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Overcoming the Inevitable Anchoring Effect: Considering the Opposite Compensates for Selective Accessibility

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Anchoring effects—the assimilation of a numeric estimate to a previously considered standard—have proved to be remarkably robust. Results of two studies, however, demonstrate that anchoring can be reduced by applying a consider-the-opposite strategy. Based on the Selective Accessibility Model, which assumes that anchoring is mediated by the selectively increased accessibility of anchor-consistent knowledge, the authors hypothesized that increasing the accessibility of anchor-inconsistent knowledge mitigates the effect. Considering the opposite (i.e., generating reasons why an anchor is inappropriate) fulfills this objective and consequently proves to be a successful corrective strategy. In a real-world setting using experts as participants, Study 1 demonstrated that listing arguments that speak against a provided anchor value reduces the effect. Study 2 further revealed that the effects of anchoring and considering the opposite are additive.

Human judgment falls prey to a variety of systematic biases and distortions (for an overview, see Kahneman, Slovic, & Tversky, 1982). In many cases, these biases result from the use of judgmental heuristics (Tversky & Kahneman, 1974) that are highly adaptive and beneficial under most circumstances but also may produce distortions (e.g., Arkes, 1991). One typical finding—called the anchoring effect (Tversky & Kahneman, 1974)—is that numeric estimates are assimilated to a previously considered standard of comparison. In what is probably the best-known demonstration of this effect, Tversky and Kahneman (1974) first asked their research participants whether the percentage of African nations in the United Nations (UN) is higher or lower than an arbitrary number (the anchor) that had ostensibly been determined by spinning a wheel of fortune (e.g., 65% or 10%). Participants were then asked to give their best estimate of this percentage. Absolute judgments were assimilated to the provided anchor value so that the mean estimate of participants who received the high anchor was 45%, compared to 25% for participants who received the low anchor.

Anchoring effects such as these have proved to be a truly ubiquitous phenomenon that has been observed in a broad array of different judgmental domains (see Mussweiler, 1997; Mussweiler & Strack, 1999a). Despite this ubiquity of anchoring and other judgmental biases, critics (e.g., Gigerenzer, 1991; Hogarth, 1981) have argued that many of these biases are more apparent than real in that they disappear in information-rich, natural environments and are thus limited to the psychological laboratory (but see Gilovich, 1991). This, however, is not true for the anchoring effect, which has clear practical relevance for many decisions in real-world settings. For example, pricing decisions (Northcraft & Neale, 1987) as well as estimates for prime interest rates (Russo & Schoemaker, 1989) were found to be susceptible to the anchoring bias. Moreover, anchoring appears to play a significant role in the negotiation process: It has been demonstrated that the final agreement of a negotiation is strongly influenced by an initial offer (Chertkoff & Conley, 1967; Liebert, Smith, Hill, & Keiffer, 1968). This

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finding has been conceptualized as an anchoring effect: The initial offer serves as an anchor to which the agreement is assimilated (Neale & Bazerman, 1991; Ritov, 1996).

THE ROBUSTNESS OF THE ANCHORING PHENOMENON

Not only is the anchoring effect influential in a plethora of judgmental settings, but this influence is also remarkably robust. For one, anchoring occurs even if the anchor values are clearly uninformative for the critical estimate because—as in Tversky and Kahneman's (1974) classic study—anchors are randomly selected (e.g., Cervone & Peake, 1986; Mussweiler & Strack, in press). Moreover, anchoring remains uninfluenced by the extremity of the anchor (e.g., Chapman & Johnson, 1994; Mussweiler, Förster, & Strack, 1997; Strack & Mussweiler, 1997) so that even implausibly extreme values yield an effect. For example, in one of our own studies (Strack & Mussweiler, 1997, Study 3), estimates for the age of Mahatma Gandhi were assimilated to an unreasonably high anchor value of 140 years.

Furthermore, anchoring effects appear to be independent of participants' motivation (Wilson, Houston, Etling, & Brekke, 1996). Specifically, the attempt to improve accuracy by awarding a prize for the best estimate proved unsuccessful.[1] In addition, it has been demonstrated that anchoring occurs independently of participants' expertise (Joyce & Biddle, 1981; Northcraft & Neale, 1987; Wright & Anderson, 1989).[2] For example, Northcraft and Neale (1987) had a group of experienced real estate agents estimate the value of a house. Participants were given all the information that is typically important to make this estimate (e.g., major characteristics of the property, prices for neighboring properties) and had the opportunity to inspect the house. Although relevant information was thus easily accessible, the experts were influenced by the given listing price (i.e., the anchor).

Probably the most striking demonstration of the robustness of the phenomenon, however, stems from research demonstrating that explicit instructions to correct for a potential influence of an anchor do not mitigate the effect (Wilson et al., 1996). In fact, even explicitly forewarning judges about the potential distortion and informing them about its direction did not diminish the effect. Taken together, these findings indicate that anchoring is an exceptionally robust phenomenon that is difficult to avoid.

As mentioned before, anchoring plays an important role in many real-world situations, in which falling prey to the bias may entail remarkable costs for the decision maker. For example, in Northcraft and Neale's (1987) study, the experts' estimates of the appraisal value of the house differed by more than $7,000 in the different anchoring conditions, which is equivalent to almost 10% of the actual value. This points to the fact that anchoring can prove expensive. In light of the ubiquity of the anchoring phenomenon, being able to prevent this bias seems important to improve human judgment. To develop an appropriate strategy, however, one has to take into account the cognitive mechanisms that underlie the anchoring effect. Many judgmental biases result from inadequate cognitive strategies rather than insufficient motivation (Lord, Lepper, & Preston, 1984) so that a corrective strategy may be best designed by compensating for the mechanism that produces the distortion in the first place (Arkes, 1991; Fischhoff, 1982). Recently, we (Mussweiler, 1997; Mussweiler et al., 1997; Mussweiler & Strack, 1999a, 1999b, 2000 Strack & Mussweiler, 1997) have proposed a Selective Accessibility Model that specifies the cognitive mechanisms that underlie judgmental anchoring. This model may help identify a strategy to mitigate the effect.

THE SELECTIVE ACCESSIBILITY MODEL

The Selective Accessibility Model (for a more elaborate account, see Mussweiler & Strack, 1999a) postulates that anchoring effects are mediated by a selective increase in the accessibility of anchor-consistent semantic knowledge about the target (for related notions, see Chapman & Johnson, 1999; Pohl, 1996). We assume that judges compare the target with the anchor by testing the possibility that the target's value is equal to the anchor value. For example, judges who are asked whether the average price for a German car is higher or lower than 40,000 German Marks are assumed to test the possibility that the average price actually is 40,000 Marks. To do so, they selectively retrieve knowledge from memory that is consistent with this assumption (e.g., "A Mercedes or a BMW is even more expensive," etc.) (Trope & Liberman, 1996). As a consequence, the accessibility of anchor-consistent knowledge is increased. To generate the final numeric estimate, judges then rely primarily on easily accessible knowledge (Higgins, 1996; Wyer & Srull, 1989) so that their estimate is heavily influenced by the anchor-consistent knowledge generated before. On the surface, this is apparent in an assimilation of the final estimate to the anchor value (for empirical support of these assumptions, see Mussweiler et al., 1997; Mussweiler & Strack, 1999b, 2000; Strack & Mussweiler, 1997; for an overview, see Mussweiler & Strack, 1999a).

From this selective accessibility perspective, anchoring results because the knowledge base that is used to make the numeric judgment is distorted in that anchor-consistent knowledge is more accessible than anchor-inconsistent knowledge. Consequently, reduc-

ing this selectivity may mitigate the effect. That is, if the accessibility of anchor-inconsistent knowledge is increased, this knowledge should be equally used to make the final estimate and may thus compensate for the effects of easily accessible anchor-consistent knowledge. Hence, a procedure that increases the accessibility of anchor-inconsistent knowledge constitutes a promising candidate for a successful corrective strategy.

CONSIDER THE OPPOSITE AS A CORRECTIVE STRATEGY

Inducing judges to consider reasons why the implications of the anchor value may be wrong may constitute such a strategy. In line with this assumption, it has been demonstrated that considering the opposite (Lord, Lepper, & Preston, 1984), that is, taking into account evidence that is inconsistent with one's initial beliefs, is an effective strategy to improve human judgment in a variety of domains. For example, Koriat, Lichtenstein, and Fischhoff (1980) found that applying a consider-the-opposite strategy reduces overconfidence in the correctness of a chosen answer: Inducing participants to list arguments that speak against the validity of their response reduces their confidence in its correctness (see also Griffin, Dunning, & Ross, 1990; Hoch, 1985). This may be the case because overconfidence results from a neglect of evidence that contradicts the chosen alternative so that making this evidence more salient reduces the effect (Koriat et al., 1980). Similar strategies were found to mitigate other judgmental biases, such as the hindsight bias (Arkes, Faust, Guilmette, & Hart, 1988; Davies, 1992), and biased processing of new information (Lord et al., 1984).

The psychological processes that mediate these phenomena (Koehler, 1991) appear to be similar to those that underlie judgmental anchoring. Hence, a consider-the-opposite strategy also may reduce the ubiquitous anchoring effect. In fact, some recent data (Chapman & Johnson, 1999) support this assumption. In one study, participants were asked to estimate the likelihood that a republican would win the next presidential elections after indicating whether this probability is higher or lower than the last two digits of their social security number. Before giving their final estimate, some of the participants were instructed to list one reason why a republican would win, some why a Republican would not win, and some were not instructed to list any reasons. A significant anchoring effect was only obtained for those participants who listed reasons that were consistent with the implications of the anchor value (e.g., pro arguments for a probability of more than 50%) or no reasons at all. Considering reasons that were inconsistent with the anchor (e.g., con arguments for a probability of more than 50%), however, eliminated the bias. From the current perspective, this may have been the case because listing reasons that oppose the implications of the anchor value increased the accessibility of anchor-inconsistent semantic knowledge. Thus, anchor-consistent and anchor-inconsistent knowledge was similarly accessible so that the knowledge base used to make the final estimate was unbiased. Consequently, judgments were unbiased as well.

In the present research, we explore the role a consider-the-opposite strategy may play in reducing the anchoring effect. Specifically, Study 1 tested whether this strategy may be fruitfully applied to a real-world setting. Just as judgmental heuristics may have stronger effects in the psychological laboratory where judgment-relevant knowledge is scarce (e.g., Gigerenzer, 1991; Hogarth, 1981), simple corrective devices may be ineffective if participants are sufficiently informed about the judgment domain. An effective corrective strategy, however, is especially needed for such real-world decisions because it is here that a biased judgment has potentially high costs. Thus, we tested the effectiveness of considering the opposite in a real-world setting, in which experienced judges had all the information available that is needed to make an accurate judgment. Study 2 further examined the effectiveness of considering the opposite using a more controlled laboratory setting.

STUDY 1

To investigate the effects of anchoring and considering the opposite in a real-world setting, we chose a car-selling scenario. Specifically, experts in the car business were approached and asked to estimate the value of a 10-year-old car. They were given all the information that is typically deemed important to make this estimate (e.g., mileage, year), had the car right in front of them throughout the whole experiment, and were given the opportunity to inspect it. In addition, their motivation to make a serious estimate was increased by holding out the prospect of a repair job to them. Taken together, these measures created a situation that is very close to a real-world interaction.

To examine the effects of considering the opposite, half of the participants were induced to list anchor-inconsistent arguments (e.g., reasons why a high price is inadequate) before giving their numeric estimate. Consistent with the above analysis, we expected this consider-the-opposite strategy to compensate for the selective accessibility increase that results from the anchoring manipulation. Specifically, listing anchor-inconsistent arguments should render the knowledge base that is used for the judgment less biased, which in turn should lead to less biased final estimates.

It is important to note, however, that in principle the expected debiasing effect of considering the opposite

also may be ascribed to conversational or pragmatic influences (e.g., Grice, 1975). For example, it may be difficult for participants to give an estimate that deviates too much from the suggested value (i.e., the anchor) because doing so would violate common norms of propriety. Specifically, a mechanic who is asked about his or her opinion concerning a high value for the car may feel obliged to give a fairly high estimate because doing otherwise may insult his or her potential customer. Asking for reasons why this value may be inappropriate, however, may release him or her from such propriety constraints so that he or she feels free to give a lower estimate. From this perspective, considering the opposite would then reduce anchoring because it alleviates pragmatic constraints and not because it debiases the informational basis for the judgment.

To provide empirical evidence against this alternative explanation, Study 1 also examines whether the debiasing effects of considering the opposite depend on the amount of anchor-inconsistent knowledge that participants generated. If—as we assume—the effects of considering the opposite are mediated by the implications of the generated information, then the more information is generated, the stronger its debiasing effect should be. Such a dependency would be difficult to explain with pragmatic influences.

Method

Participants. Participants were 60 male car experts; 44 of them were car mechanics and 16 were car dealers. All of the participants had more than 5 years of experience on the job. In fact, the majority ($N = 51$) had worked in the car business for more than 10 years. Participants were randomly assigned to one of four experimental conditions. Specifically, the condition they were assigned to was randomly determined before approaching them.

Material. A 10-year-old car (1987 Opel Kadett E) was used as the object to be evaluated. An independent expert estimated an adequate buying and selling price for this car. The buying price (i.e., price for buying the car from a dealer) was estimated to be 4,500 German Marks (about U.S.$2,500 at the time); the selling price (i.e., price for selling the car to a dealer) was 3,300 German Marks (about U.S.$1,833 at the time). We used these two estimates to determine the anchor values. The low anchor was set at 500 German Marks below the selling price; the high anchor was set at 500 Marks above the buying price. Thus, 2,800 Marks (about U.S.$1,556 at the time) and 5,000 Marks (about U.S.$2,778 at the time) served as anchor values.

Procedure. Participants were approached individually at their place of employment. After arriving with his car, the experimenter requested to talk to an expert who could tell him whether a little bump he had in his car was still worth fixing given that the car was fairly old. Typically, an expert was then sent to him and the experimenter explained that his girlfriend had had a minor collision with his car and that he was uncertain whether it would still be worth fixing. To decide, he would like an expert to estimate what the actual value of this car was and how much it would cost him to have it fixed. Then, he provided the expert with the major facts about the car, namely, its mileage (160,000 kilometers) and year (1987), and gave his personal estimate for its value ("I thought that the car should sell for about 2,800/5,000 Marks"). For half of the participants, this estimate was equivalent to the low anchor value of 2,800 German Marks; for the other half of the participants, the estimate was equivalent to the high anchor of 5,000 Marks.

Congruent with the standard anchoring procedure, the expert was first asked to indicate whether the anchor value was too high or too low ("According to your opinion, is this value too high or too low?"). He was then asked to give his estimate for the value ("Could you tell me, what do you think is the approximate price for the car as you see it?"). Before giving this estimate, however, half of the participants were asked for reasons why the anchor value might be inappropriate ("A friend of mine mentioned yesterday that he thought this value is too high/low. What would you say argues against this price?"). For the other half of the participants, the absolute question immediately followed their comparative judgment. Thus, the four experimental conditions resulted from a combination of anchor (high vs. low) and argument listing (no argument vs. anchor-inconsistent argument). Both factors were manipulated between participants.

To maintain credibility, participants were then asked to estimate the costs for the required repair. Finally, the experimenter inquired how long the participant had worked in the car business already. The experimenter then thanked the expert, said that he would think about whether he should have his car fixed, and left.

Results

Number of generated arguments. Participants who received the low anchor generated less anchor-inconsistent arguments ($M = 1.33$) than did participants who received the high anchor ($M = 2.67$), $t(28) = 3.89$, $p < .001$. This suggests that finding arguments that indicate that the low anchor was too low was more difficult than finding arguments that indicate that the high anchor was too high. This may be the case because participants saw the low anchor (which was close to the price a dealer would typically pay for the car) to be a more appropriate estimate than the high anchor. Consistent with this

assumption, the average estimate over all four experimental conditions (M = 2,999 Marks) is much closer to the low anchor than to the high anchor.

Absolute estimates. Inspection of Table 1 reveals that the typical anchoring effect is replicated. Overall, the high anchor led to higher estimates for the value of the car (M = 3,347 Marks) than the did low anchor (M = 2,652 Marks), $F(1, 56) = 16.92$, $p < .001$. More important, the magnitude of the anchoring effect depended on whether participants were instructed to generate anchor-inconsistent arguments. Specifically, anchoring was weaker when participants were instructed to generate anchor-inconsistent arguments, $F(1, 56) = 4.25$, $p < .04$, for the interaction of anchor and argument listing. Contrast analyses revealed that the difference between the estimates for the high and the low anchor was significant when no arguments were listed, $t(56) = 4.37$, $p < .001$, one-tailed. This anchoring effect, however, was only marginally significant if anchor-inconsistent arguments were listed, $t(56) = 1.45$, $p < .08$, one-tailed.

Correlational analysis. To determine whether the debiasing effects of considering the opposite depend on the amount of generated information, we correlated the number of generated arguments with the final estimates. For the low anchor condition, both quantities were unrelated ($r = –.23$, $p > .4$). For the high anchor condition, however, both were negatively correlated ($r = –.39$, $p < .07$, one-tailed). Thus, the more anchor-inconsistent arguments (i.e., arguments indicating that the high anchor is too high) were generated the lower was the final estimate for the value of the car.

Discussion

The implications of these findings are manifold. For one, they demonstrate that anchoring effects occur in real-world settings in which experts have all necessary information available to make the critical judgment. Moreover, the estimates of the control group participants demonstrate that the size of the bias can be remarkable. Specifically, estimates in the high and low anchor condition deviated by more than 1,000 German Marks, which is equivalent to more than 25% of the actual value of the car. Thus, in line with previous research (e.g., Northcraft & Neale, 1987; Russo & Shoemaker, 1989), our findings demonstrate that anchoring is a potent judgmental bias in everyday judgment and decision making.

More important, these results also demonstrate that the effects of anchoring may be mitigated by applying a consider-the-opposite strategy. Given the extraordinary robustness of the anchoring effect and previous failures to find an adequate means to reduce it (e.g., Wilson et al., 1996), this finding seems especially noteworthy. Furthermore, our data demonstrate that anchoring effects are remarkably robust: Although considering the opposite reduced the effect, there is still a tendency to give higher estimates after considering the high anchor than the low anchor. Thus, considering the opposite did not completely remove the distortion.

TABLE 1: Absolute Estimates for the Value of the Car by Anchor and Argument

	Argument	
Anchor	*No*	*Anchor Inconsistent*
High	3,563	3,130
Low	2,520	2,783

NOTE: Estimates are given in German Marks. N = 15 in all cells.

Finally, our results speak to the mechanism that may be responsible for the debiasing effect of considering the opposite. Specifically, our findings seem more consistent with the assumption that considering the opposite mitigates anchoring because it debiases the informational basis for the judgment. For one, considering the opposite reduced the effects of high as well as low anchors. The debiasing effect for low anchors, however, is difficult to explain in terms of pragmatic influences. Because giving an estimate that is higher than the suggested low anchor is unlikely to offend the potential customer, there exist no propriety constraints that could be lifted by asking for anchor-inconsistent arguments. Consequently, considering the opposite should only influence the effects of high but not of low anchors. Our findings, however, demonstrate that this is not the case and are thus difficult to reconcile with the pragmatic explanation.

More important, the fact that the final estimate was correlated with the number of generated arguments suggests that the effect of considering the opposite is mediated by the knowledge that is rendered accessible. The obtained correlation seems difficult to explain with pragmatic influences because the pragmatic constraints of the situation are the same for participants who generate few arguments and for those who generate many. Notably, the correlation of generated arguments and final estimate only held for the high anchor condition but not for the low anchor condition. Although this divergence was unexpected and may shed some doubt on the viability of our account, our supplemental analysis helps to reconcile this finding with the current theoretical perspective. Specifically, the fact that the overall mean estimate was very close to our low anchor value suggests that participants saw this value as reasonable. Consequently, they had difficulties generating arguments that speak against it. This is apparent in the extremely low number of arguments listed. As a result,

the generated arguments only exerted a small effect so that the final estimates remain uncorrelated with the number of arguments. In sum, the present findings seem more consistent with the assumption that the effects of considering the opposite are due to its debiasing influence on the informational basis for the judgment rather than its propriety lifting qualities. Study 2 was in part conducted to further rule out the pragmatic account.

STUDY 2

To further rule out the pragmatic account, we examined whether considering the opposite also would mitigate the effects of anchor values that were ostensibly selected at random. Because such arbitrary anchors are not thought to have been deliberately selected by the experimenter, participants are unlikely to feel obliged to give an estimate that is close to them. That is, evaluating random anchor values does not entail the kind of propriety constraints that may have mediated the findings of Study 1. Consequently, if the effects of considering the opposite were due to its propriety-lifting qualities, it should not mitigate the effects of random anchor values.

Thus, one objective of Study 2 was to provide further evidence that speaks against the pragmatic account. In addition, we attempted to further explore the effectiveness of the considering-the-opposite strategy. In Study 1, the argument-listing procedure was explicitly designed to compensate for the effects of anchoring. That is, participants were instructed to generate arguments that speak against the provided anchor values so that the implications of arguments and anchors were opposed to one another. One may well argue that this is a necessary precondition for the argument-listing procedure to be effective. Specifically, listing anchor-consistent arguments may not have an effect on estimates because doing so may not change the knowledge base that is used to make the final estimate. For example, generating arguments that speak for a high value of the car may not exert an effect if a high anchor is present because this anchor value induces judges to think of these arguments anyway so that no additional knowledge is rendered easily accessible. Study 2 was designed to test whether argument listing depends on this restriction and is only influential if counterarguments are generated. To do so, we manipulated the implications of the anchors and the generated arguments independently of one another.

Method

Participants. We recruited 31 nonpsychology students at the University of Würzburg as participants and randomly assigned them to one of the three argument-listing conditions. They were asked to take part in a pretest for the construction of a survey questionnaire and were offered a chocolate bar as compensation.

Materials. The questionnaire consisted of two pairs of questions. The first question pair pertained to the likelihood that German Chancellor Kohl would win the next election. Specifically, participants were first asked to indicate whether the likelihood that Chancellor Kohl would win the next election is higher or lower than either 20% or 80%. In the subsequent question, they were asked to give an estimate of this probability. The second question pertained to the likelihood that the German opposition leader Oskar Lafontaine would be nominated as a candidate for the election. Again, participants were first asked to indicate whether this percentage is higher or lower than either 20% or 80% and then asked to give a numeric estimate.

The anchors were set at 20% and 80%. For half of the participants, the first question pair included the high anchor and the second question pair included the low anchor. For the other half, this assignment was reversed.

The argument-listing manipulation was inserted after the comparative question. Participants in the high condition were instructed to list three arguments that implied that Chancellor Kohl would win the next election and that opposition leader Lafontaine would be nominated, respectively. Participants in the low condition were instructed to list three arguments that spoke against these possibilities. Participants in the no argument condition did not list any arguments. For them, the absolute questions immediately followed the comparative ones.

In sum, the six experimental conditions resulted from a combination of anchor (high vs. low), which was varied within participants, and argument listing (no vs. high vs. low), which was manipulated between participants.

Procedure. Participants were run in groups of up to 10. They were recruited in the university cafeteria, led to a separate room, and handed the questionnaire. In the instructions, participants were informed that they were taking part in a pretest for the construction of a survey questionnaire. It was emphasized that the purpose of the pretest was to find the best wording for the opinion survey. Moreover, they were told that some of the questions would require a comparison with a given numerical standard and that these standards were randomly selected by using a mechanism similar to that of a wheel of fortune. It was pointed out that this was necessary to minimize a possible influence that the standards may have on the answers and to identify the impact of different question formats. The random selection of the anchor values was emphasized to reduce their ascribed informativeness (Grice, 1975) and thus ensure that the obtained effects were not mediated by conversational inferences (cf. Jacowitz & Kahneman, 1995).

Results

Preliminary analysis. A preliminary Anchor (high vs. low) × Argument Listing (no vs. high vs. low) × Content (Kohl vs. Lafontaine) ANOVA demonstrated that the specific content exerted no effect ($F < 1$) for all effects, including content. Consequently, this factor is not considered in the main analysis.

Absolute estimates. To allow for a comparison of estimates given for different content domains, responses were transformed into *z* scores for each question. Thus, the resulting cell means reflect participants' average deviations from the question mean in units of the pertinent standard deviation. As is apparent in Table 2, the typical anchoring effect was replicated. High anchors led to higher estimates ($M = .33$) than did low anchors ($M = –.32$), $F(1, 28) = 18.28$, $p < .001$. More important, absolute estimates also depended on the implications of the arguments that were listed after the comparative question. Specifically, absolute estimates were lowest for low arguments ($M = –.46$), highest for high arguments ($M = .51$), and intermediate if no arguments were listed at all ($M = –.01$), $F(2, 28) = 3.95$, $p < .03$. Finally, the magnitude of the anchoring effect (i.e., the difference between the estimates given for high and low anchors) remained uninfluenced by the argument listing, $F(2, 28) < 1$, for the interaction of anchor and argument listing.

Discussion

These results indicate that the effects of argument listing that we obtained in Study 1 also hold for randomly selected anchor values. Because evaluating such arbitrary anchors is unlikely to entail any propriety constraints, these findings speak against a pragmatic account for the effects of considering the opposite. At the same time, they are consistent with the assumption that considering the opposite mitigates anchoring because it debiases the informational basis for the judgment. Furthermore, the results of Study 2 suggest that the effects of argument listing are not restricted to the generation of anchor-inconsistent arguments. Although inspection of the means depicted in Table 2 reveals a tendency for anchor-inconsistent arguments to have a stronger effect than anchor-consistent arguments, this tendency does not yield a significant effect. This suggests that regardless of the anchor value, instructing participants to list arguments leads them to access knowledge that they have not previously thought about. For example, although participants who received the high anchor value of 80% for the probability that Chancellor Kohl would be reelected presumably generate evidence that favors this possibility already, they generate additional favorable evidence when explicitly instructed to do so. As a consequence, generating arguments makes an independent contribution to the accessibility of judgment-relevant knowledge so that it also exerts an independent influence on estimates that are based on this knowledge. Thus, the effectiveness of the argument-listing procedure does not appear to be restricted to the generation of counterarguments.

TABLE 2: Absolute Estimates (*z* transformed) by Anchor and Argument

	Argument		
Anchor	*No*	*High*	*Low*
High	.37 ($N = 11$)	.89 ($N = 10$)	–.26 ($N = 10$)
Low	–.39 ($N = 11$)	.12 ($N = 10$)	–.67 ($N = 10$)

GENERAL DISCUSSION

We have examined considering the opposite as a corrective strategy for the ubiquitous anchoring effect. In a real-world setting using experts as participants, Study 1 demonstrated that judgmental anchoring can be mitigated by generating anchor-inconsistent arguments before making the numeric estimate. This finding seems especially remarkable because anchoring has proved to be an exceptionally robust phenomenon for which standard corrective strategies, such as increasing the motivation to give an accurate estimate and informing judges about the nature of the distorting influence (Wilson et al., 1996), remain uninfluential. Considering the opposite appears to be the first mechanism that successfully reduces the anchoring bias.

Correction by Theory-Based Adjustment Versus Considering the Opposite

Recent conceptualizations of judgmental correction (e.g., Strack, 1992; Strack & Hannover, 1996; Wegener & Petty, 1997; Wilson & Brekke, 1994) suggest a general corrective strategy that—in principle—also may be applied to the anchoring phenomenon. Specifically, it has been suggested that judgmental correction often takes the form of theory-based adjustment: To correct, judges may consult their naive theories about judgmental distortion and determine the direction and magnitude of the bias. The initial judgment is then adjusted in the opposite direction of the perceived bias to a degree that compensates for the assumed magnitude of the distortion. Wilson et al.'s (1996) failure to reduce the anchoring bias by instigating such theory-based adjustment, however, demonstrates that using this corrective device to eliminate a present bias is a difficult task to master. This may be the case because—to correct successfully—judges have to meet a multitude of preconditions (e.g., Strack, 1992; Strack & Hannover, 1996; Wilson &

Brekke, 1994). Specifically, they have to be (a) motivated to give an accurate judgment, (b) aware of the potentially distorting influence, and (c) aware of the direction and magnitude of this influence.

The consider-the-opposite strategy, however, seems less difficult to master. In contrast to theory-based adjustment, judges merely have to be motivated to give an accurate judgment and to be aware of the distorting influence. Awareness of the direction and the magnitude of the distortion is not necessary. Thus, considering the opposite seems an effective corrective device able to improve human judgment even when other corrective strategies have failed. Moreover, its scope is not limited to the anchoring phenomenon. As pointed out before, it has proved to be successful for a variety of judgmental distortions, such as the hindsight bias (e.g., Arkes et al., 1988), overconfidence (e.g., Koriat et al., 1980), biased hypothesis-testing (Lord et al., 1984), and biased processing of novel information (Lord et al., 1984).[3]

CONCLUSION

Anchoring has been a long-standing enigma in psychological research, with its remarkable robustness constituting one of the most enigmatic characteristics. The Selective Accessibility Model, however, suggests that increasing the accessibility of anchor-inconsistent knowledge reduces the magnitude of the anchoring bias. Considering the opposite appears to be one way to achieve this objective and consequently proved to be an effective corrective strategy. From the present perspective, considering the opposite was successful because it counteracted the very mechanism that is responsible for the bias, namely, selective accessibility. In line with earlier conceptualizations of debiasing manipulations (e.g., Arkes, 1991; Fischhoff, 1982), this suggests that first analyzing the psychological mechanisms that underlie a specific bias and then designing a corrective strategy that counteracts these mechanisms is a fruitful strategy to enhance human judgment.

NOTES

1. At first sight, these findings appear to be inconsistent with other data demonstrating that anchoring is attenuated by increasing participants' evaluation apprehension (Kruglanski & Freund, 1983). This discrepancy, however, may be due to the different judgmental paradigms used in both studies. Wilson, Houston, Etling, and Brekke (1996) used the standard paradigm (Tversky & Kahneman, 1974), whereas Kruglanski and Freund (1983) examined anchoring in the context of choices between conjunctive and disjunctive events (Bar-Hillel, 1973). Both paradigms differ with respect to participants' ability to find the correct answer. In the standard paradigm, participants cannot provide a correct answer regardless of their effort. In the latter paradigm, however, they can do so by analyzing the individual probabilities that form the critical conjunctive and disjunctive events.

2. To be sure, anchoring as a bias in judgments under uncertainty (Tversky & Kahneman, 1974) is unlikely to occur if judges know the exact value for the estimate. Thus, expertise will only remain uninfluential if it does not involve knowledge of the true value.

3. Naturally, considering the opposite does not inevitably improve judgment. To the extent that judges' awareness of a distorting influence is false, considering the opposite also may distort a previously accurate judgment. Specifically, judges may correct for an influence that does not exist.

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