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Moody experts — How mood and expertise influence judgmental anchoring

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Abstract

Anchoring effects, the assimilation of numerical estimates to previously considered standards, are highly robust. Two studies examined whether mood and expertise jointly moderate the magnitude of anchoring. Previous research has demonstrated that happy mood induces judges to process information in a less thorough manner than sad mood, which means that happy judges tend to be more susceptible to unwanted influences. However, this may not be true for anchoring effects. Because anchoring results from an elaborate process of selective knowledge activation, more thorough processing should lead to more anchoring; as a result, sad judges should show stronger anchoring effects than happy judges and happy judges may even remain uninfluenced by the given anchors. Because information processing of experts may be relatively independent of their mood, however, mood may influence anchoring only in non-experts. Results of two studies on legal decision-making (Study 1) and numeric estimates (Study 2) are consistent with these expectations. These findings suggest that, at least for non-experts, positive mood may eliminate the otherwise robust anchoring effect.

Keywords: anchoring effect, mood, expertise, assimilation, heuristics, judicial decision making.

1 Introduction

Human judgment is shaped by affective influences. How people judge and evaluate a given target critically depends on how they feel (for a recent review, see Schwarz & Clore, 2007). Judges' mood, for example, influences how they judge their own lives (Schwarz & Clore, 1983), other persons (Ottati & Isbell, 1996), or the frequency of risks (Johnson & Tversky, 1983). These effects might occur because judges tend to use their mood as information in the judgment process (Schwarz & Clore, 1983). However, moods influence human judgments not only because they are used directly as information, but also because they exert a more indirect influence by changing how judges process information. In particular, judges who are in a happy mood tend to process information in a more superficial or heuristic manner, whereas those in a sad mood tend to process information more thoroughly (Schwarz, 1990, 1998). For example, judges in a happy mood rely more on the use of stereotypes (Bodenhausen, Kramer, & Süsser, 1994) and other heuristic strategies (Isen & Means, 1983; Mackie & Worth, 1989) than judges in a sad mood (Bodenhausen, Sheppard & Kramer, 1993; Bless, Bohner, Schwarz & Strack, 1990). To the extent that the use of such heuristic strategies leads to judgmental biases (Tversky & Kahneman, 1974), these findings suggest that happy judges are typically less accurate and more biased than sad judges. However, there appears to be at least one notable exception to this rule – judgmental anchoring.

1.1 Judgmental anchoring

Judgmental anchoring — the assimilation of a numeric judgment towards a previously considered number — is known to be a strikingly robust phenomenon. Anchoring effects have been demonstrated in a diversity of judgmental domains (for reviews see Chapman & Johnson, 2002; Epley, 2004; Mussweiler, Englich & Strack, 2004) and result from exposure to implausible as well as plausible anchors (Chapman & Johnson, 1994; Mussweiler & Strack, 1999; Strack & Mussweiler, 1997). Assimilation toward a numerical standard can be elicited even by subliminal standard presentation (Mussweiler & Englich, 2005). Even highly motivated or forewarned participants seem unable to correct for anchoring effects (Wilson, Houston, Etling, & Brekke, 1996). Furthermore, anchoring effects are not restricted to experiments in the labo-

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ratory, but can be demonstrated in a variety of real world settings as well. For example, robust anchoring effects have been shown in the context of negotiation (Galinsky & Mussweiler, 2001; Ritov, 1996) as well as in judicial decisions of legal laypeople (Chapman & Bornstein, 1996) and legal experts (Englich & Mussweiler, 2001). In the latter context, the sentencing decisions of legal experts are influenced even by normatively irrelevant anchors such as a journalists' questions, sentencing demands that were randomly determined by throwing dice (Englich, Mussweiler & Strack, 2006), or extreme sentencing demands that were shouted into the courtroom by an obviously partial person (Englich, 2005). Taken together, this evidence suggests that anchoring is a robust phenomenon. How strongly judges assimilate numeric estimates towards a given anchor value appears to be virtually immune to a variety of experimental manipulations and contextual variations.

1.2 Mood

In light of this striking robustness, it is all the more remarkable that judges' mood has been found to influence the magnitude of anchoring effects. Judges in different mood states are not influenced by a given anchor value to the same degree. The most direct evidence for this dependency exists for the influence of sad mood. Surprisingly, however, sad mood does not reduce the magnitude of anchoring. Rather, it has been demonstrated that sad judges assimilate numeric estimates to a given anchor value even more strongly than judges in a neutral control mood, who already show a large anchoring effect. Sad mood thus appears to further increase the amount of numeric anchoring (Bodenhausen, Gabriel & Lineberger, 2000). How happy mood influences the magnitude of assimilation towards a numeric anchor has not yet been directly tested. There is, however, some initial evidence which has been taken to suggest that happy mood may reduce anchoring. Specifically, in clinical judgments, happy participants were less likely to maintain a self-generated hypothesis in spite of disconfirming evidence than participants in a neutral control mood (Estrada, Isen, & Young, 1997). Happy participants were thus less likely to engage in hypothesis-consistent information processing. Because anchoring has also been linked to mechanisms of hypothesis-consistent information processing (Mussweiler & Strack, 1999), this evidence allows us to speculate that happy mood may in fact reduce the magnitude of anchoring. In sum, these findings suggest that for the case of anchoring, happy judges may be influenced less than sad judges.

How could this be explained? Why would mood influence the operation of the anchoring heuristic in precisely the opposite way from its sibling heuristics, e.g., availability (Isen & Means, 1983; Ruder & Bless, 2003)? The answer to this question is closely tied to the mechanisms that produce anchoring effects. It has been suggested that anchoring often results from mechanisms of selective accessibility (Mussweiler & Strack, 1999, 2000a; Strack & Mussweiler, 1997) or confirmatory search (Chapman & Johnson, 1999) by which judges selectively search for and activate anchor-consistent information about the judgmental target (for an alternative account see Epley & Gilovich, 2001). A judge who is confronted with a high anchor value would thus selectively search for and activate information which indicates that the target value is indeed fairly high. The more elaborately judges engage in this selective search and activation mechanism, the more anchor-consistent information they will activate and the stronger the resulting anchoring effect is likely to be. Because sad mood typically induces judges to engage in more thorough information processing, it will also induce them to be more thorough in the selective search for anchor-consistent information. The result is a more pronounced anchoring effect (see Bodenhausen et al., 2000). Because happy mood typically induces judges to engage in less thorough information processing, it will also induce them to be less thorough in the selective search mechanism. This may result in a reduced anchoring effect or may even eliminate anchoring altogether. The possibility that sad judges are more susceptible to anchoring effects than happy judges — while surprising at first sight — is thus well in line with current accounts of the psychological mechanisms that underlie anchoring effects.

1.3 Expertise

The described mood effects on the magnitude of anchoring, however, may not hold for everyone. In fact, it has been suggested that how strongly mood influences human judgment depends on judges' expertise in that "people are less likely to rely on their moods when they have high expertise in the domain of judgment" (Schwarz & Clore, 2007, p. 389). This is also likely to be the case for indirect effects of mood on judgment via changes in information processing styles, which have been demonstrated to be quite flexible (Bless, Bohner, Schwarz & Strack, 1990; Schwarz, 2002). Experts typically process information in their domain of expertise in a more efficient manner (Reyna & Lloyd, 2006; Reyna, Lloyd & Brainerd, 2003; Ste-Marie, 1999), so that information processing is also likely to depend less on factors that influence capacity allocation. Because one such factor is judges' mood (Schwarz & Clore, 2007) information processing of experts may be relatively independent of their mood. For the domain of anchoring, this reasoning suggests that the judgments of experts may be influenced by a given anchor to similar degrees, no matter whether they are in

a happy or sad mood. Thus, judges' mood may influence only the magnitude of anchoring that is apparent in judgments of non-experts.

1.4 The present research

The present research was designed to test this reasoning. To do so, we examined how strongly judicial sentencing decisions of experts vs. non-experts for whom a happy vs. sad mood was induced were influenced by a given anchor. Participants were asked to work on a standard anchoring task. Before this task, we used a memory-elicitation procedure (Strack, Schwarz, & Gschneidinger, 1985) to induce a happy vs. sad mood. About half of the participants were asked to recall and re-experience an incident that made them happy. The other half were asked to recall and re-experience an incident that made them sad. We expected that this mood manipulation would influence the extent to which judgments are assimilated towards the given anchors. This, however, should be the case only for non-experts, not for experts. Specifically, we assumed that happy non-experts would assimilate their estimates to the given anchors to a lesser degree than sad non-experts. For experts, however, the magnitude of the resulting anchoring effect should be independent of the induced mood state.

We tested this reasoning in two studies using different content domains. In Study 1, participants were asked to take the role of a trial judge in a legal shoplifting case and were exposed to either a high or a low sentencing anchor before giving a sentencing decision. Participants were either legal-laypeople (non-experts) or legal professionals (experts). In Study 2, student participants made estimates for which they had little expertise (i.e., the height of the Brandenburg Gate) vs. a lot of expertise (the rent for a student dorm apartment). In both studies, we expect that the magnitude of the obtained anchoring effect only depends on the induced mood if judges' expertise is low. In addition, Study 2 will attempt to shed light on the psychological mechanisms that contribute to this expected pattern. Our reasoning holds that induced mood influences the magnitude of anchoring only if expertise is low, because only under conditions of low expertise does mood influence how thoroughly judges process the anchor. To see whether this is indeed the case, we will examine how long judges think about and process the given anchor values.

2 Study 1

2.1 Method

Participants. We recruited 163 participants by approaching them on their university campus and asking them to take part in a study on judicial decision-making. After agreeing to participate, they were taken to a separate room where they were greeted by the experimenter and led to a separate table. Here they received the experimental materials. Expert participants were junior lawyers from different German courts who were enrolled in a supplemental national postgraduate training program at the German University of Administrative Sciences in Speyer. These participants had recently received their law degree and had acquired their first experiences as judges in court. Non-expert participants were students from various disciplines other than law at the University of Würzburg. All participants were offered ice-cream or candy as a compensation for participation.

Materials and Procedures. Participants were asked to work through the experimental materials in the given order and to read instructions carefully. Instructions pointed out that the ostensible purpose of this study was to examine how intermissions during court hearings influence judicial decision making. To that end, participants would first be asked to carefully read the materials about one specific legal case and to then work on a filler task that was ostensibly included to simulate the influence of an intermission. Subsequently they would be asked to answer a brief questionnaire.

The case materials concerned a fictitious shoplifting case about a woman who had stolen some items from a supermarket for the twelfth time. The case materials were similar to those used in previous research (Englich et al., 2006) and were compiled in close collaboration with legal professionals. The materials consisted of brief descriptions of the incidence and the defendant ("Lena M."), an advisory opinion from a psycho-legal expert, and a description of the defendant's previous crimes. Participants were also provided with the relevant passages from the penal code.

After reading through these materials, participants were asked to work on the filler task. Following procedures for mood inductions used in previous research (Bodenhausen et al., 2000; Strack et al., 1985), participants were asked to take about 10 min to describe one incident from their life. They were instructed to remember how they felt during this incident and to re-experience this situation. About half of the participants were asked to describe a happy incident. The other half was asked to describe a sad incident. After finishing this description, participants were asked to answer a series of questions assessing their demographic information. In between these questions was our mood manipulation check question, which asked participants to indicate how they felt right then on a 9-point scale (-4: bad to + 4: good).

Participants then proceeded with the questionnaire assessing their sentence for the shoplifting case. Following the procedures used in previous research (Englich et al.,

Figure 1: Sentencing decisions (in months) by Expertise (non-expert vs. expert), Mood (happy vs. sad), and Anchor (high vs. low) (Study 1).

2006), participants were first exposed to the sentencing anchor. Specifically, they were informed about the sentencing demand of the prosecutor in the given case and were asked to indicate whether this demand was too low, too high, or just right. For about half of the participants, the sentencing demand was a low anchor of 3 months on probation, for the other half it was a high anchor of 9 months on probation. Subsequently, participants were confronted with the defense attorney's demand, which was always 1 month on probation, and again indicated whether they considered this demand to be too low, too high, or just right. Finally, participants reported their sentencing decision for the given case and indicated how certain they felt about their judgment (1 = *not at all certain*, 9 = *very certain*).

Taken together, Study 1 is based on a 2 (Expertise: non-expert vs. expert) X 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) experimental design. All factors were varied between participants.

2.2 Results

Mood manipulation check. An analysis of participants' answers to the question *"How do you feel right now?"* indicates that our mood induction was clearly successful. Participants who described a happy incident in their life indicated that they felt better (M = 1.55; SD = 1.72) than those who described a sad incident (M = .08, SD = 1.85). In a 2 (Expertise: non-expert vs. expert) X 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) analysis of variance (ANOVA), this difference produced a significant main effect of Mood, $F(1, 155) = 27.28$, $p < .001$. In this analysis, none of the remaining effects reached significance. There was a tendency for a main effect of Expertise indicating that the experts in our sample tended to feel better (M = 1.09, SD = 1.83) than non-experts (M = .59, SD = 2.00), $F(1, 155) = 3.14$, $p < .08$, for all other effects, $F < 1.3$, $p > .25$.

Numeric estimates: Sentencing decisions. As Figure 1 reveals, participants' sentencing decisions were jointly influenced by their expertise, their mood, and the given anchor.

For non-experts an anchoring effect occurred only if they were in a sad mood (low anchor M = 3.07, SD = 2.27; high anchor M = 6.19, SD = 2.74), $t(155) = 3.67$, $p < .001$, not when they were in a happy mood (low anchor M = 5.02, SD = 3.16; high anchor M = 5.28, SD = 3.33), $t(155) = .3$, $p > .7$. This pattern produced a significant interaction effect in a 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) ANOVA, $F(1, 81) = 5.16$, $p < .05$. In this analysis the main effect of Anchor also reached significance, $F(1, 81) = 7.13$, $p < .01$.

For experts, however, an anchoring effect occurred no matter whether they were in a sad mood (low anchor M = 4.85, SD = 2.74; high anchor M = 7.44, SD = 2.57), $t(155) = 2.9$, $p < .01$, or in a happy mood (low anchor M = 5.42, SD = 2.9; high anchor M = 8.6, SD = 1.96), $t(155) = 3.65$, $p < .001$. This pattern produced only a main effect of Anchor in a 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) ANOVA, $F(1, 74) = 24.58$, $p < .001$.

In a 2 (Expertise: non-expert vs. expert) X 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) ANOVA, this entire pattern produced the expected 3-way interaction, $F(1, 155) = 3.99$, $p < .05$. In this overall analysis, the main effect of Anchor, $F(1, 155) = 28.02$, $p < .001$ also reached significance. In addition, the main effect of Expertise was significant $F(1, 155) = 15.32$, $p < .001$, indicating that experts gave higher sentences (M = 6.56, SD = 2.95) than non-experts (M = 4.9, SD = 3.08). None of the remaining effects obtained significance, $F < 2.6$, $p > .11$.

Uncertainty. An analysis of participants' answers to the question *"How certain are you about your sentencing decision?"* revealed that experts (M = 6.36, SD = 1.51) felt more certain than non-experts (M = 4.82, SD = 1.94), $F(1, 155) = 31.62$, $p < .001$. No other significant effects on judges' certainty ratings were obtained, all $F < 2$, $p > .16$.

2.3 Discussion

These results are consistent with our hypotheses. As expected, mood influenced the magnitude of the anchoring effect that was obtained for non-experts, but not that for experts. Whereas experts assimilated their sentencing decisions to the given anchors irrespective of whether they were in a happy or sad mood, non-experts were susceptible to this anchoring effect only if they were in a sad

mood. Happy non-experts, however, remained uninfluenced by the given anchor.

Experts were more certain about their sentencing decision than non-experts. This finding is consistent with previous research (Englich & Mussweiler, 2001). Our manipulation check revealed an unexpected non-significant tendency for experts to feel better than non-experts. It is important to note that this tendency works against our hypothesis. If feeling happy reduces the magnitude of anchoring — as the data for non-experts show — then it is all the more impressive that experts — despite feeling a little happier than non-experts — were so robustly influenced by the given anchors.

3 Study 2

One potential caveat of Study 1 is that it examined affective influences on judgmental anchoring in a context that is potentially laden with affect. Judicial decisions can be influenced by feelings such as revenge or forgiveness (Haidt, 2001; Vidmar, 2001) which in principle may interact with our mood manipulation. To examine the generalizability of the obtained effects, we set out to replicate them in a judgmental domain which is less affective in nature. In particular, student participants were asked to make numeric estimates for which they had low vs. high expertise. More specifically, student participants gave either a numeric estimate in the context of a general knowledge question (low expertise) or a numeric estimate that is closely related to their everyday life as a student (high expertise). In light of Study 1, we expected a preceding mood induction to influence the magnitude of the anchoring effect obtained only for the high expertise question, not for the low expertise question.

Our reasoning holds that this pattern results because induced mood influences how thoroughly judges process the anchor value only under conditions of low expertise. To see whether this is indeed the case, we will examine how long judges think about and process the given anchor values.

3.1 Method

Participants. We recruited 120 students at the University of Cologne as participants. They were contacted in the main university cafeteria and asked to participate in two independent studies. The first of the two studies would contain the description of an incident from their life, the second study some general knowledge questions. Participants were offered a coffee voucher and a chocolate bar as compensation.

Materials and procedure. Study 2 used materials and procedures that were in part similar to those of Study 1. Again, we first induced either a positive or negative mood with the help of the experience sampling procedure described in Study 1 and then asked them the same manipulation check question as before ("How do you feel right now?").

Subsequently, participants worked on standard anchoring tasks that were similar to those used in previous research (e.g., Strack & Mussweiler, 1997; Mussweiler & Strack, 1999, 2000a). Instructions to this task pointed out that participants would work on a series of knowledge questions, some of which would include numeric values. In line with the typical anchoring procedure (Kahneman & Tversky, 1974) it was emphasized that these numeric values were randomly determined. Also in line with the standard anchoring procedure, each anchoring task consisted of two questions, a comparative and an absolute one. In the comparative question, participants were exposed to the anchor and asked to indicate whether it is higher, lower or identical to the target quantity. In the absolute question, participants were then asked to give their best estimate of this quantity. For example, participants were first asked to indicate whether the Brandenburg Gate is higher, lower or identical to 10 meters (comparative question) and then to estimate the height of the Brandenburg Gate (absolute question). The critical anchoring question varied in the high vs. low expertise condition. Participants in the low expertise condition were given a comparative and an absolute question concerning the height of the Brandenburg Gate. Participants in the high expertise condition were given a pair of questions concerning a content that is closer to students' life, namely the rent for a student dorm apartment. Specifically, the latter group was first asked to indicate whether the average rent of a student dorm apartment at the University of Cologne is higher or lower than a given anchor value and then to estimate how high the average rent is. The high and low anchor values for both domains were selected on the basis of a pretest in which a different group of students (N = 77) gave absolute estimates for the target quantities. High anchors were set at the 85th percentile of pre-test estimates, low anchors at the 15th percentile. The resulting anchors were 200 vs. 300 Euro for the mean rent of a student dorm apartment at the University of Cologne and 10 vs. 50 m for the height of the Brandenburg Gate.

To examine how thoroughly participants processed the anchor value, we assessed response latencies for the comparative anchoring questions, as was done in previous research (e.g., Mussweiler & Strack, 2000a; Strack & Mussweiler, 1997). Specifically, the time that elapsed from the presentation of the comparative question on the computer screen until participant had provided their answer was assessed as an indicator of how thoroughly participants processed the anchor. In line with previous re-

search, we used a series of practice trials to familiarize participants with the procedures and to thus reduce variance in response latencies. Specifically, participants were first presented with four practice trials before they worked on the critical pair of comparative and absolute question. Depending on condition, the latter pair pertained to the mean rent of a student dorm apartment at the University of Cologne or the height of the Brandenburg Gate.

Taken together, Study 2 was based on a 2 (Expertise: low vs. high) X 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) experimental design. All factors were varied between participants.

3.2 Results

Mood manipulation check. An analysis of participants' answers to the question "*How do you feel right now?*" indicates that our mood induction was again successful. Participants who described a happy incident in their life indicated that they felt better (M = 1.23; SD = 1.97) than those who described a sad incident (M = –.22, SD = 1.81). In a 2 (Expertise: low vs. high) X 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) analysis of variance (ANOVA), this difference produced a significant main effect of Mood, $F(1, 112) = 17.79$, $p < .001$. In this analysis, none of the remaining effects reached significance.[1]

Numeric estimates. Unlike Study 1, where the range of possible numeric estimates is constrained by the sentencing range given in the penal code, the estimates given in Study 2 allowed for almost unrestrained variance. To control for the influence of extreme outliers and consistent with previous research (e.g., Mussweiler & Strack, 2000b), we excluded a total of 9 estimates that deviated from the question mean by more than 2 standard deviations. Our analyses are thus based on the responses of the remaining 111 participants.

In line with the results of Study 1, participants' estimates were again jointly influenced by expertise, mood and the given anchor.

For the low expertise question (height of Brandenburg Gate), an anchoring effect only occurred if participants were in a sad mood (low anchor M = 21.29 m, SD = 10.98; high anchor M = 45.25 m, SD = 8.52), $t(103) = 2.12$, $p < .05$, not when they were in a happy mood (low anchor M = 22.00 m, SD = 14.45; high anchor M = 30.27 m, SD = 13.14), $t < 1$. This data pattern produced a significant interaction effect in a 2 (Mood: happy vs. sad) X 2 (Anchor: high vs. low) ANOVA, $F(1, 48) = 5.40$, $p < .03$. In this analysis the main effect of Anchor as well as the main effect of Mood also reached significance, $F(1, 48) = 22.77$, $p < .001$ and $F(1, 48) = 4.46$, $p < .05$. As expected, estimates in the high anchor condition were higher (M = 38.09 m, SD = 13.16) than estimates in the low anchor condition (M = 21.66 m, SD = 12.67). Additionally, estimates were higher under sad mood (M = 32.35 m, SD = 15.59) than under happy mood (M = 25.50 m, SD = 14.26).

For the high expertise question (mean rent for a student dorm apartment), however, an anchoring effect occurred no matter whether participants were in a sad mood (low anchor M = 235.67 Euros, SD = 31.78; high anchor M = 262.33 Euros, SD = 32.78), $t(103) = 2.54$, $p < .05$ or in a happy mood (low anchor M = 240.71 Euros, SD = 37.10; high anchor M = 280.00 Euros, SD = 47.06), $t(103) = 3.68$, $p < .001$. A 2 X 2 ANOVA reveals a significant main effect of the given anchor on estimates on the high expertise question, $F(1, 55) = 11.29$, $p < .001$. In this analysis, there is no significant main effect of Mood, $F < 1.4$, *ns*, and — more importantly — no significant interaction effect of Mood and Anchor, $F < 1$.

In a 2 (Expertise) X 2 (Mood) X 2 (Anchor) ANOVA using the z-transformed estimates to the low and high expertise questions as dependent variables, this entire pattern produced the expected 3-way interaction, $F(1, 103) = 4.12$, $p < .05$. In this analysis, the two-way interaction of Expertise X Mood also reached significance, $F(1, 103) = 5.12$, $p < .03$, all other effects, $F < 1.2$, *ns*.

Elaboration times. To compare response latencies across different content domains we transformed them into z-scores. The resulting scores thus reflect deviations from the question mean in units of the pertinent standard deviation. In line with data treatment in previous research (e.g., Mussweiler & Strack, 1999, 2000b), we excluded response latencies that deviated by more than 2 standard deviations from the question mean as outliers. A total of 5 response latencies were excluded so that our analysis is based on the remaining 106 participants.

As is apparent from the response latencies depicted in Figure 2, the time participants spent to elaborate on the anchor value during the comparative anchoring question was a joint product of the induced mood and the level of expertise. For the low expertise question, participants in a happy mood thought less about the anchor (M = –.32, SD = .79) than participants in a sad mood (M = .33, SD = 1.10), $t(98) = 2.54$, $p < .05$. For the high expertise question, however, the time of elaboration did not depend on whether participants were in a happy (M = .03, SD = .98)

[1] There was a tendency for an unexpected and theoretically meaningless interaction effect of Expertise X Anchor indicating that participants in the high expertise condition who would later be exposed to the high anchor tended to feel better (M = 1.1; SD = 1.83) than those who would later be exposed to the low anchor (M = 0.0 ; SD = 2.23). No such tendency existed for participants in the low expertise condition (M = .43; SD = 2.17 vs. M = .50; SD = 1.76), $F(1, 112) = 2.88$, $p < .1$, $F < 2.3$, $p > .13$ for all other effects.

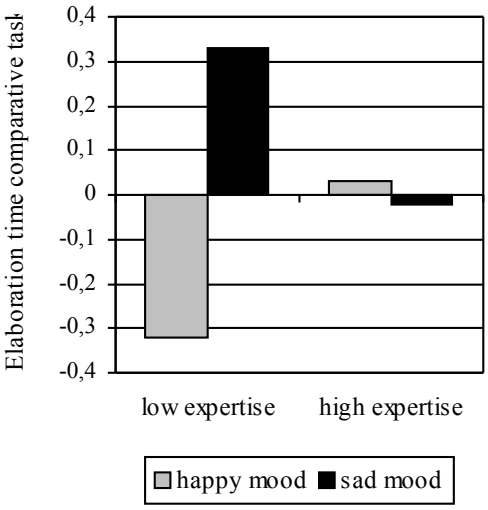

Figure 2: Elaboration times (z-values) for the comparative task by Expertise (non-expert vs. expert) and Mood (happy vs. sad) (Study 2).

or a sad mood (M = –.02, SD = 1.04), t <1, *ns*. In a 2 (Expertise) X 2 (Mood) X 2 (Anchor) ANOVA, this pattern produced a significant interaction effect of Expertise X Mood, $F(1, 98) = 4.01$, $p < .05$.[2] In this analysis, no other effects reached significance.[3]

3.3 Discussion

These findings extend those of Study 1 in at least two ways. First, they replicate the judgmental effects obtained in Study 1 in a very different and less affect laden content domain. As in Study 1, our data again demonstrate that mood influenced the magnitude of the anchoring effect only for low levels of expertise. Here participants' estimates were influenced by the given anchor values only if they were in a sad mood, not if they were in a happy mood. For high levels of expertise, however, the magnitude of the obtained anchoring effect did not depend on participants' induced mood.

Second, and more importantly, these findings shed some light on the psychological mechanisms that may contribute to these differential effects of mood for high vs. low expertise. As our reasoning suggests, positive vs. negative induced mood lead to differential elaboration of the given anchors only for low levels of expertise. Here, participants in a sad mood apparently processed the anchor values more thoroughly than participants in a happy mood. This difference in elaboration may contribute to the obtained difference in the magnitude of the obtained anchoring effect. For high levels of expertise, however, anchor elaboration did not depend on the induced mood. This is well in line with our finding that the magnitude of anchoring also remains uninfluenced by induced mood for high levels of expertise.

4 General discussion

Taken together, the findings of these two studies have a number of implications for research on judgmental anchoring and affective influences on social judgment.

Anchoring effects have been found to be strikingly robust, so that the magnitude of the effect remains mostly uninfluenced by a variety of potentially influential characteristics of the anchor, the judge, or the experimental situation. In a review of the anchoring literature, Chapman and Johnson (2002) conclude that the "effect occurs even for extreme anchors and even when respondents are unaware of the effect, have been warned to avoid the effect or are motivated to be accurate" (p. 126). Furthermore, even manipulations that manage to reduce the magnitude of anchoring, typically do not manage to eliminate the effect entirely (e.g., Mussweiler, Strack & Pfeiffer, 2000). In light of this robustness, it is all the more remarkable that no reliable anchoring effect occurred for non-experts that were in a happy mood. This finding suggests that anchoring is less inevitable than was previously assumed. It also raises the question of why anchoring effects are so reliably found in other studies, particularly because anchoring research often uses general knowledge questions for which participants have little expertise. How do the present results go together with previous anchoring research? It is important to note that a direct comparison between the present and previous findings is difficult to make, because anchoring studies typically neither manipulate nor measure participants' mood. At the same time, the present findings suggest that anchoring effects may be as robust as is typically assumed only in conditions with negative or neutral affective underpinnings. Given that participation in psychological experiments rarely elicits intensive positive affect, most

[2]The same pattern of results emerged if untransformed mean elaboration times are analysed. In this analysis, for the low expertise question, participants in a happy mood thought less about the anchor (M = 6953 ms, SD = 2760) than participants in a sad mood (M = .9191 ms, SD = 3817), $t(98) = 3.02$, $p < .01$. For the high expertise question, however, the time of elaboration did not depend on whether participants were in a happy (M = 5616 ms, SD = 2398) or a sad mood (M = 5492 ms, SD = 2541), t <1, *ns*. In a 2 (Expertise) X 2 (Mood) X 2 (Anchor) ANOVA, this pattern produced a significant interaction effect of Expertise X Mood, $F(1, 98) = 5.46$, $p < .03$.

[3]Overall, sad people tended to elaborate more on the anchor values than happy participants (M = 0.13, SD = 1.07 vs. M = -.14, SD = .90), $F(1, 98) = 3.05$, $p < .09$. Additionally, participants tended to elaborate more on high than on low anchors (M = .20, SD = 1.05 vs. M = –.17, SD = .92), $F(1, 98) = 3.72$, $p < .06$. These main effects are qualified by a tendency of sad participants elaborate particularly on high anchors, Mood X Anchor $F(1, 98) = 2.76$, $p < .1$. None of these tendencies is theoretically meaningful with respect to our hypotheses, all other $F < 1$.

demonstrations of anchoring in the lab are likely to implement these conditions. Moreover, an anchoring effect can be significant overall even if some participants are not susceptible to it.

In addition, the present findings extend previous work examining affective influences on anchoring (Bodenhausen et al., 2000). First, the present studies substantiate the speculation that — at least for some groups of participants — positive mood may reduce the magnitude of anchoring and even eliminate the effect altogether. Suggestive evidence for this possibility has been reported before (Estrada et al., 1997). The present research is the first to directly demonstrate the anchor-reducing effect of positive mood within a classic anchoring paradigm that examines how anchor values influence numeric judgments. Second, the present research specifies a first boundary condition under which mood does and does not influence the magnitude of anchoring. Specifically, mood appears to moderate the amount of anchoring that is apparent only in judgments of non-experts. No such moderation seems to occur for experts.

Moreover, the present research also sheds some initial light on the psychological mechanisms that may contribute to these differential effects of mood on anchoring for high vs. low expertise. In particular, the response latency data obtained in Study 2 demonstrate that only in situations of low expertise does the extent to which judges elaborate on the given anchor depend on their mood. It has been suggested (Mussweiler & Strack, 1999, 2000a; Strack & Mussweiler, 1997) that the magnitude of an obtained anchoring effect depends on how elaborately judges engage in a process of selectively activating anchor-consistent information about the target. As a consequence, the more judges elaborate on the anchor, the stronger the resulting anchoring effect should be. The present findings are well consistent with this perspective.

Furthermore, these results help to delineate how expertise more generally influences judges' susceptibility to judgmental anchoring. In research to date, expertise was typically found to have little if any influence on anchoring. Within the domain of anchoring effects in legal decision-making, for example, Englich and her colleagues (Englich & Mussweiler, 2001; Englich, Mussweiler & Strack, 2005; Englich et al., 2006) have repeatedly demonstrated that experienced trial judges are influenced by irrelevant anchors to similar degrees as legal laypersons with no legal expertise at all. Expertise does thus not appear to protect judges from the anchoring effect. As is also true in the present research, the only consistent difference between experts and non-experts is that — while being influenced to similar degrees — experts tend to be more certain about their judgment. Extending these findings, the present Study 1 shows that under conditions of positive mood, experts may be even more strongly influenced than non-experts. The fact that distinct patterns of influence were obtained for experts and non-experts emphasizes that the influence of expertise in anchoring may have been underestimated. Most anchoring research deliberately focuses on judgments for which participants have very little if any expertise, such as trivia questions (Tversky & Kahneman, 1974; Strack & Mussweiler, 1997). It may not always be appropriate to generalize findings obtained in such paradigms to decision-making of experts in more realistic settings. In discussing these implications for judgmental anchoring it is important to keep in mind that anchoring has been demonstrated in a variety of different paradigms that may involve different psychological mechanisms (Epley, 2004; Mussweiler & Strack, 2001; Wilson et al., 1996). In fact, anchoring effects demonstrated in different paradigms have been shown to have different characteristics (e.g., Epley & Gilovich, 2001; Englich, 2008; Brewer & Chapman). In line with the majority of anchoring studies, we have applied the original anchoring paradigm introduced by Tversky and Kahneman (1974). Whether the present findings generalize to other types of anchoring effects remains to be examined by future research.

In addition, the present findings supplement the literature examining affective influences on social judgment. Here, happy mood is typically described as leading to more heuristic processing and thus a higher potential for biased judgments than sad mood (Schwarz & Clore, 2007). Previous research has demonstrated that anchoring appears to be an exception to this rule in that negative mood increases the susceptibility to the anchoring bias (Bodenhausen et al., 2000). The present findings supplement this research by demonstrating that positive mood may reduce and even eliminate the anchoring effect. Notably, this finding is perfectly in line with recent accounts that attribute the occurrence of judgmental anchoring to processes of selective accessibility (Mussweiler & Strack, 1999, 2000; Strack & Mussweiler, 1997) and confirmatory search (Chapman & Johnson, 1999).

It is one of the hallmarks of research on mood effects that happy and sad mood influences how information is processed. Happy mood tends to lead to more superficial processing, whereas sad mood tends to lead to more thorough processing (e.g., Schwarz & Clore, 2007). The present research demonstrates that this link between happy vs. sad mood on the one hand and superficial vs. thorough processing on the other hand is somewhat flexible. Specifically, only if judges have low expertise in the judgment domain does the thoroughness of information processing appear to depend on their mood. If judges have high expertise, the thoroughness of information processing appears to be independent of their mood. Thus, experts are not only less likely to rely on their current mood state as information that they use as a basis for their

judgment (Bhattacharjee & Moreno, 2002; Ottati & Isbell, 1996) but they also appear to be less likely to engage in the information processing strategy that is typically associated with their mood. These latter speculations about the role of expertise in how mood influences styles of information processing, while consistent with the present data, will have to be substantiated by future research.

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