

# Anchoring: accessibility as a cause of judgmental assimilation

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Anchoring denotes assimilation of judgment toward a previously considered value — an anchor. The selective accessibility model argues that anchoring is a result of selective accessibility of information compatible with an anchor. The present review shows the similarities between anchoring and knowledge accessibility effects. Both effects depend on the applicability of the accessible information, which is also used similarly. Furthermore, both knowledge accessibility and anchoring influence the time needed for the judgment and both display temporal robustness. Finally, we offer recent evidence for the selective accessibility model and demonstrate how the model can be applied to reducing the anchoring effect.

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## Anchoring effect

In 1974, Amos Tversky and Daniel Kahneman reported an interesting experimental phenomenon. Participants received a number determined by spinning a wheel of fortune which they were supposed to use in a comparative judgment. Specifically, they had to decide if the proportion of African states in the United Nations was higher or lower than the randomly generated number. The subsequent absolute judgment yielded a surprising result. Participants who had received a lower comparison standard generated a lower absolute judgment than participants with a higher reference point. This assimilation of an absolute judgment toward a previously considered comparison standard was called ‘anchoring’ [1\*].

While this phenomenon proved highly robust [2] and applicable to many judgmental domains, the underlying mechanism was greatly disputed.

## Explanations

### Insufficient adjustment

For Tversky and Kahneman, the observed assimilation effect was the consequence of ‘insufficient adjustment’. Specifically, judges were assumed to use the comparison standard as an ‘anchor’ from which the absolute judgment was adjusted toward the presumably correct value. However, this adjustment was insufficient such that the starting point exerted an effect.

The explanatory power of this account has been questioned. If anchoring was a result of insufficient adjustment, an anchor should not influence the answer to the comparative question. However, it was shown that people are more likely to report that the value in question is more extreme than the anchor than would be expected based on the distribution of absolute judgments of people given no anchor [3].

As a consequence, researchers proposed new accounts that were based on the cognitive consequences of generating a comparative judgment. Specifically, they were based on the accessibility of the information that was activated in the task that preceded the absolute judgment.

### Numeric priming

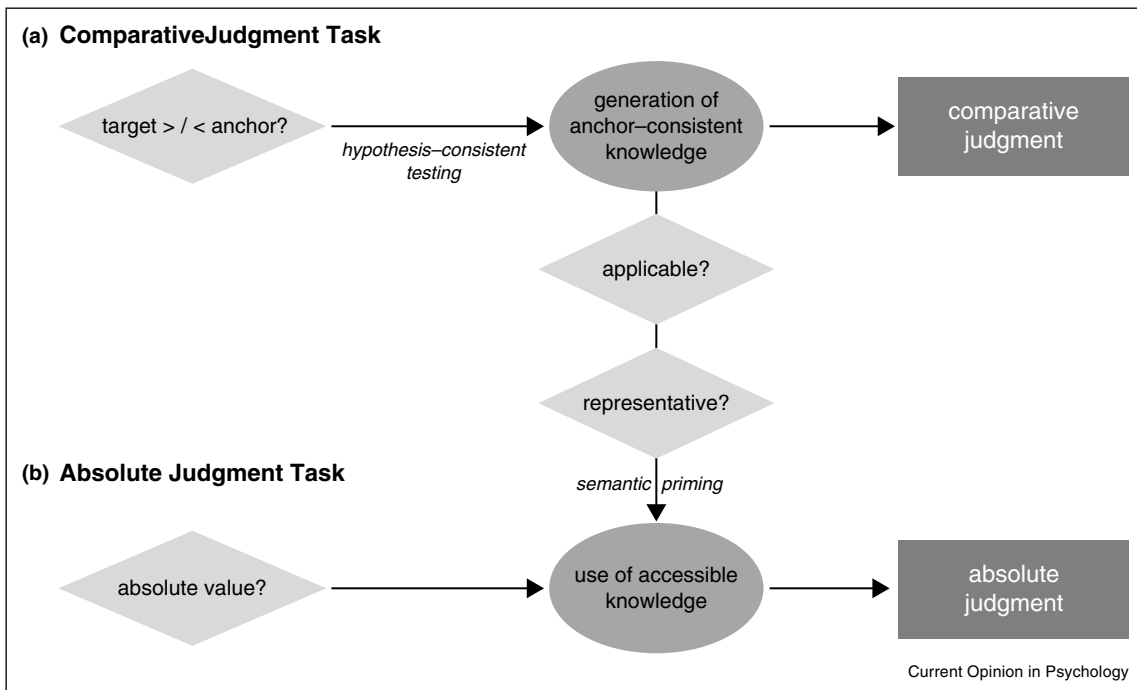
Two types of information were seen as candidates for explaining the anchoring effect. The first was the numeric information that was conveyed by the anchor value. It has been argued that an anchor is superficially represented in short-term memory as an absolute value, which is retrieved when the absolute judgment is generated [4] (see also [3]). As simple and straightforward this ‘numeric priming’ account may appear, it is inconsistent with many findings. In particular, it is difficult to explain why the absolute judgment, although being assimilated toward the anchor, hardly ever assumes its exact value. As a consequence, mere numeric accessibility is rarely sufficient to account for the anchoring effect [5].

### Anchoring as a knowledge accessibility effect (selective accessibility model)

A second type of accessibility is semantic in nature. On the basis of rudimentary mechanisms of cognitive functioning, anchoring was assumed to be the result of *semantic priming* [6]. This assumption gave rise to a more elaborate ‘selective accessibility model’ [7,8\*\*] (see also [9]) that was corroborated in a number of experiments. The operation of the model is illustrated in [Figure 1](#).

The model assumes that to generate a comparative judgment, relevant information needs to be retrieved from

Figure 1



The selective accessibility model (SAM).

memory. At the same time, the provided standard operates like a hypothesis to be tested in a qualified manner. That is, people who were asked if the proportion of African states in the UN is higher or lower than a high anchor of 65 percent are assumed to have tested the possibility that the proportion is 65 percent and then responded by giving the direction in which the retrieved information deviated from the standard. However, research on hypothesis testing has shown that this information search is selective such that hypothesis-consistent information (e.g., 'Many African nations that are members of the UN come easily to mind.') will be more likely to be retrieved than inconsistent information [10]. Even if the hypothesis is rejected, this type of semantic priming will cause the consistent information to remain accessible and enter into the absolute judgment.

### Similarities between anchoring and knowledge accessibility effects

#### Influence of the applicability of accessible knowledge

This conceptualization of anchoring as a knowledge accessibility (i.e., priming) effect is supported by a large body of evidence demonstrating that anchoring effects share many of the qualities that are typical for knowledge-accessibility effects in general (for a review, see [11]). First, anchoring effects usually depend on the *applicability* of the knowledge that was rendered accessible by the comparative task. It has repeatedly been demonstrated that the degree to which increasing the accessibility of a specific concept in a priming task influences a subsequent

judgment depends on how applicable the activated concept is to this judgment [12,13]. In a similar way, the extent of anchoring depends on the degree to which the knowledge that was rendered accessible by the comparative task is applicable to the absolute judgment. For example, comparing the height of the Brandenburg Gate to a given anchor yields stronger effects on absolute estimates of the height of the gate than on estimates of its width [8<sup>\*\*</sup>,14], presumably because the knowledge generated during the comparative task has more direct implications for estimates of height than for estimates of width (i.e., it is more applicable to judgments of height). Thus, anchoring effects seem to depend on the applicability criterion [13] in much the same way as semantic priming effects in general.

#### Use of accessible information

A second link to the priming literature is the similarity in use of the accessible information. Research on the judgmental effects of priming has repeatedly demonstrated that the direction of a priming influence depends on how the accessible knowledge is used during the judgment task [15,16] (for discussions, see [11,17,18]). If an accessible concept is similar to the judgmental target, it is typically used as a basis for the judgment, which leads to assimilation. If, however, an accessible concept differs largely from the target, it will be used as a standard of comparison, which produces a contrast effect. Judgments about the ferocity of a fox, for example, were assimilated to a slightly more ferocious (i.e., similar) animal such as a

wolf, so that the fox was judged to be more ferocious if wolf had previously been primed. However, judgments were contrasted away from an extremely ferocious animal such as a tiger, so that the fox was judged to be less ferocious if tiger had been activated [16]. Similarly, the direction of anchoring effects (i.e., assimilation versus contrast) was found to depend on whether the activated knowledge was similar or largely dissimilar to the target of the absolute question. For example, comparing the mean winter temperature in the Antarctic to a high versus low anchor ( $-20^{\circ}\text{C}$  versus  $-50^{\circ}\text{C}$ ) produced an assimilation effect on absolute judgments of temperatures in the maximally similar Antarctic while the same comparison produced a contrast effect on absolute judgments of temperatures on maximally dissimilar Hawaii [8<sup>\*\*</sup>]. Thus, the direction of anchoring effects appears to depend on the similarity of the activated concept and the judgmental target, just as is true for knowledge-accessibility effects in general.

#### **Influence on time needed to make a judgment**

A third feature that anchoring and knowledge-accessibility effects have in common is that the degree of accessibility of judgment-relevant knowledge determines the time that is needed to make a judgment [6]. This pattern was replicated in the anchoring domain where response latencies for the absolute judgment depended on the extent to which the accessibility of relevant knowledge had been increased during the preceding comparative task [8<sup>\*\*</sup>,19,20<sup>\*\*</sup>,21].

However, different levels of accessibility do not only influence the speed of absolute judgments, but also their content. In particular, larger anchoring effects occur under conditions that promote an extensive generation of anchor-consistent knowledge [9]. Furthermore, judges who generate more anchor-consistent knowledge during the comparative task because they are in a sad mood, which is typically associated with more elaborate processing [22,23], show larger anchoring effects than judges in a neutral mood [24,25].

#### **Robustness**

A final characteristic of knowledge accessibility effects that is shared by anchoring is its temporal robustness. Knowledge accessibility effects are typically long-lasting, provided they are not superimposed by other applicable information [26]. The same temporal robustness also characterizes judgmental anchoring. In particular, it has been demonstrated that anchoring effects still occur if the comparative and absolute questions are separated by one week [27<sup>\*</sup>].

#### **Implications of the selective accessibility model**

The selective accessibility model not only incorporated knowledge accessibility effects to the anchoring literature,

but also led to many testable predictions. Most recently, based on the selective accessibility model, Bahník and Strack [28<sup>\*</sup>] argued that the information activated by a comparative question should influence judgment only if it would not have been used for making the absolute judgment even without the comparative question. Accordingly, they found that a comparison of the average *annual* temperature in New York City with a high anchor does not influence absolute judgment about the average *summer* temperature in New York City, but a comparison with a low anchor does. Presumably, the positive hypothesis testing conducted within the frame of the whole year activated knowledge about summer in the case of the high anchor, and winter in the case of the low anchor. The former information overlapped with information that would have been used making the absolute judgment in any case, and thus did not influence the absolute judgment. Similarly, when the absolute judgment was about the average *winter* temperature, a high anchor influenced the absolute judgment, but a low anchor did not.

The selective accessibility model also implies possible strategies for reducing the anchoring effect. Since positive hypothesis testing leads to activation of the information compatible with the anchor value and this in turn biases the judgment, it is possible to reduce the influence of the anchor by activating information incompatible with the anchor or preventing positive hypothesis testing. The former can be achieved by instruction to actively generate reasons why an anchor is inappropriate [29<sup>\*</sup>]. The latter may result, for example, from a procedural priming task which induces the focus on differences [30] (see also [31]).

#### **Conclusion**

In the present review, we argue that there exists a common basis of knowledge accessibility effects and anchoring. However, this does not mean that all anchoring effects share this underlying mechanism. The term anchoring is used broadly for the assimilation of a judgment toward a previously considered value, and there are various processes that can lead to the same effect under different circumstances (see [32<sup>\*</sup>], for a review).

In summary, this line of research demonstrates how the dynamics of basic cognitive processes can be harnessed to better explain phenomena whose underlying mechanisms have not been sufficiently understood. Applying priming to the anchoring heuristic is a case in point.

#### **Conflict of interest statement**

Nothing declared.

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