

## **CONSIDERING THE IMPOSSIBLE: EXPLAINING THE EFFECTS OF IMPLAUSIBLE ANCHORS**

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Research on judgmental anchoring - the assimilation of a numeric estimate towards a previously considered standard - has demonstrated that implausible anchors produce large effects. We propose an insufficient adjustment plus selective accessibility account for these effects. Specifically, judges may adjust from an implausible anchor until a plausible value for the target is reached and may then test the hypothesis that the target's extension is similar to this value. If this is indeed the case, then differentially extreme implausible anchors should produce similar absolute estimates, because adjustment from any implausible anchor should terminate at the same value. Results of two studies are consistent with this prediction. They show that implausible anchors that differ extremely produce similar absolute estimates. The implications of these findings for alternative models of anchoring are discussed.

Human judgment under uncertainty is often influenced by salient judgmental anchors. In what is probably the best known demonstration of such anchoring effects (Tversky & Kahneman, 1974), participants first received a comparative judgment task in which they were asked whether the percentage of African nations in the UN is higher or lower than an arbitrary number (the anchor) that had been determined by spinning a wheel of fortune (i.e., 65% or 10%). In the subsequent absolute judgment task, participants were asked to give their

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best estimate of the actual percentage of African nations in the UN. Consistent with many other findings (for an overview see Mussweiler & Strack, 1999a), absolute judgments were assimilated to the anchor that was provided in the comparative task, so that the mean estimate of participants who received the high anchor was 45%, compared to 25% for participants who received the low anchor.

One of the most remarkable findings on judgmental anchoring is that even extremely implausible anchor values that clearly do not constitute a possible value for the target produce a strong and reliable assimilation effect (e.g., Chapman & Johnson, 1994; Mussweiler, Förster, & Strack, 1997; Mussweiler & Strack, 1999b, 2000a; Strack & Mussweiler, 1997). For example, in one of our own studies (Strack & Mussweiler, 1997), we asked participants whether Mahatma Gandhi was older or younger than either 140 years or 9 years of age. Although these two anchors are clearly implausible values for Gandhi's age, they produced a strong assimilation effect on subsequent absolute estimates: Participants who received the high implausible anchor on average estimated Gandhi to have lived 67 years, whereas participants who received the low implausible anchor thought that he was merely 50 years old. Thus, the consideration of what is clearly an impossible state of affairs (i.e., Gandhi having reached the age of 9 or 140 years) strongly influenced subsequent judgments.

Although such effects of implausible anchors are well documented in the literature (e.g., Chapman & Johnson, 1994; Mussweiler et al., 1997; Mussweiler & Strack, 1999b, 2000a; Strack & Mussweiler, 1997), little is known about the psychological mechanisms that produce them. Moreover, recent research (Mussweiler & Strack, 1999b, 2000a; Strack & Mussweiler, 1997) examining the mechanisms that may be responsible for the effects of plausible anchors, has provided some indications that implausible anchors differ from plausible ones with respect to the effects they produce as well as the mechanisms that underlie them. For one, implausible anchors often produce stronger anchoring effects than plausible ones (e.g., Mussweiler et al., 1997; Mussweiler & Strack, 1999b). Moreover, comparisons with implausible anchors are typically made faster than those with plausible anchors (Mussweiler & Strack, 1999b, 2000b; Strack & Mussweiler, 1997). This may be the case because comparing the target to an implausible anchor requires the generation of less knowledge about the specific target than comparing it to a plausible anchor. For example,

to decide whether Mahatma Gandhi was older or younger than 140 years, one needs to generate less specific knowledge about him than to decide whether he was younger or older than 61 years. In fact, implausible anchors appear to be processed primarily based on knowledge about the general category of the target rather than the specific exemplar. Thus, to process the implausible anchor of 140 years for the age of Mahatma Gandhi, judges may primarily generate knowledge about humans in general rather than Mahatma Gandhi, specifically.

A study examining response latencies for absolute estimates that either pertained to the judgmental target itself or to its general category supports this assumption (Mussweiler & Strack, 2000a). Before making either of these two kinds of absolute estimates, participants were asked to compare the target to either a plausible or an implausible anchor. Specifically, participants were either asked to indicate whether the Mississippi River is longer or shorter than 2,000 miles (a plausible anchor) or 30,000 miles (an implausible anchor). Subsequently they were asked to estimate the length of the Mississippi River itself (i.e., make an absolute exemplar judgment) or the maximal length rivers can reach (i.e., make an absolute category judgment). Our results demonstrated that solving a comparative task that included an implausible anchor facilitated absolute category judgments, whereas solving a comparative task that included a plausible anchor facilitated absolute exemplar judgments. Such facilitation effects indicate that the knowledge that is needed to make the respective judgment was rendered easily accessible during the comparative task. In this respect, these findings suggest that processing an implausible anchor involves the generation of more category knowledge about the target, whereas processing a plausible anchor involves the generation of more exemplar knowledge.

Thus, judges appear to compare the target to an implausible anchor by briefly consulting their category knowledge rather than elaborately generating exemplar knowledge about the specific target itself. Note, however, that the category knowledge that is generated during a comparison with an implausible anchor is not sufficient to make the subsequent absolute judgment. For example, to estimate the length of the Mississippi River, it is not sufficient to know that the Mississippi is a member of the category "rivers" and is thus shorter than the maximum value for this category. Rather, knowledge that

pertains specifically to the Mississippi is required to make this estimate. Consistent with this assumption is the fact that response latencies for absolute exemplar judgments are typically longer after comparisons with implausible rather than plausible anchors, which indicates that judges have to generate this knowledge while working on the absolute task. Were absolute estimates merely based on the implications of accessible category knowledge, then judges should make such a category-based absolute estimate at least as fast as the exemplar-based estimate following a comparison with a plausible standard. The available data (Mussweiler & Strack, 1999a, 2000a, 2000b; Strack & Mussweiler, 1997) clearly demonstrate that this is not the case.

The fact that comparisons with implausible anchors do not appear to involve the generation of exemplar knowledge about the target, however, is troublesome because recent findings (e.g., Mussweiler & Strack, 1999b, 2000a; Strack & Mussweiler, 1997) suggest that a selective generation of exemplar knowledge is the very mechanism that is responsible for anchoring effects - at least those of plausible anchors. Specifically, judges appear to process plausible anchors by testing the hypothesis that the target's extension is similar to the anchor value. To do so, they selectively generate exemplar knowledge about the target that is consistent with this assumption. For example, a judge who is asked whether Mahatma Gandhi was younger or older than 86 years may test the hypothesis that he was indeed about 86 years old by generating evidence that is consistent with this hypothesis. Doing so increases the accessibility of anchor-consistent knowledge about the target, so that it is more likely to be used for the subsequent absolute judgment. Thus, after a comparison with a high anchor, judges are likely to base their absolute estimate on knowledge indicating that the target's value is fairly high. After a comparison with a low anchor, however, judges are likely to base their absolute estimate on knowledge suggesting that the value is fairly low. As a consequence of this selective accessibility mechanism, absolute estimates are assimilated towards the anchor. According to this reasoning, selectively generating anchor-consistent exemplar knowledge about the target during the comparative task and subsequently using this knowledge for the absolute judgment is responsible for judgmental anchoring (for a more elaborate discussion of this

model as well as empirical evidence supporting it, see Mussweiler & Strack, 1999a, 1999b, 2000a; Strack & Mussweiler, 1997).

Within this theoretical framework, the fact that processing implausible anchors involves the generation of less exemplar knowledge than processing plausible anchors suggests that they should also produce less anchoring. This, however, is not the case (Mussweiler et al., 1997; Mussweiler & Strack, 1999b; Strack & Mussweiler, 1997). Clearly, this inconsistency calls for an explanation. How could the brief consideration of an almost absurdly extreme anchor value produce a stronger effect than elaborately testing a reasonable one?

Acknowledging this theoretical gap, we (e.g., Mussweiler & Strack, 1999a, 1999b, 2000a) have recently speculated that the processes that underlie the effects of implausible anchors may be conceptualized as a combination of two mechanisms that have previously been proposed to explain anchoring effects: insufficient adjustment (e.g., Tversky & Kahneman, 1974; Quattrone, Lawrence, Warren, Souza-Silva, Finkel, & Andrus, 1984) and selective accessibility (Mussweiler & Strack, 1999a, 1999b, 2000a; Strack & Mussweiler, 1997). Specifically, judges may process implausible anchors by first adjusting to the boundary value of a distribution of plausible values (Mussweiler & Strack, 2000b; Quattrone et al., 1984) and then testing the hypothesis that the target's extension is similar to this boundary value. That is, they may first select an appropriate standard of comparison by adjusting from the provided implausible value and then compare the target object to this self-set standard.<sup>1</sup>

Assume for example that you were asked whether Mahatma Gandhi was younger or older than 214 years. Our previous research (Mussweiler & Strack, 2000a) suggests that you would process this comparative anchoring task by primarily consulting your knowledge about the general category of the target. Specifically, it is easy to

1. Although insufficient adjustment may thus contribute to the effects of implausible anchors, this mechanism is unlikely to play a role in the effect of plausible anchors. Because judges are assumed to adjust until they reach the first plausible value for the target (Quattrone et al., 1984), they should not adjust at all, if the starting-point of this process (i.e., the anchor) is plausible itself. From this perspective, absolute estimates should thus be identical to a given plausible anchor value. This, however, is typically not the case (for a more elaborate discussion, see Mussweiler & Strack, 1999a).

decide that Gandhi must have been younger than 214 years, because this anchor is substantially higher than the maximum value (say 110 years) that can be reached by any member of the category humans. Thus, a quick comparison of the anchor value with the upper boundary of a distribution of plausible values for the target (e.g., 110 years) is sufficient to solve the comparative task, so that no - or very little - exemplar knowledge needs to be generated. Estimating the age of Mahatma Gandhi in the subsequent absolute judgment task, however, necessarily requires the use of specific knowledge about the judgmental target itself. Because knowledge about the general category of the target only prescribes a certain range of possible values, it is not sufficient to generate the specific value the absolute judgment typically asks for. Thus, to be able to make an exact absolute estimate after comparing the target to an implausible anchor, you need to generate exemplar knowledge about the specific target itself. From the current perspective, you would use the boundary value to do so. Specifically, you may use this value as a self-set standard and test the hypothesis that the target's value is similar to this standard. In our example, you may thus test the hypothesis that Mahatma Gandhi was 110 years old. As our previous research has demonstrated (e.g., Mussweiler & Strack, 2000a), doing so increases the accessibility of evidence that is consistent with this hypothesis which is then used to form the absolute judgment. Thus, evidence indicating that Mahatma Gandhi grew extremely old would build the basis for your estimate.

The described mechanism is well consistent with the effects that have been obtained for implausible anchors (for an overview see Mussweiler & Strack, 1999a). For one—to the extent that a plausible anchor is sufficiently removed from the boundary value—implausible anchors may yield stronger anchoring effects than plausible ones because the boundary value is more extreme than the plausible anchor. Consequently, the implications of the knowledge generated to test the assumption that the target is similar to this more extreme value are likely to be more extreme as well. As a result, using this knowledge as a basis for the absolute judgment is likely to produce more extreme judgments. Moreover, response latencies for absolute exemplar judgments may be longer for implausible than for plausible anchors because the required exemplar knowledge is retrieved while the absolute judgment is generated. The proposed mechanism

is thus consistent with the existing literature on the effects of implausible anchors.

Furthermore, some of our recent evidence provides direct support for some crucial aspects of this process and demonstrates that comparing the judgmental target to an implausible anchor involves the generation of evidence about the boundary value for the target's category. In particular, the fact that participants were faster in indicating the maximum extension rivers can reach subsequent to the comparison with an implausible rather than a plausible high anchor (Mussweiler & Strack, 2000a) indicates that they have considered this boundary value while processing the implausible anchor. Thus, judges indeed appear to think about the most extreme value the target could plausibly reach as is implied in the insufficient adjustment plus selective accessibility mechanism. They may then engaged in the assumed test of the hypothesis that the target's extension is similar to this boundary value. In this respect, supporting evidence for the assumption that processing implausible anchors involves a test of the possibility that the target value may be similar to the most extreme plausible value (i.e., the boundary value of a distribution of plausible values for the target) already exists. The present research was designed to supplement this evidence and provide more direct support for the insufficient adjustment component of the described mechanism.

To do so, we examined one central implication of insufficient adjustment. Specifically, this mechanism implies that implausible anchor values of differing extremity should produce similar absolute estimates. This is the case because the boundary value at which adjustment from the implausible anchor terminates is likely to be independent of the extremity of the anchor itself. As a consequence, the same self-set standard should be used for the selective accessibility mechanism so that similar absolute judgments should result. For example, when asked whether Gandhi was older or younger than 214 years a specific judge should adjust to the same boundary value (e.g., 110 years) as when asked whether Gandhi was older or younger than 271 years. Thus, the same boundary value (e.g., 110 years) would be used to generate exemplar knowledge when solving the absolute task so that similar estimates should result.

We report two studies which were designed to test this implication. To do so, we gave our participants a standard anchoring task that pertained to the age of Mahatma Gandhi (Study 2) or the annual

mean temperature in the Antarctic (Study 1) respectively. In both studies we used four different types of anchors for the comparative task: Two plausible ones (e.g., 61 and 86 years for the age of Mahatma Gandhi) and two implausible ones (e.g., 214 and 271 years). The two implausible anchors were both selected to be implausibly *high*, so that they are both located beyond the upper boundary value of the assumed distribution of plausible values.<sup>2</sup> Because this upper boundary value is - by definition - higher than the two plausible anchors, both implausible anchors should lead to higher absolute estimates. Moreover, although in both studies the two plausible anchors differ less from one another than the two implausible ones, the resulting absolute estimates should differ more for the plausible than for the implausible anchors. Whereas plausible anchors are likely to produce the typical anchoring effect, with high anchors yielding higher estimates than low anchors, the estimates produced by the two implausible anchors should not differ.

## STUDY 1

### METHOD

*Participants.* We recruited 63 male and female non-psychology students at the University of Würzburg as participants and randomly assigned them to one of four experimental conditions. They were asked to take part in a pretest for the construction of a questionnaire assessing general knowledge and were offered a chocolate bar as compensation.

*Materials.* The questionnaire consisted of four pairs of comparative and absolute questions which were similar to those used in our previous research on anchoring (Mussweiler et al., 1997; Mussweiler & Strack, 1999b; Strack & Mussweiler, 1997). The first three pairs served

2. Note that in order to test our hypothesis, both implausible anchors have to deviate from the actual value of the target in the same direction (i.e., both have to lie beyond the upper or the lower boundary value of the distribution of plausible values). Thus, both have to constitute either implausibly high or implausibly low anchors. In the present research, we focussed on implausibly high anchors, because many judgmental domains (e.g., age, length, weight) have a fixed lower boundary (e.g., 0 years, centimeters, grams) but no upper boundary. In principle, however, the same processes are likely to underlie the effects of implausibly high and low anchors.



to familiarize the participants with the experimental procedure, whereas the fourth pair was the critical one that pertained to the annual mean temperature in the Antarctic (“Is the annual mean temperature in the Antarctic higher or lower than  $X^{\circ}\text{C}$ ?,” and “How high is the annual mean temperature in the Antarctic?”).

Consistent with our earlier work (e.g., Mussweiler & Strack, 2000a, 2000b) we defined plausibility relative to the most extreme possible value for the target category. In particular, an anchor that constitutes a possible value for a member of the target category is regarded as plausible. An anchor that constitutes an impossible value for a member of the target category is seen as implausible. For example, a value of  $-17^{\circ}\text{C}$  is a plausible anchor for temperatures in the Antarctic because this temperature can potentially be reached in some places on earth. A value of  $700^{\circ}\text{C}$ , however, is implausible, because this temperature can not be reached in any place on earth.

On an operational basis, the anchors were determined based on the results of a pretest in which a different set of participants ( $N = 151$ ) received only absolute questions (“How high is the annual mean temperature in the Antarctic?”). The plausible anchors deviated from the mean of this calibration group by about 1 standard deviation. Specifically, the plausible high anchor ( $-17^{\circ}\text{C}$ ) was about 1 standard deviation above the mean and the plausible low anchor ( $-43^{\circ}\text{C}$ ) was about 1 standard deviation below the mean. Both implausible anchors were above the mean. The low implausible anchor ( $700^{\circ}\text{C}$ ) was about 56 standard deviations above the mean estimate of the calibration group; the high implausible anchor ( $900^{\circ}\text{C}$ ) was about 72 standard deviations above this mean. Thus, the difference between the two implausible anchors was about 8 times that between the two plausible anchors. For each participant the critical comparative anchoring question contained one of these four anchors. The actual mean temperature in the Antarctic is  $-68^{\circ}\text{C}$ .

*Procedure.* Participants were recruited in the university cafeteria and were then led to a separate room in which they completed the questionnaire in groups of up to 15. Upon arrival, they were given the questionnaire and were told to read instructions carefully. They were informed that they were taking part in a pretest for the construction of a general knowledge questionnaire. The purpose of the pretest was ostensibly to find the best wording for general knowledge questions. To reduce the prescribed informativeness of the an-

TABLE 1. Absolute Estimates for the Annual Mean Temperature in the Antarctic by Anchor and Plausibility

Anchor	Plausibility	
	Plausible	Implausible
High	-24.84 ( <i>SD</i> = 16.36)	-24.44 ( <i>SD</i> = 18.58)
Low	-41.12 ( <i>SD</i> = 16.79)	-23.27 ( <i>SD</i> = 13.83)

*Note.* Estimates are given in degrees Celsius. *N* = 15 or 16 per cell.

chors and thus discourage conversational inferences (Grice, 1975), participants were told that the values were randomly selected. In particular, it was pointed out that they had been determined by spinning a wheel of fortune. This process was described in detail, and the fact that as a consequence of their random selection the anchors are not informative with respect to the true value of the target was explicitly pointed out. It was further explained that the random selection of the anchors was necessary to minimize their impact on the answers and to identify the impact of different question formats. Finally, participants were instructed to answer the questions as accurately as possible.

## RESULTS AND DISCUSSION

Inspection of the means given in Table 1 reveals that the expected pattern was obtained. Although the two implausible anchors differed much more from one another than the two plausible ones, the difference in the resulting absolute estimates was much larger for the plausible than the implausible anchors.

In a 2 (Anchor: high vs. low) X 2 (Plausibility: plausible vs. implausible) ANOVA using the absolute estimates as the dependent variable, this pattern was borne out in a significant interaction effect,  $F(1, 59) = 4.39, p < .04$ . In this analysis the main effect of Plausibility was also significant,  $F(1, 59) = 4.81, p < .03$ , and the main effect of Anchor proved to be marginal,  $F(1, 59) = 3.29, p < .08$ . An analysis of the simple effects further revealed that the difference between the high and the low anchor condition was only significant for the plausible anchors,  $t(30) = 2.78, p < .01$ , and not for the implausible ones,  $t(29) = .2, p > .8$ .

This finding provides initial evidence in support of our conceptualization. It demonstrates that the pattern of estimates corresponds

with the predictions derived from our model. To demonstrate the ability of our findings to be generalized, we attempted to replicate this finding with a different content domain (i.e., the age of Mahatma Gandhi) and with implausible anchors that were less extreme than the ones used in Study 1.

## STUDY 2

### METHOD

*Participants.* 109 male and female non-psychology students at the University of Würzburg participated in what was ostensibly a pre-test for the construction of a general knowledge questionnaire. They were randomly assigned to one of the four experimental conditions.

*Materials and Procedure.* The questionnaire consisted of four pairs of comparative and absolute questions which were similar to those used in Study 1. The critical question pair pertained to the age of Mahatma Gandhi ("Was Mahatma Gandhi younger or older than X years when he died?," and "How old was Mahatma Gandhi?") and was taken from a pool of questions we used in our earlier research (Strack & Mussweiler, 1997). The low plausible anchor (61 years) was one standard deviation below the mean estimate of our calibration sample ( $N = 151$ ). The high plausible anchor (86 years) was one standard deviation above that mean. The two implausible anchors (214 and 271 years) were about 18 and 26 standard deviations above the mean. Mahatma Gandhi actually died at the age of 78. The procedure was identical to that used in Study 1.

## RESULTS AND DISCUSSION

Inspection of the means given in Table 2 reveals the expected pattern. Again, the difference between absolute estimates that resulted for the high and low anchors, was larger for the plausible than for the implausible anchors.

In a 2 (Anchor: high vs. low) X 2 (Plausibility: plausible vs. implausible) ANOVA using the absolute estimates as the dependent variable, this pattern yielded a significant interaction effect,  $F(1, 105) = 3.84, p < .05$ . In this analysis, the main effect for Plausibility also reached significance,  $F(1, 105) = 8.73, p < .004$ , whereas the main effect of Anchor did not,  $F < 1$ . An analysis of the simple effects further re-

TABLE 2. Absolute Estimates for the Age of Mahatma Gandhi by Anchor and Plausibility

Anchor	Plausibility	
	Plausible	Implausible
High	70.36 ( <i>SD</i> = 12.66)	72.86 ( <i>SD</i> = 13.82)
Low	62.92 ( <i>SD</i> = 10.72)	75.26 ( <i>SD</i> = 14.77)

*Note.* Estimates are given in years. *N* is between 26 and 28 per cell.

vealed that the difference between the high and the low anchor conditions was only significant for the plausible anchors,  $t(52) = 2.32, p < .02$ , not for the implausible ones,  $t(53) = .62, p > .5$ .

These results support our conceptualization of the mechanisms that are responsible for the effects of implausible anchors. They demonstrate that the two implausible anchor values yielded very similar estimates. Although the absolute difference between these two implausible anchors was substantially larger than that between the two plausible anchors, only the latter produced absolute estimates that differed reliably from one another.

## GENERAL DISCUSSION

Taken together, the results of Studies 1 and 2 are clearly consistent with the insufficient adjustment plus selective accessibility rationale that we have proposed to account for the effects of implausible anchors. In combination with previous data (e.g., Chapman & Johnson, 1994; Mussweiler et al., 1997; Mussweiler & Strack, 1999b, 2000a; Strack & Mussweiler, 1997), they draw the following picture of the psychological processes that underlie the effects of implausible anchors. Judges appear to solve an anchoring task that involves an implausible anchor by comparing the anchor to the boundary value of a distribution of plausible values. Our earlier findings (Mussweiler & Strack, 2000a) suggest that this comparison is primarily based on knowledge about the general category of the target. Thus, implausible anchors appear to be processed by comparing them to the maximum or minimum extension of the general category of the target. This process resembles an insufficient adjustment mechanism (Tversky & Kahneman, 1974; Quattrone et al., 1984) in which the implausible anchor serves as a starting-point which is then adjusted until the first plausible value for the target category is reached. Such an

adjustment, however, does not provide judges with the specific exemplar knowledge about the target that is needed to make an exact absolute estimate. As a consequence, judges have to generate this knowledge while working on the absolute task. The present data suggest that they do so by using the boundary value of the distribution of plausible values for the target as a self-set standard in the selective accessibility process. Thus, they may test the hypothesis that the target's extension is similar to the category boundary. Doing so increases the accessibility of knowledge that is consistent with this assumption. This knowledge is then used to generate the absolute estimate, which ultimately produces the extreme estimates that are typical for implausible anchors (e.g., Mussweiler & Strack, 1999b).

As pointed out before, this mechanism is able to account for all the effects of implausible anchors that have been demonstrated so far. For one, under conditions in which the plausible anchor is sufficiently removed from the boundary value, implausible anchors may yield more extreme estimates because the boundary that is used as a self-set standard is more extreme than the plausible anchor. As a consequence, the implications of the knowledge that is generated to test the hypothesis that the target's value is similar to this standard are more extreme as well. Using this evidence as a basis for the absolute judgment ultimately leads to more extreme judgments. Moreover, comparative anchoring tasks that include implausible anchors are processed faster than those including plausible anchors, because simply comparing the target to the boundary value takes less time than elaborately testing the hypothesis that its value is similar to the anchor. Finally, absolute anchoring tasks are processed more slowly for implausible than for plausible anchors, because the exemplar knowledge that is needed to make the exact estimate has to be generated while working on this task. Thus the insufficient adjustment plus selective accessibility notion nicely incorporates all of the psychological consequences implausible anchors have been demonstrated to have.

At the same time, alternative mechanisms that have been suggested to underlie anchoring effects are unable to account for the complete pattern of effects implausible anchors produce. In addition to the two mechanisms of insufficient adjustment and selective accessibility that form the basis of the process we have put forward, two alternative mechanisms have been described. One possibility is

that anchoring effects are produced by conversational inferences (e.g., *Jacowitz & Kahneman, 1995*). In particular, applying implicit rules of natural conversations (*Grice, 1975*) to standardized situations (e.g., *Clark & Schober, 1992; Schwarz, 1994; Strack & Martin, 1987*) participants may use the anchor value to infer the actual range of possible answers. Participants who expect the experimenter to be maximally informative (see *Grice's maxim of quantity, 1975*) in asking his or her questions, may assume that the anchor value is close to the actual value and consequently position their estimate in its vicinity. This explanation, however, presupposes that the anchor value constitutes a plausible value. Anchors such as 214 years for the age of Mahatma Gandhi are unlikely to be seen as a conversational hint at the actual target value, so that from a conversational perspective implausible anchors should actually yield no effect at all. This clearly is not the case.

Our data are also difficult to reconcile with a numeric priming explanation of anchoring. It has been suggested that anchoring may result because solving the comparative anchoring task primes the numeric anchor value itself, so that it is more likely to be used as a possible answer when the final estimate is generated (*Jacowitz & Kahneman, 1995; Wilson, Houston, Etling, & Brekke, 1996; Wong & Kwong, 2000*). Note that in contrast to the selective accessibility model (*Mussweiler & Strack, 1999a, 1999b; Strack & Mussweiler, 1997*), this account assumes that the increased accessibility of the numeric anchor value itself rather than the accessibility of a specific subset of target knowledge mediates anchoring. If it were indeed the mere accessibility of the numeric anchor value that drives anchoring, however, then implausible values that are differentially extreme should lead to different absolute estimates. Again, the empirical evidence tells a different story.

Thus, neither conversational inferences nor numeric priming appear to be the mechanism that drives the effects of implausible anchors. Furthermore, if considered in isolation, the two components of the present proposal - insufficient adjustment and selective accessibility - are also unable to account for the complete pattern of findings. On the one hand, a pure selective accessibility account would predict that because comparisons with implausible anchors involve less generation of anchor-consistent exemplar knowledge about the target, they should exert less of an anchoring effect. This does not appear to

be the case. On the other hand, a pure insufficient adjustment account does not explicate the mechanism of generating target knowledge that builds the basis of the absolute estimate. Given the accumulating evidence demonstrating that anchoring effects are semantic in nature and critically depend on the target knowledge that is activated during the comparison, insufficient adjustment draws too narrow a picture of the anchoring process. The fact that response latencies to the comparative and the absolute question are inversely related (e.g., Strack & Mussweiler, 1997), for example, indicates that absolute estimates require at least some knowledge about the judgmental target in specific. This dependency is difficult to reduce to insufficient adjustment. Thus, in isolation the two components of the described mechanism appear to be unable to explain the effects of implausible anchors. Rather, their combination - an insufficient adjustment plus selective accessibility mechanism - appears to be best suited to account for the diverse set of consequences that comparisons with implausible anchors have been demonstrated to have.

## CONCLUSION

On a more general level, the current findings suggest that to fully understand the anchoring phenomenon, one may have to take different psychological mechanisms into account. Ultimately a complete understanding of this pervasive phenomenon may only be achieved if the different mechanisms that contribute to it are integrated into one conceptual framework. The present conceptualization constitutes one example of such an integrative framework. Although by itself insufficient adjustment appears to be unable to account for many characteristics of judgmental anchoring (for a more detailed discussion, see Mussweiler & Strack, 1999a), it seems to play a role in the effects of implausible anchors. Thus, as would be expected of a phenomenon that is as ubiquitous and multifaceted as judgmental anchoring, multiple psychological mechanisms seem to contribute to it.

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