When you ask each spouse of a married couple to estimate the percentage of their own contribution to the housework, chances are high that each spouse overestimates their own contribution so that the sum exceeds 100%. People normally overestimate their own contribution to the joint product of a group. Ross and Sicoly (1979) found this effect in naturally occurring discussion groups, basketball players, groups assembled in the laboratory, and married couples. Why do individuals overestimate their contribution to a joint product? One explanation would be that they are motivated to see themselves in a positive light. It is, however, possible that cognitive processes alone, without involvement of motivational processes, account for the observed overestimation. Let us take a closer look at the married couple. If the husband is asked about his contribution to the housework, he retrieves relevant information. He recalls instances of preparing meals and cleaning the house. Moreover, he recalls instances of his wife doing the same work. However, this retrieval is biased: He is better at retrieving instances of his own housework than instances of his wife’s work. He remembers in some detail how he prepared a tiramisu. He may have forgotten, however, that his wife prepared paella, which takes about the same time and effort. Even if he remembers the paella, his memories of his own efforts expended on the tiramisu are probably more vivid than the memories of his wife’s work. Other instances are remembered in an analogous way so that, in general, he remembers more easily instances of his own contribution to the housework than of his wife’s contribution. If he now has to estimate his own contribution, he compares the ease with which he can retrieve instances of his own work with the ease with which he can retrieve instances of his wife’s work. As he can more easily remember his own contributions, he overestimates his share of the housework. Of course, his wife proceeds in the same manner, with the consequence that she can retrieve instances of her housework with greater ease; this results in an overestimation of her contribution.

The mechanism leading to these overestimations might be “availability”. This is one of the famous heuristics proposed by Tversky and Kahneman (1973), along with the representativeness heuristic (see Chapter 12 in this volume) and anchoring and adjustment (see Chapter 13). Text box 11.1 provides a definition of availability.
Text box 11.1 Definition of availability

Availability is the ease with which relevant instances of a class (in our example housework) come to mind (Tversky & Kahneman, 1973). Alternative terms to “availability” have been proposed. Higgins (1996), for example, distinguished between availability and accessibility in accordance with Tulving, who used “the term ‘availability’ to refer to the hypothetical presence of information in the memory store […] That part of the available information that could be recalled was said to be accessible” (Tulving, 1983, p. 203). Note that these authors used the term availability differently from the way Tversky and Kahneman (1973) used it. In this chapter, we use the term “availability” as a general heuristic relying on ease or amount of recall, and the term ease of recall when discussing the specific mechanisms behind the availability heuristic. Later researchers used the term retrieval fluency, clarifying that ease of processing is the mechanism underlying the availability heuristic (e.g., Benjamin et al., 1998; Hertwig et al., 2008).

Let us apply the term availability to our example: Both the husband and his wife overestimate their own contribution to the housework because information about their own contribution is more available than information about their spouse’s contribution. As they are unable to come to an objective assessment of the proportion of housework that each of them has contributed, they use the availability of information as a heuristic for their estimate.

Overestimation of one’s contribution to the joint products of a group has been only one of many applications of the availability heuristic. Although availability is often a valid cue to frequencies in the environment, it sometimes causes biased estimates. In this chapter, we first describe two of the experiments from the classical paper of Tversky and Kahneman (1973). We then turn to some early applications of the availability heuristic, such as overestimation of the frequency of sensational events and the effects of vividness of information, before discussing some studies that explore mental mechanisms behind availability.

Two basic experiments

We start with summarizing two classical studies from Tversky and Kahneman’s (1973) seminal paper and then turn to adaptations of the studies for classroom demonstrations.

Experiment 1: The famous-names experiment

The basic idea of Tversky and Kahneman’s (1973, Exp. 8) famous-names experiment was to show that estimates of frequency of occurrence depend on availability (see Text box 11.2 for a classroom demonstration).

Method

Participants were presented with a tape-recorded list of 39 names, at a rate of two seconds per name. The independent variable, manipulated within participants, was fame of the names. Some names were famous (e.g., Richard Nixon, Elizabeth Taylor), others less famous (e.g., William Fulbright, Lana Turner). Some participants heard names of public...
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figures (e.g., Richard Nixon, William Fulbright), others of entertainers (e.g., Elizabeth Taylor, Lana Turner). In one group, 19 of these names were of famous women and the remaining 20 of less famous men. In the other group, 19 names were of famous men and the remaining 20 of less famous women. Note that non-famous names always outnumbered famous names. There were two dependent variables: (a) After listening to the recordings, about half of the participants had to recall as many names as possible; this measure indicated the availability with which an instance could be recalled. Participants were assumed to represent famous names more vividly than non-famous names and therefore to recall the former more readily than the latter. (b) The other participants had to judge whether the list contained more names of men or of women. If people use the availability heuristic, they are expected to judge that there are more instances with famous names even though non-famous names outnumbered less famous names. If 19 famous women and 20 less famous men were shown, participants were expected to judge that there were more women in the list. In contrast, if 19 famous men and 20 less famous women were presented, participants were expected to judge that more men were shown.

Results

The results were clear-cut: Those participants who had to recall as many names as possible recalled 12.3 of the 19 famous names and 8.4 of the 20 less famous names. Of 86 participants in the recall condition, 57 recalled more famous than less famous names; only 13 recalled fewer famous names than less famous names. A sign test revealed that this difference was significant. Among the 99 participants who compared the frequency of men and women in the list, 80 erroneously believed that the gender consisting of the more famous names occurred more frequently. Again, a sign test revealed that this difference was significant. The authors concluded that the participants used the availability heuristic because they recalled more famous names and they judged famous names as occurring more frequently on the list.

Text box 11.2 Classroom demonstration of Experiment 1

This is an easy experiment that always worked as a classroom demonstration; even with small sample sizes of 20 to 30 students, the result was numerically in the right direction. The design of the experiment can be simplified. Here is the recipe: Compile a list of nine famous women and ten less famous men, or vice versa. Update the list after a few years because some less famous people rise to stardom and some famous ones sink into oblivion. Present the list for about one minute – enough to read all names once. Then ask the participants whether there were more men or women in the list. The independent variable is fame, the dependent variable the estimated prevalence of female versus male names. Simply count how many participants chose the gender with the famous and the non-famous names, respectively, and assess the outcome by a sign test.

The idea behind the other part of the experiment – the recall of names – is to check whether famous names are indeed more readily recalled than less famous names. As we will see later, however, number of recalled names is not necessarily a good indicator of ease of recall and can be omitted in the classroom demonstration.
Experiment 2: The letter-frequency experiment

Another classical experiment instructs participants to judge letter frequency (Tversky & Kahneman, 1973, Exp. 3). A classroom adaptation of this experiment can be found in Text box 11.3.

Method

Participants of this study were given the following instructions (Tversky & Kahneman, 1973, pp. 211–212):

The frequency of appearance of letters in the English language was studied. A typical text was selected, and the relative frequency with which various letters of the alphabet appeared in the first and third positions in words was recorded. Words of less than three letters were excluded from the count.

You will be given several letters of the alphabet, and you will be asked to judge whether these letters appear more often in the first or in the third position, and to estimate the ratio of the frequency with which they appear in these positions.

The authors assessed two dependent variables: First, participants were asked whether a certain letter, for example, R, is more likely to appear in the first or in the third position. The participants had to mark the correct answer. Second, they were asked to estimate the ratio of these two values, in our example Rs in the first position divided by Rs in the third position. In their original study, the authors used five letters, K, L, N, R, and V, all of them occurring more frequently in the third than in the first letter position in English words. There was no manipulation of an independent variable; the authors were interested in the question whether participants judged these letters to appear more frequently in the first position even though all of them were more frequent in the third position in English language.

Results

As it is easier to retrieve letters in the first position than letters in the third position, the majority of participants judged the first position to be more likely for the majority of letters: From 152 participants, 105 judged the first position to be more likely for the presented letters, and 47 judged the third position to be more likely for the letters. The authors employed a sign test and found a significant preference for the first letter position. Moreover, each of the five letters was judged to be more frequent in the first rather than in the third position, with a median ratio of about 2:1, even though each letter was more frequent in the third position.

Text box 11.3 Classroom demonstration of Experiment 2

For a classroom demonstration, you may choose an uneven number of consonants that in your language is more frequent in the third than in the first position. Ask the respondents to indicate for each of these letters – shown one by one – whether it is more frequent in the first position or in the third position. The independent variable is the objective letter position (first versus third; this manipulation was not
included in the original experiments), the dependent variable is the judgment of the perceived letter position (first versus third). Simply count how many respondents chose the first and how many chose the third position for the majority of letters. The original experiment should replicate that it is easier to recall letters at the first position and participants therefore overestimate the number of letters in the first position, compared to the third position. More participants may judge that there are more letters in the first position rather than the third position, but this result is unlikely to be significant with a sign test in small classes of less than 30.

We now turn to an overview on research on the availability heuristic that is partitioned into two sections: First, we review early research that applied the concept of availability before turning to more recent discussions of mechanisms underlying the availability heuristic. For a discussion of the difference between availability and representativeness, see Text box 11.4.

**Text box 11.4 What is the difference between availability and representativeness?**

Heuristics have been criticized for being unspecified processes where one heuristic can be said to explain a biased answer as easily as another heuristic (Gigerenzer, 1998). It is not easy to distinguish between the two heuristics because we cannot directly observe the underlying cognitive processes. The availability heuristic relies on the ease with which relevant instances of a class come to mind; the representativeness heuristic relies on the similarity of an instance to its class or category (Chapter 12 in this volume). In order to explore the difference between the use of the two heuristics, Braga et al. (2018) conducted a study in which they presented letter strings that either appeared to be a randomly generated string (e.g., HHTHTTHT) or to include a streak at the end (e.g., HHTTTTTT). In our example, people will typically predict that after six Ts in a row, an H will appear. This is the so-called gambler’s fallacy that relies on the representativeness heuristic because the streak is not representative for a randomly generated letter string. This change from the last letter in the string to the predicted letter (from T to H) cannot be explained by the availability heuristic because the most available letter – the one that comes to mind most easily – is the last letter in the sequence, especially after a streak. In our example, participants using the representativeness heuristic would predict H, especially after seeing six Ts but participants using the availability heuristic would choose T, again especially after the streak of Ts.

Braga et al. (2018) exploited one characteristic difference between the two heuristics. As the representativeness heuristic is more abstract and includes more complex cognitive processes than the availability heuristic, they expected and found that participants use the representativeness heuristic only when they have sufficient time. In this case, participants switched the letter after a streak, committing the gambler’s fallacy. However, under time pressure, participants more probably predicted that the last letter would appear again than when they had enough time; they used the availability heuristic. This result supported the notion that the two heuristics can be distinguished and that their underlying cognitive processes differ.
Applications of the availability heuristic

The judgments in the examples above (letter frequency) are frequency judgments. Some studies show that people’s ability to recall how often events occur is surprisingly good and differs from other memory processes in being largely automatic (e.g., Zacks & Hasher, 2002). Individuals usually have to make a deliberate effort to remember newly introduced people’s names or to get what they need from the supermarket. However, for recalling frequencies, deliberate effort does not increase performance, nor is there much effect of training that typically improves performance on other memory tasks. So why are people’s frequency judgments sometimes wrong?

To answer this question, we review first how biased encoding and retrieval influence availability of information, then vividness as a basis of availability of information, and the role of perspective taking for availability. Perspective taking is an instructive example of how both retrieval processes and vividness jointly contribute to availability.

Biased encoding and retrieval of information

Many people are afraid of becoming a victim of a crime, often more than is justified by official crime statistics. One possibility is that more crimes are committed than revealed in official statistics. Alternatively, people may overestimate the prevalence of violent crimes because these are exhaustively covered and sensationalized by the media. Due to high media coverage, violent crimes become more available in memory, and their frequency is thus overestimated. Lichtenstein et al. (1978) examined this assumption in a study about judging the frequency of lethal events.

They chose 41 causes of death that varied widely in frequency. It is very uncommon to die from botulism, whereas stroke is one of the more frequent causes of death. Some causes were natural, for example, stomach cancer, whereas others were unnatural, such as homicide. The authors predicted that unnatural causes with high media coverage were judged to be more frequent than quiet killers like stomach cancer. Their findings matched their predictions: Although stomach cancer is more than five times more frequent than homicide, participants estimated that homicide is about 1.6 times more frequent than stomach cancer. Moreover, media coverage was high for homicides, but zero for stomach cancer, and media coverage predicted the frequency estimates of causes of death. The authors concluded that estimates of frequency of lethal events are based on high availability of vivid or sensational events. Indeed, among the most overestimated causes were sensational events like tornado, flood, homicide, and motor vehicle accidents. Most causes of death that were underestimated were those not much covered by the media, like asthma, tuberculosis, diabetes, stomach cancer, and heart disease.

Despite claims that we are rather good at tracking frequencies, we make mistakes in a systematic manner because of biased encoding and retrieval. Another way to think about this is Hogarth et al.’s (2015) concept of kind versus wicked environments. In kind environments, implicitly processed information leads to valid inferences, and thus correct judgments. Wicked environments, on the other hand, are environments where samples of experience are not representative, which in turn leads to incorrect judgments. Though people may process the data they see appropriately, they lack the metacognitive ability to correct for biases in the environment. For example, the choice of stimuli used in the original letter-experiment by Tversky and Kahneman (1973) might reveal the effects of a wicked environment because the letters K, L, N, R, and V differ from most other
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consonants which occur more frequently in the first position. By contrast, the letters K, L, N, R, and V occur more frequently in the third position (Gigerenzer & Brighton, 2009). Indeed, when Sedlmeier et al. (1998) conducted the same experiment with German letters that were more representative of the distribution of letters in the German language, they did not obtain biased estimates. This does not invalidate the availability heuristic, but its use may be more likely to bias estimates in wicked environments. We reviewed evidence of biased retrieval of frequencies. Another source of availability is vividness of information.

Vividness of information

Estimations of frequency of lethal events are biased because of the disproportionate media coverage of some sensational, but relatively infrequent events. Thus, two independent features of the information may cause the increase in availability of homicide compared to stomach cancer: Homicides may be more available because instances of death from homicide are covered more frequently in the media than instances of death from stomach cancer, as discussed above. Alternatively, homicides can be more available even if not encountered more frequently than stomach cancer because people can imagine violent crimes more vividly than quiet killers. Therefore, frequency of public coverage of an event and its vividness need to be manipulated independently.

Reyes et al. (1980) showed that vividness of presented evidence from a trial affected both its retention and judgments of guilt after a 48-hour delay. The authors presented nine pieces of evidence from the prosecution and nine pieces of evidence from the defense, but for some participants, only the prosecution evidence was vivid, while for the other participants, only the defense evidence was vivid. For example, the pallid prosecution version was: “On his way out the door, Sanders [the defendant] staggered against a serving table, knocking a bowl to the floor.” The vivid version read: “On his way out the door, Sanders staggered against a serving table, knocking a bowl of guacamole dip to the floor and splattering guacamole on the white shag carpet.” The participants remembered more evidence of the prosecution and gave higher judgments of the defendant’s guilt when the prosecution presented the vivid evidence. In contrast, the participants remembered more evidence of the defense and gave lower judgments of the defendant’s guilt when the defense presented vivid evidence. This finding suggests that vividness and imaginability of an instance increase availability of the respective category that in turn increases judged frequency (or, in this experiment, judged probability) of occurrence of instances of the category.

There are many examples that vivid cases weigh more than pallid data summaries (see Nisbett & Ross, 1980). For example, in the 20 years after the US Surgeon General published a report that linked cigarette smoking to lung cancer, no decline in average cigarette consumption was observed. There was one exception: Physicians, especially radiologists. The probability that a physician smokes is directly related to the distance of a physician’s specialty from lung disease. It seems that those who diagnose and treat lung cancer daily have vivid illustrations of the dangers of cigarette smoking, while other people just see statistics that do not activate their imagination.

Adopting the perspective of others

If a husband thinks about how much housework his wife does, he has to adopt her perspective. As he does not see all the housework she does, he can try to think as if he were
his wife and then estimate her contribution to joint outcomes. As we have already seen, adopting the other’s perspective seems to be difficult, as suggested by the fact that spouses overestimate their own contribution to the housework. Both retrieval biases and vividness may contribute to the resulting bias: When estimating the share of the housework, people probably retrieve more instances and have more vivid memories of their own housework than of the spouse’s housework. Another well-known phenomenon that can at least partly be explained by the availability heuristic is unrealistic optimism (Weinstein, 1980). When people judge the chances that positive or negative life events happen to them, they believe they have higher chances than their classmates to experience positive events and lower chances to experience negative events (cf. Chapter 8 on the illusion of control). Of course, the average chances to experience positive or negative events should equal the chances of the whole group. Therefore, the optimism revealed in Weinstein’s study is unrealistic. Among several mechanisms that contribute to this illusion, one is availability that may come into play in two ways: One factor that influences risk assessments is one’s own experience. If one has experienced heart disease in his or her family, the risk of heart disease is more available than for someone who has no family history of heart disease. A second factor may be people’s difficulties to adopt the perspective of others, comparable to the married partners who overestimated their share of the housework (Ross & Sicoly, 1979). Individuals see their own actions that increase the probabilities of positive outcomes and decrease their probabilities of negative outcomes, but not what others do. If people assess their chances, they may see reasons for why they have better chances, but they may not understand that others also think about such reasons and may arrive at similar conclusions. Therefore, people perceive a difference in chances between themselves and others.

**Interim summary**

So far, we have discussed how biased encoding and retrieval, or vividness of information has an impact on the availability of information that, in turn, may influence frequency estimates or judgments of apparent guilt. The lack of ability to adopt another’s perspective normally results in both more frequent encoding and more vivid memories of one’s own actions, leading to overestimation of one’s contribution to joint products.

Availability has been a very popular theoretical framework to explain different phenomena. Part of this appeal, some critics stated, has come from the vagueness of the term availability (e.g., Betsch & Pohl, 2002): It has been used in a very broad sense, and no process was specified that is unique to availability. It was unclear, for example, whether availability was tied to ease of recall or to amount of recall. Research by Norbert Schwarz and his colleagues addressed this issue (see Schwarz, 1998).

**Availability: ease or amount of recall?**

Let us take a closer look at the first of the two basic experiments described above. Tversky and Kahneman (1973) found that people recalled more famous names and judged famous names to be presented more frequently. For example, if names of 19 famous women and 20 non-famous men were presented, participants responded that more women were in the list. The authors concluded that people used availability – the ease with which they were able to bring instances to mind – as information to judge whether names of men or women were presented more frequently. Note that there is an inherent ambiguity to
this finding: When famous names are more available, people can both retrieve them more easily and retrieve more of them. Ease of recall and amount of recall were confounded in this experiment. Thus, there are two alternative possibilities how people can arrive at the conclusion that names of (famous) women were more frequent than (non-famous) men: First, they may have recalled the famous women more easily than the non-famous men, concluding that if it so easy to recall names of women, there must have been more of them in the list. Alternatively, they might simply have recalled more names of women than of men. From the fact that they have recalled more female names, they may conclude that there must have been more female names in the list. There is no way to resolve this ambiguity in the original experiments by Tversky and Kahneman.

How can this ambiguity be resolved? Schwarz et al. (1991) used an experimental paradigm that separated ease of recall from amount of recall. They asked participants to list six or twelve instances where they behaved self-assertively. In pilot studies, these authors had found that it is relatively easy to recall six instances of self-assertive behaviors, but it is quite difficult to recall twelve such instances. After the participants recalled these behaviors, they were asked how assertive they are. If people base their judgment of self-assertiveness on the experienced ease of recall, rated assertiveness is expected to be higher after recalling six behaviors than after recalling twelve behaviors. In contrast, if people base their judgment on amount of recall, those who recall twelve assertive behaviors should judge themselves as being more assertive than those who recall six behaviors. The results supported the ease of recall view: Participants who listed six behaviors judged themselves to be more assertive than those who listed twelve behaviors. In other experimental conditions, the authors assessed the judgment of assertiveness after participants listed six or twelve instances of unassertive behaviors. The participants again based their judgments on ease of recall and judged themselves to be less assertive after recalling six rather than twelve behaviors. If it was easy to recall six unassertive behaviors, I cannot be assertive after all. The difficulty to recall twelve unassertive behaviors, in contrast, seems to indicate that I am rather assertive.

In the study by Schwarz et al. (1991), availability was related to ease of recall, not to amount of recall. However, do people always base their judgments on ease of recall, or are there instances where availability is better captured in terms of amount of recall? A recent meta-analysis found that the impact of feelings of ease of recall on judgment has a medium effect size. Moreover, the findings suggest that variables other than ease of retrieval influence the judgments (Weingarten & Hutchinson, 2018). Ease of retrieval includes ease of recall and ease of other kinds of memory retrieval but, mostly, ease of recall is manipulated.

Several variables have been found to affect the role of ease of recall, among them the diagnosticity of the recall experience; its representativeness towards the target; its relevance for the judgment; the malleability of the judgment; and processing motivation and opportunity (for reviews, see Greifeneder et al., 2011; Schwarz, 1998, 2004; Weingarten & Hutchinson, 2018). We will discuss these variables in the next sections.

Is the recall experience diagnostic?

Imagine that a participant has recalled six examples of behavior where she behaved assertively. She now concludes from the ease with which she was able to recall these behaviors that she must be self-assertive. In a slightly different set-up, a participant in the same experiment listens to music, a meditational piece at half speed. He is told that this music
facilitates the recall of self-assertive behaviors. After recalling six instances, he has to judge how assertive he is. What is the difference to the condition without music? The difference lies in the diagnosticity of the recall experience: The participant in the condition without music normally bases her judgment on ease of recall because she believes that ease of recall tells her something about her assertiveness. The participant who hears music experiences the same amount of ease of recall when he recalls instances of self-assertive behavior, but he believes that the experience of ease is caused by the music. Therefore, he has no reason to base his judgment of assertiveness on the experienced ease of recall. Ease of recall is considered to be undiagnostic as information for judging self-assertiveness. Another participant has to recall six behaviors and hears music, but she is told that music inhibits the recall of examples. It is easy to recall six instances of self-assertive behavior, but the music is supposed to make recall difficult. This participant has reason to argue that if it is easy to recall instances of self-assertive behavior despite the inhibiting influence of music, she must be highly assertive. In this case, ease of recall is considered as being diagnostic information for self-assertiveness. Schwarz et al. (1991) tested this assumption experimentally and indeed found that people used their recall experience only if it was diagnostic or even surprising (see Wänke & Hansen, 2015). If the informational value of the recall experience was undermined because participants could attribute these feelings to the music played to them, they no longer relied on their recall experiences. A naïve theory about the source of the feeling which is perceived as unrelated to the judgment renders the feeling non-diagnostic.

However, naïve theories can also serve as an explanation for the meaning of the feelings which in some circumstances influence the judgment. For example, Winkielman and Schwarz (2001) showed that the same experience of ease or difficulty in recalling childhood events can lead to opposite judgments, depending on participants’ naïve theory about the meaning of the subjective experience. Specifically, these researchers first manipulated the recall experience by asking participants to recall few or many childhood events. Then, they manipulated participants’ naïve theories about the reason for their specific recall experiences. They told one group of participants that recall can be difficult because pleasant childhood events fade from memory; and another group that recall can be difficult because unpleasant childhood events fade from memory. As expected, participants reached opposite conclusions about their childhood happiness when the same recall experience was suggested to have different causes: Participants who experienced easy recall and believed that recall difficulty indicated an unpleasant childhood judged their childhood as more pleasant than those with easy recall and the belief that recall difficulty indicated a pleasant childhood. When recall was difficult, participants who believed that recall difficulty indicated a pleasant childhood judged their childhood to be more pleasant than those who believed that recall difficulty is caused by an unpleasant childhood. These findings show that people use their naïve beliefs to interpret their processing experiences.

Representativeness of the feelings towards the retrieval target

You are more likely to rely on your feelings in judgments when you think that the feelings originate from the target and reflect its essential characteristics (Weingarten & Hutchinson, 2018). One example is that you are more likely to display an ease of retrieval effect when making judgments about yourself versus others, or your ingroup versus an outgroup. For example, participants were asked to recall either two or six instances of when they had been creative. Participants who experienced greater ease of recall (two
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instances) judged ingroup members to be more creative than outgroup members (Woltin et al., 2014).

The relevance of the feeling for the judgment at hand

The use of feelings as information becomes more likely if they are seen as relevant for the judgment, and their use depends on both dispositional characteristics and contextual factors (see Greifeneder et al., 2011). In a study exploring dispositional characteristics, experts (car mechanics) and non-experts (holders of a driver’s license) had to list few or many causes for car breakdowns. When they had to estimate the frequency of car breakdowns, lay people but not experts were influenced by ease of recall (Ofir, 2000). Similarly, people’s belief in the power of intuition increases the reliance on feelings (Keller & Bless, 2009), and powerful individuals rely more on recall experiences than less powerful individuals, presumably because people in power can feel free to make judgments based on feelings while individuals who lack power need to pay attention to multiple social cues in order to get along with those in power (Weick & Guinote, 2008). An example of a contextual factor is mood. People are more likely to rely on their recall experiences and to make fast evaluations when they are in a positive mood (Ruder & Bless, 2003).

The malleability of the judgment

Another moderator is the malleability of the judgment. Individuals with strong preexisting attitudes towards the topic are less likely to be influenced by feelings. Let us assume that the recall experience is both informative for the target stimulus and relevant for the judgment at hand, but people might still not use the experience because they use a different criterion. One example is the direct access of a judgment in memory so that it is no longer malleable, and experiences play a minor role.

When people can access a judgment directly, they do not need to rely on recall experiences. For example, people who have thought much about doctor-assisted suicide and are extremely in favor or against it do not need to inspect their feelings to determine how strong their attitude is; they retrieve this information directly. In line with this reasoning, Haddock et al. (1999) found that ease of recall influenced judgments of the strength of students’ attitude toward doctor-assisted suicide only when the pre-experimentally assessed attitude was not extreme. Those respondents who were strongly in favor or against doctor-assisted suicide did not rely on recall experiences when they judged attitude strength. Processing experiences influenced the participants’ judgments about attitude strength only when attitudes were moderate and direct retrieval of information about attitude strength was not possible.

Processing motivation and processing opportunities

If you have to list behaviors that increase your risk for heart disease and are then asked to estimate your vulnerability for this disease, your personal experiences may affect your judgment. If there is no history of heart disease in your family, it feels less relevant and you probably base your judgment of vulnerability on ease of recall. However, if heart disease has occurred in your family, it might feel more relevant to you and make you more motivated to process this information systematically, for example, by paying attention to the actual number of risk-increasing behaviors you are able to list. Rothman and Schwarz
(1998) explored the consequences of processing motivation by asking participants to list either three or eight behaviors that increased or decreased the risk of heart disease, where about half of the participants had a family history of heart disease, the others had not. Participants without a family history of heart disease based their judgments on ease of recall. They judged themselves to be more vulnerable and thought that they needed more urgently to change their behavior if they had to recall either three rather than eight examples of risk-increasing behaviors or eight rather than three examples of risk-decreasing behaviors. This pattern reversed for participants with a family history of heart disease who instead relied on the amount of information they retrieved. These participants judged themselves to be more vulnerable and thought that there was a higher need to change their behavior if they had to recall eight rather than three examples of risk-increasing behaviors or three rather than eight examples of risk-decreasing behaviors. This study demonstrated the effect of processing motivation on the informational implications of processing experience: Participants without a family history of heart disease had a low motivation to examine the processed information and therefore based their judgments on ease of recall. Participants with a history of heart disease, on the other hand, were highly motivated to monitor how many risk-increasing or risk-decreasing behaviors they could list and based their judgments on amount of recall.

Individuals sometimes do not lack processing motivation but the opportunity to process information deeply. Processing opportunities could be diminished by two variables. The first is lack of information which makes it impossible to process relevant knowledge. The second is lack of cognitive resources. Greifeneder and Bless (2007) induced cognitive load in their study by instructing participants to keep an eight-digit number in mind while they formed their judgment. A control group did not have to keep the number in mind. As predicted, participants used ease of recall as information to make their judgments when they were under cognitive load and did not have sufficient processing opportunities.

From availability to retrieval fluency

The concept of availability has become very popular and went far beyond estimates of frequencies. The experimental paradigm introduced by Schwarz and colleagues (1991) revealed that people rely on ease of retrieval. Several variables have been found to increase the use of ease of recall such as the feelings’ representativeness towards the target; its relevance for the judgment; or the opportunity and motivation to process the judgment. On the other hand, if the feelings can be attributed to some other source (and thus deemed non-diagnostic) or if the judgment lacks malleability, people use amount of information. Tversky and Kahneman (1973) defined availability as the ease with which relevant instances come to mind, which is compatible with findings by Schwarz and colleagues and the more recent concept of retrieval fluency. Nowadays, retrieval fluency is one of several types of processing fluency, which is the experienced ease with which a mental operation is performed (see Reber & Greifeneder, 2017). In other words, the concept of ease of retrieval has been broadened and – together with other cognitive processes, such as perceptual fluency and encoding fluency – been subsumed under the umbrella term processing fluency. For a classification of different types of fluency, see Alter and Oppenheimer (2009). We will now focus on some recent research on retrieval fluency.

Hertwig et al. (2008) tested the use of retrieval fluency as a judgmental heuristic in its own right. Participants in their study had to choose which of two US cities, such as San Antonio or Portland, is largest. When participants recognized both cities, they
indeed chose the city that was easier to recall, as measured by recognition latency. This measure of retrieval fluency indicates the relative familiarity of the two cities which is an automatic process. However, recent research has shown that, although theoretically interesting, it seems that people rarely use the fluency heuristic in such decisions (Pohl et al., 2016).

However, retrieval fluency influences judgments relevant for learning at school, such as feelings of knowing, judgments of learning, and performance estimates (see Reber & Greifeneder, 2017, for a review). Benjamin et al. (1998) examined effects of retrieval fluency on predictions of learning (see Chapter 19 on biases in metacognitive judgments). Participants in their study had to answer general knowledge questions and to predict for each question whether they will later remember the answer. Participants predicted that they would remember answers when they could retrieve them easily, but in fact they remembered answers best when they had difficulties retrieving them, as measured by response latencies. This yields the paradoxical phenomenon that experiencing difficulties when retrieving an answer results in predictions of worse recall when recall in fact is better. Another series of experiments showed that learners use retrieval fluency not only in prospective performance judgments but also in retrospective performance estimates (Reber et al., 2006). In other words, retrieval fluency is not only involved in predicting future performance but also in judging past performance. Similarly, participants had more confidence in solutions to a problem that were easy to retrieve; participants merely inferred from the ease with which they could retrieve a problem’s solution that this solution must be true (Ackerman & Zalmanov, 2012).

How do these findings relate to the frequency judgments assessed in the studies of Tversky and Kahneman (1973) discussed earlier? Can we conclude that their participants estimated the relative frequency of men and women or of word frequencies on the basis of retrieval fluency? The use of the availability heuristic is not the only way people can assess frequency. When people are confronted with low frequencies, they simply try to count (Brown, 1995). If, for example, respondents in a survey are asked how many times they have eaten fancy caviar in the last two years, most of them probably are able to count the frequency of this event. This means that availability – or retrieval fluency – may be used only when frequencies are sufficiently high. The findings that relate retrieval fluency to frequency judgments are mixed. While Schwarz et al. (1991) found by the manipulation of music as the alleged source of fluency that retrieval fluency is related to judged frequency (for similar findings, see Wänke et al., 1995), Sedlmeier et al. (1998) found no evidence for effects of availability on judgments of letter frequencies in German language and concluded that people encode frequency automatically along with information about events. In another study, Reber and Zupanek (2002) manipulated ease of processing at encoding of frequently presented stimulus events and demonstrated an influence of this manipulation on frequency judgments. To sum up, when estimating high frequencies, the evidence suggests that people use the availability heuristic often but not always. However, there is good evidence for the use of retrieval fluency as a cue to inferences, for example in the domain of learning.

Conclusions

We have discussed in some detail whether availability as a judgmental basis is better described in terms of ease of recall or of amount of recall. In sum, participants relied on ease of recall, or retrieval fluency, when they thought that experienced ease was
diagnostic of the recall experience, representative of the target, relevant for the judgment, the judgment was malleable, and they had both the opportunity and motivation to process the judgment.

The seminal paper by Tversky and Kahneman (1973) has opened a new way of thinking about how frequency judgments are performed, and subsequent research has shown the importance of the availability heuristic in different domains. As an important consequence, phenomena that formerly had been discussed in terms of motivational processes now were explained in terms of cognitive mechanisms. After some ambiguities about the mechanisms underlying the availability heuristic had been resolved, research revealed different effects of retrieval fluency, and it is easy to think about new research directions that continue Tversky and Kahneman’s work on the availability heuristic.

Summary

• Availability is the ease with which relevant instances of a class come to mind.
• Sources of biased availability are biased frequencies, vividness of information, and the inability to adopt the perspective of another person.
• Availability affects frequency estimates and various kinds of judgments.
• Recent work disentangled the contributions of ease and amount of recall of instances to judgment formation.
• Whether people use ease or amount of recall as information depends on variables such as the perceived diagnosticity of experienced ease; the feelings’ representativeness towards the target; the relevance of the experience for the judgment; malleability of the judgment; and processing motivation and opportunities.
• Research on retrieval fluency explored effects of feelings relevant to learning at school.

Further reading

The classical piece on this topic is the article by Tversky and Kahneman (1973) that has been cited over 12,000 times to date (source: Google Scholar). We recommend reading some elegant studies into availability, for example, by Lichtenstein et al. (1978), Ross and Sicoly (1979), and Schwarz et al. (1991). Weingarten and Hutchinson (2018) offer a meta-analysis of ease of retrieval effects. For early applications of the availability heuristic, see Nisbett and Ross (1980), for more recent studies, Braga et al. (2018) and Hertwig et al. (2008).

References


