is not the case that people believe that things will work magically, they rather think that they have the skills and know-how to do so.
- The distortion of optimism is more likely to occur when the negative risk scenarios are perceived as unlikely. For example, if a person believes that companies rarely go bankrupt, they are rather unrealistically optimistic about these specific risks.

Research has shown that people who are anxious are less likely to be confronted with the optimism bias. It has also been found that experiencing certain risk events can reduce the distortion of optimism. Related to ERM, the occurrence and consequences of a risk can thus reduce the value of experience and thus the optimism bias. After all, it is less likely to experience the bias if one regularly compares one's behaviour with that of others in decision-making situations. In this context, it can help to establish valuation rules and place hypothetical bets against the desired event (Montibeller and von Winterfeldt 2015, p. 1235).

Researchers also have tried to help people reduce the distortion of optimism, especially to promote healthy behaviours and reduce risky behaviours. However, they have found that reducing or eliminating the bias is indeed incredibly difficult. Attempts to reduce the optimism bias through measures such as educating participants about risk factors, encouraging them to consider risky examples, and educating subjects have led to little change (Cherry 2018a).

In the context of risk analysis, the following approach might reduce the optimism bias: Similar to the previous biases, it is crucial to take an outside view on risk scenarios by considering additional perspectives of subject matter experts. One effective approach that supports this idea is called "prospective hindsight", in which participants of risk assessments imagine that a specific business objective has not been accomplished and then identify all the possible risks why this happened. This exercise enables people identify possible risks and opportunities in their assessments that may not come to mind otherwise (see similar Singh and Ryvola 2018).

2.1.6 Transparency Bias

Gleißner (2017) states that a transparent identification and presentation of risks is not necessarily in the personal interest of each manager and decision-maker (p. 14). Various reasons for this can be found that lead to both conscious and unconscious non-identification of risks. For example, it can be assumed that people who are prepared to take fraudulent (business-damaging) actions do not support complete transparency. They probably do not want past fraudulent actions to be uncovered, nor do they want such actions to be thwarted in the future.

Furthermore, the transparent presentation of risks can weaken a manager's own position. It is possible that some projects would be discontinued if all risks were presented transparently. Specifically if an employee or even a manager is dependent on a project and wants to advance his or her career with it, a conscious non-identification is to be assumed. However, lack of communication about the benefits of ERM can also lead to uncertainty on the part of employees, who consciously and unconsciously conceal risks.

Increasing managers' motivation to be accurate is a key remedy. This can be done by making them aware of potential biases, or by incentivizing them for the accuracy of their feedback. Rewards for accurate feedback on risks and rewards does not sound intuitive at first. The key idea here is to reward people to be more transparent and precise about risk,

independent from the scale (impact) of the risk. Training, bonuses or other incentives could be offered for increasing the transparency in risk assessments. If such incentive systems are adequately established, superiors can also recognise who is reporting honestly and correctly which also increases visibility.

Gamification might be a very promising approach to counter transparency bias. In fact, very little research on the relationship of game mechanisms and ERM transparency is available. However, motivating people to be transparent in risk assessments could be enhanced by awarding specific "transparency rewards": Collecting points, unlocking new levels, receiving fictitious titles and other approaches could play an important role. Internal and external leaderboards support these transparency efforts. In this context, it is important that incentives should not only be implemented at the individual level, but also at the team and department level (Hossain and Li 2013).

2.2 Cognitive Biases

Cognitive biases are systematic errors in thinking that may affect input into decisions and judgments that people make. Basically, from an evolutionary standpoint, these instincts provide mechanisms to make rapid decisions in important and complex situations based on previously observed patterns (Rees 2015, p. 12). One must be careful not to confuse cognitive biases with logical fallacies. A logical fallacy is based on an error in a logical argument, while a cognitive bias is related to false thought processing often arising from challenges with attention, attribution, memory or other mental stumbling blocks.

2.2.1 Anchoring

To arrive at a decision an individual usually starts from an anchor number and then adjusts that number or estimate by correcting it up or down (Wolf 2012). A decision maker must be careful not to use this as a shortcut that can lead to wrong decisions. People have the habit that they like to think automatically. Sometimes we avoid making decisions because it is too much of a burden. Anchoring could be an easy way to make decisions based on one particular piece of information. When decision makers focus on or give too much weight to one piece of information without considering other crucial factors, serious mistakes are made (Friedman 2017).

Information overload and lack of time make people more susceptible to anchoring. If there are no clear points of orientation available to the decision-maker, the person prefers to seek for an anchor. If an anchor is not readily available, a decision-maker will probably consider the first one when some numbers, statistics or other information is presented. Any projection of the future is to some extent based on historical data and also

includes some anchoring. As the balanced and conscious decision-making on risks and rewards is a centrepiece of ERM, it is important that risk-based decisions are not based on anchors that may significantly bias risk perception and risk assessments.

Example

Anchoring is not a curiosity only occurring in research laboratories; it can be just as powerful in the real world. In an experiment conducted a few years ago, real estate agents were given the opportunity to assess the value of a house that was actually for sale. They visited the house and studied a comprehensive information brochure containing a price claim. Half of the brokers saw an asking price that was significantly higher than the list price of the house; the other half saw one that was significantly lower. Each broker expressed his opinion about a reasonable purchase price for the house and the lowest price at which he or she would sell the house if he or she were the owner.

The estate agents were then asked about the factors that affected their judgment. Remarkably, the asking price was not one of these factors; the brokers were proud of their ability to ignore them. They claimed that price demands did not influence their answers, but they were wrong. The anchor effect was 41%. In fact, knowledgeable practitioners were almost as vulnerable to anchor effects as students of business administration without real estate experience, whose anchor index was 48%. The only difference between the two groups was that the students admitted to having been influenced by the anchor, while the professionals denied this influence (Kahneman 2012).

Several measures are available to deal with anchoring. Risk managers can consider a specific reference point for information when preparing risk-based decisions. It may be essential to set an anchor based on current knowledge and financial objectives and be willing to adapt it to changing circumstances. It is important to consider and discuss the underlying fundamental data and assumptions which led to a specific anchor. In addition, risk managers must ensure that risk assessments remain flexible and are open to new sources of information during workshops or interviews. They must be aware of that bias in risk analysis and not provide interviewees with specific anchors prior risk identification and risk assessment.

A skilled risk manager can ask relevant questions that can reveal a company's anchoring behaviour. Are risk assessments carried out in such a way that a constructive discussion between different opinion leaders has led to consensus? Are risks assessed on a neutral basis without specifying anchor numbers or anchor data prior to risk assessment? Are risks consequently discussed with an advocate who argues against the first consensus within risk assessments or risk workshops? Taking into account these aspects may help to ameliorate anchoring bias (see similar Kent Baker and Puttonen 2017, pp. 118–119).

2.2.2 Availability Bias

As suggested by Tversky and Kahneman (1973), a persistent cognitive bias that has special relevance for risk perception is known as availability. Leaning on frequently occurring (risk) events is an often applied short cut when trying to predict the future and make decisions when faced risk and uncertainty (Wolf 2012). Availability is also affected by numerous factors unrelated to the frequency of occurrence. An example of availability is the extent to which individuals are influenced by their memories and perceptions of past events in discussion about (future) risks and opportunities.

Due to the availability bias, many risk assessment are heavily distorted. For example, we tend to systematically overestimate the risk of earthquakes, thunderstorms or fires. At the same time, we underestimate strategic or operational risks such as increasing customer complaints or systematic bottlenecks at management level. Topics often intensively covered by media and press are often much rarer as we believe. Spectacular risks are basically much more present in our brains than the opposite.

The availability bias may for example affect the Board of Directors. As a rule, there is usually an intense discussion about what management presents, e.g. quarterly figures such as revenues and EBIT. More important topics such as a skilful product launch by the competition, increased employee turnover or an unexpected change in customer behaviour are rarely adequately discussed. However, these neglected topics can pose significant threats to the company, i.e. can become strategic risks.

The following points can be suggested as countermeasures. It may be worth to offer basic courses and trainings on how probability estimates can be assessed not based on past events and experience. Providing counter-examples can also be used to show the effect of availability biases. In this context, risk managers can address the challenge of assessing risks prospectively instead of retrospectively. Risk managers can set high standards for “neutral thinking” in risk workshops by asking questions to uncover potential availability distortions such as: What happened in the past? Has this risk occurred once or several times in the past? What type of risk mitigation has been performed after this risk? Is this risk still relevant in the future? In summary, it can be said that risk managers and risk managers who assess risks should pay attention to past information that flows into scenario development (Montibeller and von Winterfeldt 2015, p. 1233).

Additionally, different perspectives of various persons involved in risk assessments should be considered regularly. A risk manager may form a team with different experiences and perspectives. This countermeasure itself will limit the distortion of availability as people usually question each other’s natural thinking. It can be worth to consider also external perspectives that simply do not exist within the company.

2.2.3 Dissonance Bias

An incompatible opinion (e.g. risk assessment) with our existing way of thinking creates discomfort because our mind cannot easily deal with contradictory ideas at the same time. This discomfort is called cognitive dissonance. The result is the urge to discredit or ignore information that does not fit the current way of thinking. Thus, it is conceivable that information about downside risk is ignored because it contradicts the potential opportunities (rewards). Avoiding this dissonance can obviously affect the quality of decisions under uncertainty.

Cognitive dissonance in the workplace is widespread and a major source of stress for professionals working for example in organisational support functions such as risk management. There are many examples and scenarios that can lead to cognitive dissonance, ranging from observing inappropriate and poor leadership practices to encouraging people to take on tasks that are not consistent with procedures, norms, training, organisational or personal values. When confronted with contradictory beliefs and practices and the pressure to tolerate them, these professionals often experience deep personal dissatisfaction (Celati 2004, p. 58).

A first step in overcoming and eliminating dissonances is that risk managers are aware of it and address them in risk management workshops or interviews. Skilled risk managers can try to identify existing and potential dissonances. Role-playing exercises can create comfort and confidence, which in turn reduces dissonance. Another approach is to ask trusted people to review its own actions and beliefs and suggest alternative courses. Successful risk managers seek feedback from others and consider their opinions in risk assessment (Kent Baker and Puttonen 2017, p. 121).

2.2.4 Zero Risk Bias

The zero risk bias describes individual's preference for options which result in reducing small risk to zero over a greater reduction in larger risks compared to the first. In other words, we tend to have a preference for the absolute certainty of a smaller benefit (i.e., complete elimination of risk) to the lesser certainty of receiving a larger benefit. This bias can be observed specifically by risk averse people and managers. These risk averse decision-makers prefer small benefits which can be certainly realised to large ones which are less certain. For a risk decision-maker, the importance of having knowledge about this bias cannot be understated.

Example

Scientists identified a risk-free bias in the responses to a questionnaire about a hypothetical cleaning scenario involving two dangerous sites X and Y, with X causing 8 cases of cancer annually and Y causing 4 cases annually. Respondents chose three remedies: Two options each reduced the total number of cancer cases by 6, while the

third reduced the number by 5 and completely eliminated the cases at site Y. The third option reduced the number of cancer cases by 6 per year. The third option reduced the total number of cancer cases by 6, while the third option reduced the number by 5 and completely eliminated the cases at site Y. The third option reduced the total number of cancer cases by 6, while the third option reduced the number by 5 and completely eliminated the cases at site Y. The third option reduced the number of cancer cases by 6, while the third option reduced the number by 5 and completely eliminated the cases at site Y. While the latter option had the worst overall reduction, 42% of respondents rated it better than at least one of the other options. This conclusion was similar to an earlier economic study, which found that people were willing to bear high costs to eliminate a risk completely (Baron et al. 1993).

This bias can occur at various stages in ERM, specifically when weighing two options. In order to reduce the risk of a disaster from 5 to 0% (i.e. to completely exclude it), people would invest a lot more than they would to reduce it from 10 to 5%. This effect shows that people attach irrational importance to unlikely events. Particularly concerning risk mitigation efforts, this bias can have a considerable impact on costs.

A general solution for zero risk bias is not known. It is important to be aware that there is no such thing as complete security, i.e. zero risk. One way to reduce the certainty effect can be by avoiding so called "sure things" in utility elicitation and separating value and utility elicitation. It can also be useful to examine the relative risk attitude and to point out possible misinterpretations. In summary, it is often not the best course of action to completely eliminate one risk. Instead, a balanced risk portfolio that will yield a greater aggregated relative risk reduction is more efficient and effective than focusing solely on risks which can be completely mitigated.

2.2.5 Conjunction Fallacy

The conjunction (joint occurrence) of two risk events is considered more likely than the constituent risk event, specifically if the probability assessment is based on a reference case similar to the conjunction. Conjunction errors occur when we assign a higher probability to a risk event with higher specificity. This fundamentally violates the laws of probability. Consider the following example from tennis:

- A: Roger Federer will win the game
- B: Roger Federer loses the first set
- C: Roger Federer will lose the first set, but win the match
- D: Roger Federer wins the first set, but loses the match

Different studies by Kahneman show that people arrange the chances by directly contradicting the laws of logic and probability. He explains this as follows using the above

tennis example: The critical points are B and C. B is the more comprehensive event and its probability must be higher than that of an event it contains. In contrast to logic, but not representativeness or plausibility, 72% of the respondents gave B a lower probability than C. However, the loss of the first set is by definition always a more likely event than the loss of the first set and victory in the game (Tentori et al. 2013). The following example rooted in the insurance industry further illustrates the conjunction fallacy.

Example

If people are given the opportunity to take out air travel insurance shortly before the flight, they appear willing to pay more for insurance that covers terrorism than insurance that covers any cause of death from air travel—including terrorism. Obviously, insurance that only covers terrorism should be worth less than insurance that covers terrorism in addition to some other risks (see Fig. 2.1). Perhaps because we are more capable to imagine a particular risk event, we are often more likely to expect that risk happen compared to broader, unspecific risk events (Hubbard 2009, p. 100).

In business we are often prone to conjunctional errors, probably because we face so much supportive context. For example, we might hear separate rumours that company budgets are about to be cut and that a senior executive in our department is considering leaving the company. We consider each of these events unlikely—perhaps a 33% chance of budget cuts and a 25% chance of the executive leaving. But if we hear both rumours at the same time, our intuition that both events will happen is pretty high—maybe 50% or more.

To reduce conjunction fallacy, risk managers should illustrate the logic of joint probabilities with Venn diagrams and provide concrete examples to participants of risk workshops or interviews. Employees need to understand the bias and its relevance for decision-making. One approach to uncover the conjunction fallacy is to assess the probability of two events separately and then estimate the conditional probability of one event, given that the other event occurs. Whenever a company faces important decisions which include several risk scenarios that can occur simultaneously, it is helpful to discuss the probabilities of these scenarios with several experts within and outside the company.

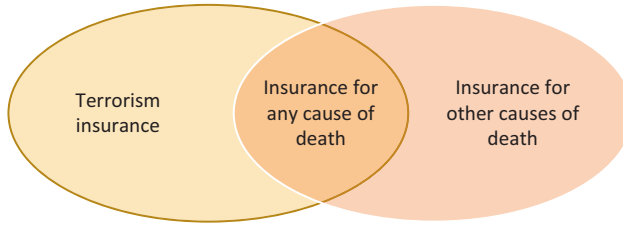

Fig. 2.1 Intersection example from the insurance industry

2.2.6 Conservatism Bias

Conservatism bias is a mental process in which people hold on to their previous views or predictions at the expense of recognizing new information (Edwards 1982). Suppose a trader receives bad news about a company's earnings and this news contradicts another profit estimate from the previous month. Decision-makers can take a conservational approach in order to minimise risks. However, this bias can result in lower profits. Avoiding bizarre and unhealthy risks should be the goal, while at the same time increasing prudent risk taking, which does not necessarily leads to greater risk exposures.

For example, there is a tendency to overestimate the probability of low-probability risk events occurring, where impact would be significant if such a risk event did happen. At the same time, a conservative mind-set may not fully take into account the reality that most operational risks are higher-probability risk scenarios. It is important to note that the conservatism bias seems to contradict the representativeness bias, the latter referring to an overreaction to new information, while the distortion of conservatism refers to an underreaction to new information.

Risk managers can reduce conservatism bias by carefully reviewing new information to determine its value over previous beliefs and seek unbiased advice. If new information is difficult to discover, verify, or explain, opinions by subject matter experts become more important. However, every new piece of information should be analysed and deserves careful review—it may reduce uncertainty. Another approach is to make the thinking process more flexible, meaning that people need to learn to let go of previous beliefs when confronted with credible evidence that contradicts existing opinions and estimates. If people are about to ignore information because it is difficult to understand (such as math or statistics), risk managers must either take the time to translate this information into "business language" or involve an expert who can support the explanation of this information.

2.2.7 Endowment and Status Quo Bias

Another type of cognitive bias is the status quo bias. People prefer things to stay the way they are, or that the current state remains the same. They ask to get paid more for an item they own than they are willing to pay for it when they do not own it. Accordingly, their disutility for losing is greater than their utility for gaining the same amount (Montibeller and von Winterfeldt 2015, p. 1235). This distortion can affect human behaviour and is of interest in many areas of sociology, politics and economics.

The evidence from a large number of experimental studies demonstrates the endowment effect. In simple versions of such experiments, half of the participants receive a particular object—for example a lottery ticket, a chocolate bar, or a pen, depending on the experiment—and the other half receive the equivalent monetary value. Subsequently,

participants are allowed to swap the object and the money, either with the experimenter or with each other, again depending on the particular experiment.

However, the number of trades is usually considerably lower than expected, and the vast majority of participants prefer to keep what they receive: for instance the pens were worth more money to those objects who started with pens than to those who started with money. This behaviour is usually regarded as a consequence of the effects of "loss aversion" and the "status quo" bias.

In politics, the status quo bias is also often used to explain the conservative way of thinking. People who describe themselves as conservative tend to focus on preserving traditions and keeping things as they are. This avoids risks associated with change, but also misses possible benefits that change could bring. Of course, as with many other cognitive distortions, the status quo bias has a benefit. Since it prevents people from taking risks, the bias provides some protection. However, this risk avoidance can also have negative effects if the alternatives actually offer more safety and benefit than the current state (Cherry 2018b).

Debiasing endowment and status quo is difficult in practice. Risk managers could explain that the status quo is not relevant for future decisions on risks and rewards. When for example discussing project risks, he or she can show that sunk costs should not play a role in the risk analysis and subsequent decisions (Montibeller and von Winterfeldt 2015, p. 1235).

2.2.8 Framing

Framing effects mean that people's response to information is influenced by how information is presented (Wolf 2012). People's preferences can be reversed by appropriate information design. As in prospect theory, framing often comes in the form of profits or losses. This theory shows that a loss is perceived as more significant and thus more avoidable than an equivalent gain. In the hierarchy of choice architecture, a safe profit is preferred to a probable one, and a probable loss to a safe loss. Decisions can also be formulated in such a way that the positive or negative aspects of the same decision are highlighted, thus bringing affect heuristics to the fore.

The following example can illustrate the framing effect:

Example

"Participants saw a film of a traffic accident and then answered questions about the event, including the question 'About how fast were the cars going when they contacted each other?' Other participants received the same information, except that the verb 'contacted' was replaced by either hit, bumped, collided, or smashed. Even though all of the participants saw the same film, the wording of the questions affected their answers. The speed estimates (in miles per hour) were 31, 34, 38, 39, and 41, respectively.

> One week later, the participants were asked whether they had seen broken glass at the accident site. Although the correct answer was 'no,' 32% of the participants who were given the 'smashed' condition said that they had. Hence the wording of the question can influence their memory of the incident." (Memon et al. 2003, p. 118).

Risk managers can reduce framing effects by trying to "see through the frame", or rather, to look at things more objectively. This task is difficult because people may have incentives "nudge" others in a certain direction or decision by the way they present information. For example, division managers try to convince management of their successful projects or risk mitigation measures by advertising and presenting them positively (Kent Baker and Puttonen 2017, p. 121).

It seems important in this context that incentives exist not only at the individual level but also at the team and department level. Another option is to get a second opinion from a person who is not involved in the decision-making process. In most cases, the latter can look at the different options from a more neutral perspective. Finally, research fortunately shows that if people feel happy, framing effects can be reduced (Cassotti et al. 2012).

2.2.9 Gambler's Fallacy

Tversky and Kahneman introduced the gambler's fallacy as a result of heuristic representativeness in the 1970s. It arises from belief in the law of small numbers, namely the notion that irrelevant information about the past is important to predict future events. If a random event has occurred several times, we tend to predict that it will occur less frequently in the future, so that the results balance out on average. This, we do not realise that small samples are often not representative of the population (Sun and Wang 2010, pp. 124–125). This error must be taken into account in particular in risk analysis and risk scenario quantification.

Gambler's Fallacy and the hot hand fallacy are closely related, but somewhat different. The hot hand fallacy refers to the phenomenon that we believe a number of successful events (e.g. non-occurrence of risk) must be continued just because a number of successes have just occurred. For example, because no risk occurred in the last three years, we are more likely to think that no risk will occur in the fourth year. The Gambler's Fallacy applies in case we expect a reversal of the results, not for the continuation of a certain result.

Today, a large number of risk decisions are strongly influenced by data analysis. McCann (2014) noted that with the increasing dependence on data analysis results, players' mistakes are becoming more and more apparent. A typical evidence that can be found in prediction is the tendency to observe and identify certain patterns in data, even if these "patterns" can only occur due to nothing but random events.

In order to reduce Gambler's Fallacy, it is advisable to impart basic statistical knowledge to employees. Managers who make important decisions need to know and understand statistical fundamentals. By explaining the probability logic and the independence of events, better decisions can be made. Risk managers can identify typical examples of mistakes and present them to management and employees (Montibeller and von Winterfeldt 2015, p. 1236).

2.2.10 Hindsight Bias

The hindsight bias describes that people change their estimates of the probability of events and outcomes after they are already known. They overestimate their ability to predict past events, even if the outcome was completely unpredictable (Wolf 2012). The bias arises because it is difficult for people to separate what they currently know from past experience. Although hindsight bias is now widely accepted, the underlying mechanisms that explain it are still being discussed. The problem with this bias is that we believe that the causes of past events were simpler than they actually were. Understanding this distortion is therefore essential so that we can learn from our experiences and mistakes. One area in the decision-making process that is very likely to be affected by hindsight bias is the control phase and the environmental scanning phase (see similar Barnes 1984, p. 130).

Typical examples of this are strategic decisions made by companies that are subsequently regarded as obvious. For example, only a few companies in the media and clothing industries have relied on Internet commerce. In the meantime, numerous traditional companies from these sectors have gone bankrupt. Frequently the question is asked why these companies were not also relying on the Internet. At the time of the strategic decision, however, it could not yet be foreseen that this would be the right decision.

One way to deal with this bias is to admit that companies are susceptible to hindsight bias. Risk managers need to remind all employees that the future is basically unpredictable, even if people think that they can predict certain risk scenarios based on their past experience. Risk managers should use objective data if available to complement opinions by subject matter experts. It is also worthwhile to review risk scenario assumptions about future developments using (outside) expert opinions. In summary, this means that risk managers and decision-makers should weigh different alternatives against each other, taking into account the fact that situations are constantly changing.

2.2.11 Overconfidence

This bias describes a decision-maker's overestimation of his or her own abilities. This can occur in two forms: Overestimation of one's own abilities or performance and overestimation of one's own knowledge. The overestimation of one's own performance

often occurs. For example, most drivers consider themselves to be better than average. However, it is not possible that more than half of the drivers are better than average. The term is used more frequently for the second form of overestimation. Decision-makers are overconfident if they consider their own judgements to be more precise than they actually are.

Overconfidence often manifests itself in the fact that, for example, intervals are given too narrowly. People are confronted with difficult factual questions and asked for their answers. This is done by giving the best answer together with a 90% confidence interval. Because the given interval is often set too narrowly, the true value is often missed (Shefrin 2016, pp. 62–63). This phenomenon is also called "miscalibration".

Economist Philip Tetlock spent 20 years studying forecasts by experts about the economy, stock markets, wars and other issues. He found the average expert did as well as random guessing or as he put it "as a dart-throwing chimpanzee". Tetlock believes forecasting can be valid, but only when done with a long list of conditions, including humility, rigorous use of data and a ruthless vigilance for biases of all types. He said that he believes it is possible to predict the future, at least in some situations and to some extent, and that any intelligent, open-minded and hardworking person can cultivate the requisite skills. Obviously, this is a challenge at the heart of the whole risk industry (Tetlock and Gardner 2015, p. 6).

In order to overcome overconfidence bias some selected debiasing strategies can help. Risk managers should declare probability training obligatory for risk owners and decision-makers. Risk managers can, for example, start the risk assessment with extreme risk estimates (low and high) and thus avoid central tendency anchors (Montibeller and von Winterfeldt 2015, p. 1233). To challenge risk scenario assessments, counter-arguments can be developed that challenge the underlying values and assumptions. Risk managers, but also every employee should further consider constructive criticism from people they trust. This can serve as a very important step to reduce overconfidence. It is not necessarily the case that criticism is always right, however, risks managers and risk owners get some food for thought to challenge their own risk perception.

2.2.12 Perceived Risks

Psychologist Paul Slovic has dealt with the question why opinions of risk experts differ from those of non-experts. Understanding these differences and the ability to articulate them is a critical skill that risk managers must have (Shefrin 2016, p. 56). Slovic points out that risk managers, when assessing risks, tend to focus more on specific variables such as expected death rates. He points out that non-experts, on the other hand, rely more on intuitive risk assessments (risk perceptions) that can be very different from expert judgements.

The risk perception of non-experts is heavily influenced by two factors, dread risk and an unknown risk. Dread risk includes dread and a number of other considerations

such as perceived lack of control, fatal consequences, catastrophic potential and unequal distribution of costs and benefits. In the context of dread risk, he mentions serious events such as Chernobyl and Fukushima. Unknown risk is the lack of familiarity, e.g. whether the activity or technology has new, unobservable, unknown and delayed harmful consequences. For example, the public assesses nuclear power as much riskier than risk experts. The difference can be attributed to both dread risk and an unknown risk. Dread risk is very complex to deal with. In this context, perceived control is an important issue. For example, psychometric research has found that people are willing to tolerate voluntary risks, e.g. from skiing, 1000 times higher than risks associated with involuntary activities, e.g. from food preservatives. Unknown risk is relevant because people are naturally afraid of the unknown (Shefrin 2016, p. 58).

The perceived risk can be managed by using two different risk reduction strategies. The first strategy is to reduce uncertainty by seeking information. To achieve this, a company-wide information system is important. In this system, objective risk information can be collected and made available to employees. It is also possible to support risk assessments by providing useful questions such as "how often in 10 years will a major problem with a nuclear power value occur" or "how often will we have a supply bottleneck in the next 10 years". Wrong risk perception can only be changed with the necessary experience and the acquisition of knowledge. The second strategy is to reduce vulnerability by reducing the risk exposure (Al-Shammari and Masri 2016, p. 248). It is also helpful that risk managers support risk owners during risk identification and risk assessment interviews. Specifically for inexperienced people, it is important to have a mentor (risk manager) who helps to assess risks more objectively.

2.3 Group-Specific Biases

At the collective level, the confirmation bias introduced in Sect. 2.1.3 is referred to as group-specific distortion. It typically occurs when a group aims to reach consensus before making decisions. Group-based decisions have fundamental advantages that are particularly evident in the following points:

- More information available
- Enriched discussion with different opinions and perspectives
- Improved accuracy and more creativity
- Higher acceptance of the decision

The relevant question is whether teams actually make better decisions than individuals do. The so-called group-specific biases must be viewed critically. The time allowed for decision-making in groups can be so limited that the group may be in a hurry to make the wrong decisions. Efforts should therefore be made to ensure that all views are heard in risk management workshops or ERM committees and taken into account.

▶ **Tip** In order to integrate different views on the same risk scenario, it is necessary to adopt a critical attitude. Often the best decisions come from changing the way people think about problems and looking at them from different angles. "Six thinking hats" can help to look at problems from different perspectives, but one by one, to avoid confusion from too many angles that overload your thinking. It is also a powerful decision-checking technique in group situations, as everyone examines the situation from every perspective simultaneously (Manktelow 2005, pp. 86–87).

Each "thinking hat" is a different way of thinking. These are explained below (de Bono 1999):

- White hat: With this thinking hat, the focus is on the available data. We look at information we have, analyse past trends, and see what we can learn. We look for gaps in our knowledge and try to close or take them into account.
- Red hat: "Wearing" red hat, we look at problems with our intuition, gut reaction and emotion. Also, we think about how others might react emotionally. We try to understand the answers from people who do not fully understand our reasoning.
- Black hat: We use black hat thinking and consider the potentially negative results of a decision. We look at it carefully and defensively. We try to understand why it might not work. This is important because it shows the weaknesses in a plan. It allows us to eliminate them, change them, or create contingency plans to address them.
  Black hat thinking helps make our plans "harder" and more resilient. It can also help us to identify fatal errors and risks before we begin a course of action. It is one of the true benefits of this model, as many successful people get so used to thinking positively that they often cannot see problems in advance. As a result, they are not well prepared for difficulties.
- Yellow hat: This hat helps us to think positively. It is the optimistic view that helps u to see all the benefits of the decision and the value in it. The yellow hat thinking helps us to go on when everything looks gloomy and difficult.
- Green hat: The green hat stands for creativity. This is where we develop creative solutions to a problem. It is a freewheeling way of thinking with little criticism of ideas (we can try out a number of creativity tools that will help us).
- Blue hat: This hat represents process control. It is the hat worn, for example, by people who lead meetings. If they have difficulties because ideas dry up, they can direct the activity into green hat thinking. When emergency plans are needed, they will prompt black hat to think.

One variant of this technique is to look at problems from the perspective of different professionals (e.g., doctors, architects, or sales managers) or different customers.

Applied in this form, the six thinking hats concept can help to reduce or even prevent biases in many of the group situations described below.

2.3.1 Authority Bias

This cognitive bias describes the tendency of people to weight the opinion of a person of authority comparatively strongly. They are also more easily influenced or persuaded by authority persons. There are numerous examples of how this cognitive bias is used to influence consumer behaviour. These can be stock market tips from self-proclaimed financial experts or advertisements for toothbrushes that promote a unique cleaning result. The effect already occurs when people look like persons of authority, whether they are actually experts in the field or just pretending to be. Conformity and compliance are so deeply embedded in a person's psyche that the acceptance of any kind of commands coming from such a person becomes a standard habit. Unfortunately, we usually simply stop questioning these authorities.

We often come across numerous articles claiming long-term health benefits associated with coffee, wine or dark chocolate. However, it is claimed that these results are based on extensive research. It may be worth to dig a little deeper and we may experience a surprise (Kamal 2018).

- This research could always be funded by these companies.
- The research could be done at an obscure university.
- The sample size can be less than 100.
- All participants can belong to a specific ethnic group.
- Etc.

Various debiasing strategies are available to reduce this distortion. Basically, it is helpful to build mutual trust. Employees are often more open if they are not constantly monitored. If we strengthen this relationship (corporate culture), employees will be more likely to honestly report risks and opportunities. Research has also shown that increasing psychological distance can help reduce bias. Instead of permanently discussing important decisions in the same office, researchers have found that telephone conversations or changes in premises can also contribute to bias reduction (Milgram 1965).

Risk managers can use suitable examples to draw the employees' attention to that bias. Before the global financial crisis of 2007/2008, which was preceded by a phase of high growth, only a few voices were critical. Hardly any financial experts dared to comment critically on the development, even though economic up and down cycles have always been part of economic action.

2.3.2 Conformity Bias

Humans are social beings. Ideas about risks that conflict with the group are not always welcome. Even if some risks are very important, people tend to contribute to stability and cooperation. When a decision maker encounters both affirmative and conflicting evidence, the tendency is to overweight the affirmative evidence and underweight the conflicting evidence. Having received affirmative evidence, we are often confident that we have enough appropriate evidence to underpin our faith. The more affirmative evidence we gather, the more confident we become.

Kelman (1958) distinguished between three different types of conformity:

- Compliance: This occurs when one person exerts influence because he or she hopes to achieve a positive response from another person or group. He assumes induced behaviour because he expects to receive specific rewards or approvals and to avoid specific punishment or rejection by conformity (Kelman 1958, p. 53).
- Internalization: This occurs when an individual assumes influence because the content of the induced behaviour—the ideas and actions it consists of—is inherently rewarding. It adopts the induced behaviour because it is congruent with its value system (Kelman 1958, p. 53).
- Identification: This occurs when an individual assumes influence because he or she wants to establish or maintain a satisfying, self-defining relationship with another person or group (Kelman 1958, p. 53).

Example

A good example of the conformity bias is the experiment conducted by Asch (1956). He shows how group coercion can influence a person to such an extent that they judge an obviously false statement to be correct. Asch's attempt was to ask for the length of several presented lines. The test persons were given a small card with a line printed on top and a selection of three more lines underneath. One of the three lower strokes was obviously just as long as the upper one, one longer, one shorter. The test subjects only had to name the line matching the upper line. Faced with this simple task alone, each subject gave the right answer.

But then Asch brought the participants together in groups. Each group consisted of a test person and seven helpers, who Asch had instructed without the knowledge of the test persons. The helpers now began unanimously to give wrong answers. They called short strokes long, long strokes short. And the unsuspecting test subjects? They followed. The same test persons who had previously been able to correctly identify the lines in front of their eyes, now explained that strokes that ended after a few finger widths were longer than those that extended almost over the entire page. Not even one in four subjects managed to resist the nonsense of the helpers.

> Asch (1956) explained the denial of reality with the fear of a dissenting opinion. In interviews, the test subjects said that they had doubted their own perception in the face of the helpers' so convincingly delivered judgments. Others claimed to have noticed the other's error, but did not want to spoil the mood. Some test persons even confessed that they were basically convinced that something was wrong with them.

Obviously, avoiding risk management workshops in larger groups and conducting one-on-one interviews instead fully eliminates conformity. To counteract conformity bias in workshops, risk managers can also collect anonymous feedback on risk scenarios first and then discuss these inputs within the group. Additionally, the can invite new experts into the group on a regular basis. Fresh people in risk management workshops do not yet feel the same pressure to adapt as other members. Also, outsiders will be unlikely to share the group's acquired prejudices. Conflicts can nevertheless arise in such a setting. Due to their outsider role, however, they do not endanger cooperation within the team. No workshop member has to stand against his own team and expect consequences that could endanger further cooperation with the risk manager (Clayton 2011, pp. 148–149).

Basically, if people contribute anonymously to a risk assessment, they are much more comfortable and will probably say what they really think about risks. One way to support this is to use anonymous mailboxes as well as contact persons who are not considered direct superiors. Management must also set the right tone that this feedback is given high priority (Clayton 2011, p. 148). Last but not least, eliciting a second risk assessment in addition to the first consensus on a risk can further reduce conformity bias.

2.3.3 Groupthink

Groupthink is a certain way of thinking of people in a group (team, meeting, workshop, conference, and committee). In group thinking, the group tends to avoid conflicts or tries to minimise them and aims at reaching consensus. However, this consensus is usually not but based on adequate critical evaluation and analysis. Individual perspectives and individual creativity are (partially) lost, lateral thinking is often undesirable. It is not the case that the group members feel compelled—they rather feel very bound to the group and avoid getting into a conflict situation. The harmony of the group is felt as more important than the development of realistic risk scenarios. This can indeed lead to people making unfavourable decisions (Kaba et al. 2016, pp. 403–404).

There are several factors that can make groups susceptible to group thinking. First, a group might have a leader who advises members not to disagree. At the same time, the leader makes clear what he or she wants to do and hear. People are inherently selfish, and most will seek opportunities in their own interests to support the leader in a way that is consistent with their own goals. The leader might want to hear "yes", not "yes, but" and certainly not "no". It also encourages group thinking when the group is made up of members with similar backgrounds. As a result, confirmation bias and availability bias

combine to limit discussion of relevant risk issues and risk perspectives (Shefrin 2016, p. 65).

Groupthink has a special significance when it comes to risk decisions. It leads to "polarization", i.e. the group dynamics strengthen the risk attitudes of the group members. Group polarization may occur when assessing risk scenarios in risk workshops. Groups tend to make extreme judgments during such workshops. This is particularly the case if the persons involved hold similar opinions before the meeting starts (Moscovici and Zavalloni 1969, pp. 125–135). If, for example, individual group members are not very risk-averse in their attitude prior to a risk workshop, group thinking can result in the whole group being too extremely risk-averse. If many individuals classify a risk as high before a group discussion, this can lead to an even higher assessment of the risk through the group discussion. Thus, there is the danger of under- and overestimation of risks through group discussions (Lermer et al. 2014, pp. 3–4).

Example

One of the main causes of the Challenger Space Shuttle disaster in January 1986 is considered the phenomenon of group thinking, particularly the illusion of unanimity. The latter means that the group decision corresponds to the majority view. When such cognitive distortion occurs, it is assumed that the majority of opinions and individual judgements are unanimous. Group thinking results from the confirmation heuristic and is explained by the following three characteristics: overestimation of the group, narrow-mindedness, and pressure to conform. These characteristics can distort the group's decision in the wrong direction.

Although the manufacturer of the O-ring (part of the Space Shuttle) has identified the risk of the O-ring malfunctioning in extreme cold, the manufacturer agreed to launch the Challenger Space Shuttle due to group thinking. Factors contributing to this irrational behaviour include in particular direct pressure on dissidents (group members are under social pressure not to contradict the group consensus), self-censorship (doubts and deviations from the perceived group consensus are not accepted) and the illusion of unanimity.

During the occurrence of the Challenger Space Shuttle disaster, the group as a whole did not consider the manufacturer's opinion that the O-ring could not function properly in a very cold environment and did not conduct a full analysis of this opinion. This eventually led to the critical disaster (Murata 2017, p. 400).

Polarization occurs because group members try to reinforce each other's judgements and suggestions. For example, one group member may propose a risky strategy. Other group members confirm why this would be a good idea. This can lead to increased risk appetite because the arguments are mutually confirmed and the members feel comfortable with even more risk. In this case, the group accepts more risk than the individual would (Stangor 2014). Finally, a group member often only discloses information if it supports the direction in which the group is moving about certain risk scenarios. This then leads

to the confirmation of others in the group. Information that runs counter to this direction is withheld. The same applies to information that makes the discloser appear in a less favourable light (Shefrin 2016, p. 65).

To reduce the group thinking bias, risk managers should look for different personalities in a risk workshop and establish a climate where group members know why it is important to question risks and opportunities. It is also important that all group members follow certain rules to ensure a fair exchange of ideas and assessments. To achieve this, groups should be kept small (5–8 participants). It is also advisable to let the group members speak first, not an authority person. This also includes reducing power imbalances, i.e. working with flat hierarchies in these teams. In this respect, it is advisable to provide channels for anonymous feedback. In this way, individual members who recognise the overconfidence but do not dare to express themselves critically can express their opinion anonymously. Otherwise, there would be a danger that the group would portray them as moaners and whingers. An also effective measure is to invite people from other departments in risk management workshops or risk committees, especially those affected by decisions (Shefrin 2016, pp. 64–65).

Within the scope of risk identification, it should be noted that risks and then opportunities are first discussed within the group. In reverse order, there is a danger that the opportunities overshadow the potential risks and are therefore discussed too less critically. In group situations, it can be helpful to define a person as an advocate whose task it is to challenge assumptions critically, including individual opportunities identified by the organisation. With regard to the negative effects mentioned, it must be taken into account that team decisions reflect the creativity of a large number of people and are generally highly accepted (Shefrin 2016, p. 65).

2.3.4 Hidden Profile

If risks are identified in groups, group-specific factors can distort the ERM process. Among other things, groups rarely manage to exchange all available and relevant information on risks. This particularly affects information known only to individuals (Lermer et al. 2014, p. 2). This phenomenon is discussed under the term hidden profile and is based on the investigations of Stasser and Titus (1985). The two researchers formed groups consisting of four students and gave the individual students convergent and divergent information. The students were to arrive at a correct result in groups of four with the help of the information received. However, this was only possible if all students shared all the information they received with the group. Though, most groups could not solve the hidden profile. Convergent information was exchanged and discussed. However, divergent information often remained unmentioned (pp. 1467–1478). This phenomenon has been reproduced in various other studies.

Moskaliuk (2013) describes various strategies to reduce this bias. Four of them are listed below:

- Being aware of this bias as a risk manager: This creates the basic prerequisites for specifically avoiding the phenomenon of hidden profiles.
- Avoid hierarchies: Especially people with low status tend to withhold their expertise. People with high status should thus first hold back with their own assessments in order to give all participants opportunities to share their views with the group.
- Search and collect first, then evaluate information: This prevents information that might be significant from being devalued directly.
- Making the expertise of those involved transparent: This makes it clear that different opinions can be expected on the basis of their specialist knowledge. In addition, the individual participants can be asked directly about their expert assessments.

The first point is basically applicable to all psychological factors mentioned. Just as risks need to be known in order to be managed, ERM specialists should be aware of psychological factors in order to reduce them. It is important to note that discussion and group leaders in particular should become aware of psychological factors. Because of their role, they have the necessary skills and power to steer the group in a goal-oriented manner. Furthermore, the strategy of avoiding hierarchies can also be transferred to the other group-specific biases (Scherrer 2018).

The third point tends to be present in ERM if the individual process steps are consistently carried out separately. If risk identification and risk assessment are carried out together, cognitive biases, which tend to occur in both process steps, are also effective. This prevents adequate identification and would consequently reduce the quality of the entire process. It is thus better to first identify risks with a conscious management of cognitive biases and only in a next step—which may even take place on another day—to consciously assess the identified risks again. The last point suggested by Moskaliuk (2013) can be considered as a specific measure to counter hidden profiles (Scherrer 2018).

2.3.5 Social Loafing

Lermer et al. (2014) describe that groups are less creative than individuals in identifying risks. Thus, risk identification in groups is not necessarily advantageous (p. 1). A possible explanation for diminishing creativity is the Ringelmann effect or social loafing. Ringelmann discovered that the average pulling force of a person during tug-of-war decreases proportionally the more people are involved in the pull. However, this effect could not only be proven in tug-of-war, but also in mental work activities (Leitl 2007). This is a kind of motivation deficit, which occurs above all when the performance of individuals is not apparent.

It is important to remember that social loafing does not always happen. For example, Karau and Williams (1997) found that social loafing did not occur for a cohesive group. Moreover, the results of their second study suggest that people can actually make greater efforts when working with low-performing employees (a social compensation effect).

According to Dobelli (2018), individual benefits should be made visible in order to reduce social loafing (p. 139). This can be done using various methods. With regard to risk identification, Lermer et al. (2014) recommend that brainstorming be dispensed with in the group and that brainwriting be used instead. Possible risks are noted in writing by the individual experts. In order to avoid the negative group effect as far as possible, they recommend that the group context be avoided altogether. This means that the experts involved in brainwriting neither meet the other experts surveyed nor present their results to a group. They also recommend using a network of individual experts for risk identification, whose results are collected centrally and, if necessary, played back individually to the experts (pp. 2–3).

As you have learned, the landscape associated with ERM processes is burdened with psychological landmines. Even risk perceptions and expert assessments are susceptible to a wide range of psychological influences. The above mentioned concepts are in the spotlight of every risk assessment. Some biases overlap in certain aspects because they address similar problems. Reducing some cognitive biases require the inclusion of a group, whereas group situations can in turn be associated with numerous own biases. Reducing susceptibility to biases is therefore a recurring task. In particular, the reduction of biases in group work can only succeed in a suitable social environment, meaning that the risk culture must also be addressed (Shefrin 2016, pp. 68–69).

Key Aspects to Remember

Know the different biases in risk analysis

Throughout the whole ERM process, it is important to note that many risks do not manifest themselves by exogenous events, but rather by people's behaviour and choices. Basically, the following three categories of biases can be identified: Motivational, cognitive and group-specific biases. Especially in the case of cognitive biases, we are usually not aware of many thinking errors and they can only be identified by an in-depth analysis and corresponding skills of risk managers and decision-makers.

Understand the importance of biases for risk analysis

Biases are an important topic for risk analysis because systematic errors are made in the risk identification and risk assessment of risks. Knowledge of biases and the measures taken to reduce them can help companies to carry out a more objective

risk analysis. Most importantly, errors in risk identification due to biases can negatively affect the whole ERM process.

Recognise the need to mitigate biases throughout the risk process

The mitigation of biases is an important issue. This can take place at various points in the assessment and decision-making process. One of the most important measures is to reduce cognitive errors by making concrete examples of biases available to risk owners and management. In addition, the involvement of several perspectives or experts is often recommended. Finally, it can help to impart basic statistical knowledge to employees.

Be familiar with limitations of biases mitigation

Not all biases can be eliminated. Every day people are confronted with possible thinking traps and they cannot always be resolved without contradiction. There are also scenarios in which biases can be revealed through group discussion, but at the same time new biases are created by the group itself. Thus, a cost-benefit analysis should also be carried out with regard to the reduction of biases.

Have some easy to understand examples for your employees ready

Theoretical knowledge of biases is merely the basis for recognizing biases in complex practical situations. Companies are well advised to disclose identified or committed errors of thought to a broad circle of decision-makers. This is the only way to improve decision quality. Ultimately, it helps if the risk manager can show some biases using concrete examples. Using past decision processes documented for example in risk management workshops, the risk manager can plausibly demonstrate how such biases have influenced decisions about risks.

Critical Thinking Questions

1. To what extent do motivational biases differ from cognitive biases?
2. What general measures can companies take to reduce cognitive biases?
3. Under what conditions are group decisions preferable to individual decisions?
4. How can the concept of “six thinking hats” help to identify and avoid group-specific biases?
5. What role can a positive risk culture play in reducing cognitive biases?

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