

Depression and the susceptibility to anchoring bias

Diogo Carvalho da Silva*  / Teresa Garcia-Marques* 

* ISPA – Instituto Universitário, Lisboa, Portugal

Abstract: Are depressive individuals more susceptible to anchoring effects? Does this susceptibility depend upon the affective nature of the event? Does individuals' tendency to ruminative thinking have a role in these effects? We approach these questions by having participants ($N=146$) in a study perform an anchoring task (see Mussweiler & Strack, 2001) with neutral, negative, and depressive events, and subsequently indicate their level of depressive symptoms, via the Patient Health Questionnaire and levels of rumination via the Ruminative Response Scale. Results show anchoring effects to be stronger for neutral events than negative or depressive events. Both depression and rumination interfere positively with anchoring in such that the higher the levels of depression and rumination the higher the susceptibility to anchors. Both effects were shown to occur independently and not to be reliably moderated by the neutral, negative, or depressive nature of the events.

Keywords: Anchoring, Bias, Affective tone, Depressive symptoms, Rumination.

Introduction

Depression is currently the leading cause of disability (World Federation for Mental Health – World Health Organization [WHO], 2012) and one of the most serious public health problems, with about 4.4% of the population suffering from this mental illness (see Carvalho, 2017). In their literature review, Cáceda et al. (2014) highlight evidence showing depression to be associated with different deficits in the decision process. These disruptions are highly important given that mentally ill person has to make important decisions in their daily lives, including taking medication or going to a medical appointment, and being biased in these same decisions, resulting in difficulties in their social integration.

In this study, we follow up such literature on the impact of depression in decisional processes and test the hypothesis that individuals with different levels of depression (in their related symptoms such as sadness and rumination) vary in their susceptibility to anchoring bias depending on the affective character (neutral, negative, depressive) of the task. Below, we define anchoring bias and explain why depression can interfere with the occurrence of this type of bias in decision making.

Anchoring bias

During a decision-making process, anchoring bias may occur when individuals' judgments are influenced by context information. Anchoring biases (Tversky & Kahneman, 1974) define the fact that individuals are influenced by contextual data (a number/value that serves as an “anchor”)

Correspondence concerning this article should be addressed to: Diogo Carvalho, ISPA – Instituto Universitário, Rua Jardim do Tabaco, 34, 1149-041 Lisboa, Portugal. E-mail: diogocsilva94@hotmail.com

when creating estimates about ambiguous tasks; that is, tasks to which they do not know the right answer. An example of this effect was reported in the study by Jacowitz & Kahneman (1995), in which participants were asked to answer a set of questions (e.g., the height of Mount Everest). Initially, they needed to indicate whether the data presented in each question (e.g., 2000 feet – low anchor *vs.* 45500 feet – high anchor) was higher or lower than the true value. Finally, participants were asked to estimate the correct value for each question. The results indicated that the participants focused on the initial contextual value (anchor) and anchored their answer to this value, that is, to each question they answered a value close to the presented anchor data.

Anchoring effects have been studied in different domains, from estimating the frequency of events that reflect general knowledge (e.g., Mussweiler & Strack, 2001) to the perceptions of self-efficacy (e.g., Cervone & Peake, 1986; for a review see Furnham & Boo, 2011). Throughout all these domains the anchoring bias has been shown to be a very robust phenomenon, difficult to avoid (Kahneman, 2012). The identification of several individual factors that moderate this effect (e.g., affective state, expertise, personality, and motivation; for review see Furnham & Boo, 2011), could have helped to better understand it, by helping to contrast between the two hypothetical mechanisms that have been considered as alternatives explanations for the phenomena.

The first explanation for the effect was defined as the anchor-and-adjust hypothesis (Tversky & Kahneman, 1974) and theorized that when people try to make estimates or predictions, they begin with some initial value, or starting point, and then adjust from there. With this approach, the bias occurs because individuals tend to fail the complete adjustment. The second proposal emphasizes the possible role of memory. Mussweiler and Strack (1999a, 1999b) and Strack and Mussweiler (1997) proposed a model of anchoring effects that is based on the concept of selective accessibility. The authors suggest that anchoring effects occur because the anchor makes relevant information more accessible in memory, and it is this information that biases individuals' estimates. However, current evidence in the field, suggests that anchoring effects are likely to be a multifaceted phenomenon with various underlying processes (e.g., Epley & Gilovich, 2006; LeBoeuf & Shafir, 2006, 2009; Russo, 2010; Simmons et al., 2010; Wegener et al., 2010). The general idea is that anchors may disrupt various cognitive processes or their subprocesses, resulting in a lack of unified explanations to encompass all the different types of anchoring effects. Within this line of thought, Blankenship et al. (2008) and Wegener et al. (2010) show that anchor effects occur in different elaborative conditions, not being necessarily associated with a more heuristic pathway.

Depression and anchoring

To our knowledge, no study has addressed different susceptibility to anchors related to mental illness. This, even knowing that depressed individuals show many cognitive biases, such as an attention bias that favors negative information (see Peckham et al., 2010) an interpretation bias having ambiguous information as negative information (Wisco & Nolen-Hoeksema, 2010), a recall bias favoring negative memories relatively to positive memories (e.g., Williams et al., 1997) and show cognitive deficits in executive functioning, working memory, and processing speed (LeMoult & Gotlib, 2019); especially problems in inhibiting negative information (Goeleven et al., 2006; Gotlib et al., 2004) in shifting and updating representations in working memory (e.g., Lo & Allen, 2011).

The literature review provided by Cáceda et al. (2014) identifies these and other cognitive deficits in the decision process associated with depression. However, this review also suggests that the deficit could be less for depressive people. That is, some studies show that individuals suffering from depression present a more careful/precise decision-making, defending the existence of a lower presence of cognitive errors on their part compared to normative individuals (Alloy &

Abramson, 1979; Lewinsohn et al., 1980; Rozenky et al., 1977). For example, the results of Alloy and Abramson's (1979) study indicated that depressed participants made more accurate contingency judgments, failing less in their predictions compared to normative participants.

The majority of the evidence shows an inverse conclusion, this is, that common symptoms in depressed individuals are factors that interfere with their cognitive functioning (e.g., Zhang et al., 2012). These symptoms being indecision (Leykin et al., 2011), risk aversion (Murphy et al., 2001) a feeling of hopelessness (Abramson et al., 1989) feelings of regret (Monroe et al., 2005) experience of sadness or negative mood, increased negative rumination (see Nolen-Hoeksema et al., 2008) among others. Kircanski and colleagues (2012) call our attention to the fact that these symptoms the ones with more implications for cognitive bias and deficits in cognitive control and inhibition may be the ones associated with facilitations of the repetitive negative thinking, or rumination, that has been found to be most relevant characteristic of depressed individuals.

In this paper, we address how feelings of depression and possible associated rumination can have implications for the sensibility of anchoring effects. Even being so important to understand the bias in decision making little is known about how this mental illness interferes with anchoring effects. Below we review the literature that suggests that this is the case.

Sadness, rumination and anchoring effects

Sadness, when deep and constant, is defined as one of the main symptoms of depression (American Psychiatric Association [APA], 2014). The individual's negative state of sadness (uprooted from depression) is also associated with inconsistent data regarding how it drives cognitive biases (Chepenik et al., 2007).

In various research scenarios, sadness has been linked to a tendency for more thorough and detailed thinking compared to happiness (e.g., Mackie & Worth, 1989). This often leads to a reduction in judgmental biases promoted by the use of simplistic decision-making shortcuts. The results parallel those of Alloy and Abramson's (1979) relative to depressive participants.

Highly relevant is that in parallel with the evidence suggesting that sadness reduces cognitive bias in general, there is direct evidence on the anchoring effect suggesting that sadness can increase susceptibility to the anchoring effect (Bodenhausen et al., 2000; Chen, 2013; English & Soder, 2009).

One reason why incongruent expectation may occur is because anchoring may occur not only through a more heuristic pathway but also through a more elaborative pathway (Blankenship et al., 2008; Wegener et al., 2010). Since sadness tends to prompt deeper processing (Bless et al., 2006; Garcia-Marques & Mackie, 2000), in the context of the anchoring effect, giving more consideration to the initial reference value leads to a stronger alignment of estimates with the anchor. If individuals in a sad emotional state are inclined to think more actively about the judgmental anchor compared to those in a neutral mood, it follows that their subsequent judgments would be more likely to be influenced by this reference point. This is suggested by data in one of Bodenhausen et al. (2000) studies, where authors induced a sad affective state in participants before the anchoring task, inviting them to recall a recent moment that made them feel extremely sad. Then, they were asked to answer a set of questions that required an estimated value (e.g., the length of the Mississippi River). The question presented contained the presence of a low or high anchor (e.g., "Is the Mississippi River longer or shorter than X miles?"), subject to a binary answer (yes or no) and, finally, the participant who answered the question was asked to give the value he thought was correct. The results showed that participants induced to a sad mood were more susceptible to the anchoring effect, compared to participants with a neutral mood, substantially underestimating at low anchors and substantially overestimating at high anchors.

Other studies also corroborated that our mood states are likely to interfere with anchoring effects associating a negative state with more susceptibility to bias. For instance, Chen (2013), presents results indicating a greater susceptibility to the anchoring effect on the part of individuals induced in a negative mood, compared to individuals induced in a positive mood or a neutral state. Also, English and Soder (2009) by contrasting those in happy and sad moods in the performance of an estimation task show that anchoring bias for those who were not an expert in the task content, was higher for sad people than for happy people. Together these results suggest that similar effects will be found when comparing individuals with different levels of depression in their susceptibility to anchoring effects. This is because depression is a syndrome for which a negative mood is the main symptom.

As reviewed above, the degree of sadness felt in a depressive state is related to individual easiness in recalling sad or negative events (memory congruence effect) (e.g., Matt et al., 1992, for review), with biased attention to the content of negative items (Peckham et al., 2010), and all these processes are related with a general tendency to increase negative rumination (see Nolen-Hoeksema et al., 2008). In essence, this rumination (for review, Papageorgiou & Wells, 2003) occurs when a range of conscious thoughts revolve around a common theme and tend to repeat themselves even when there are no immediate external pressures prompting these thoughts (Martin & Tesser, 1996). For a depressive person, these ruminative thoughts are likely negative and depressive.

Rumination is not only associated with the intrusion of task-irrelevant negative thoughts (see Hertel, 2000) making them more accessible. It also reduces processing cognitive resources (Hertel, 1998; see also Beevers, 2005) thereby preventing these resources from being allocated to effortful tasks. Although no direct studies have approached the relationship between rumination and sensitivity to anchor effects, previous research has related the increased bias to conditions that lack cognitive resources, either defined by higher time pressure or cognitive load (Lieder et al., 2018; see Epley & Gilovich 2006).

In summary, the available empirical data suggest that depressive individuals may be more susceptible to anchor effects, given that negative mood increases such susceptibility (e.g., Bodenhausen et al., 2000). Because depressed people are more likely to overload memory negatively having greater difficulty in diverting attention from it (Gotlib & Joormann, 2010) we should also expect depressive individuals to be more susceptible to anchor effects.

However, these effects may be moderated by the type of information being processed. This is because one of the studies reported above, English and Soder (2009), showing the effects of an induced negative versus a positive state on their susceptibility to anchors, shows the effect to be moderated by the topic level of expertise. Individuals in a negative mood were only more susceptible to the anchoring effect, with regard to judgments for which they were not experts. As such it is possible that the effect revert if the topic of the negative information relates to the depressive individual's area of expertise, the one related to depressive symptoms.

Current study

Our goal is to test the hypothesis of the non-clinical state of depression being associated with differential levels of susceptibility to the anchoring effect. Besides assessing the levels of sadness experienced by participants, we independently assessed participants' tendency for negative rumination, to further explore the role of this factor in the expected effect. Finally, we control for the nature of the information being processed, neutral, negative, and depressive to assess if and how the level of expertise showing through depression interferes with the effect.

To test this hypothesis, an anchoring task was designed through 24 trials related to various domains of knowledge with different affective tones (8 neutral tones x 8 negative tones x 8 depressive tones). Half of each of the three categories of trials were presented with a high anchor

and the other half with a low anchor. All events were pre-tested to guarantee their affective nature, with special attention given to the distinction between the negative (which occurs for all people) and the depressive tone (which occurs mainly for those with depression). Individuals' level of depression was evaluated through the PHQ-9 (Kroenke et al., 2001), and levels of rumination through the Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991). A measure of susceptibility to anchoring was created through the difference between the responses to the (standardized) high-anchor and low-anchor questions for each of the three events (neutral, negative, depressive).

We hypothesized that the higher the participants' level of depression and rumination, the greater their susceptibility to anchoring effects. We also hypothesized that this effect could be moderated by the nature of the information, with those who are depressed being less susceptible to anchoring effects in the case of depressive events, possibly due to an expert effect.

Method

Participants and design

The participants were 146 Portuguese (74.7% female) with an average age of 28.11 years ($SD=10.91$), with 34.2% reporting that they suffer or have suffered from depression. They were recruited for convenience and using a snowball technique. All participants saw the three events with different anchor levels which defines our design as a 3 (affective tone of the questions: neutral vs. negative vs. depressive) x 2 (anchor: low vs. high) within-participant design. A power analysis using *G*Power* to detect within effects suggests a sample of 36 participants. However, to detect a moderate bivariate relationship ($r=.30$) between depression, rumination, and the anchoring effect, for alpha 5% and 80% power, we calculated a need for an N of 82. We collect some more to overcome the possible presence of outliers.

Anchoring task

The anchoring task was defined by 24 trials where participants were asked to estimate a quantity related to various domains of knowledge and with three different affective tones: 8 neutral, 8 negative, and 8 with a depressive tone. Four of each tone were presented with a high anchor value and the other four with a low anchor value (counterbalanced and randomly presented). All natures of the events were pre-tested, primarily to validate the distinction between events of a negative nature *versus* those of a depressive nature, which is of utmost importance. The creation of neutral events was based on the most common anchoring tasks in the literature. Examples of neutral events are statements related to the number of sales of vehicles at a stand; the amount of meat *versus* fish dishes served in a restaurant; percentage of vocational courses in certain specific cities. On the other hand, the creation of negative events was associated with factors with a clear negative charge, such as the percentage of accidents, misfortunes, and crimes. Finally, the depressive-themed events were created based on the depressive symptomatology described in the DSM-V (APA, 2014), considering that the majority of common knowledge characterizes depression in line with what is described in the DSM-V (Räty et al., 2006). Some examples of these latter ones were: “*What percentage of people suffer from insomnia in the Lisbon region?*”; “*In 1000 people, how many spend more than two days crying?*”. After the creation/adaptation of the tasks, three judges, who were completely unaware of the study's objective, of different ages, genders, varying levels of education, and different levels of familiarity with depression (knowing acquaintances/family

members who have experienced it versus not knowing anyone who has), assessed the nature of each of the 24 sentences/tasks (inter-judge agreement being .813 of the *Kappa* coefficient).

Depression and rumination measures

Participants' depressive symptoms were assessed using the Patient Health Questionnaire (*PHQ-9*) (Kroenke et al., 2001) which is valid for the Portuguese context (Ferreira et al., 2019; Lamela et al., 2020; Monteiro et al., 2013, 2019) in both clinical ($\alpha=.77$) and non-clinical ($\alpha=.88$) populations. This scale asks the participant about the frequency with which he was affected, in the previous two weeks, by any of the nine problems, representing depressive symptoms, (e.g., "I had a lack or excess of appetite"), through a response scale of four points ranging from 0 – *Never* to 3 – *Almost every day*. In this study, the scale was modified to vary between 1 – *Never* to 4 – *Almost every day*.

We assessed participants' level of rumination using the Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991), in the version by Treynor et al. (2003) which in turn was adapted to Portuguese (Dinis et al., 2011). This scale asks participants to indicate what they usually do when they feel sad, depressed, or more down, using a degree of agreement for each of nine actions (e.g., "I analyze my personality and try to understand why I feel depressed"), with a response scale ranging from 1 – *Almost never* to 4 – *Almost always*.

Procedure

Through a snowball, procedure participants were invited to participate in this study via personal email. Informed consent was requested together with the link to the *Qualtrics* online platform, where data was collected. Each of the three sets of trials (8 neutral + 8 negative + 8 depressive) was presented in random order and trials were presented randomly within each of the sets to participants. On each trial, participants were first asked a relative estimation of a quantity reporting it was lower or higher than a specific anchor value. In a subsequent screen, participants were asked to provide their absolute estimation of the value (some questions worked on absolute estimates and others on relative estimates) that they estimated to be true for that question. After finishing this anchoring task, participants were asked to answer the nine questions of the *PHQ-9* followed by the 9 actions that evaluated their tendency to ruminate. Finally, they were asked to provide their gender and age and thanked for their participation.

Results

We first analyze anchoring effects associated with each type of event, participants' responses were all standardized, and, with these transformed variables, an average was aggregated by each set of events (neutral, negative, depressive), according to the associated anchor level (low anchors vs. high anchors). Extreme values of these responses, above or below 3.5 *SD*, were considered outliers and excluded from the analysis.

Anchoring effects

The repeated measure *ANOVA* shows a clear anchoring effect, $F(1,145)=96.10$; $p<.001$; $\eta_p^2=.40$, suggesting that higher estimates were provided for events associated with high anchors ($M=.10$; $SD=.27$) than with low anchors ($M=-.17$; $SD=.27$), $t(145)=9.80$; $p<.001$; $d=.99$. No main effect of

type of event, $F < 1$, was detected. In turn, the results suggest the presence of an interaction between anchoring x type of event, $F(2,290)=14.61$; $p < .001$; $\eta_p^2=.09$, suggesting that participants were much more sensitive to neutral affective tone anchors than in the other two conditions (see Figure 1). Post hoc contrasts (Fisher's *LSD*) show that the anchoring effect is present for the set of neutral events, $t(435)=9.90$; $p < .001$; $d=1.06$, as well as for the set of depressive events, $t(435)=4.68$; $p < .001$; $d=.50$, but did not achieve significance for negative events, $t(435)=-2.47$; $p=.134$.

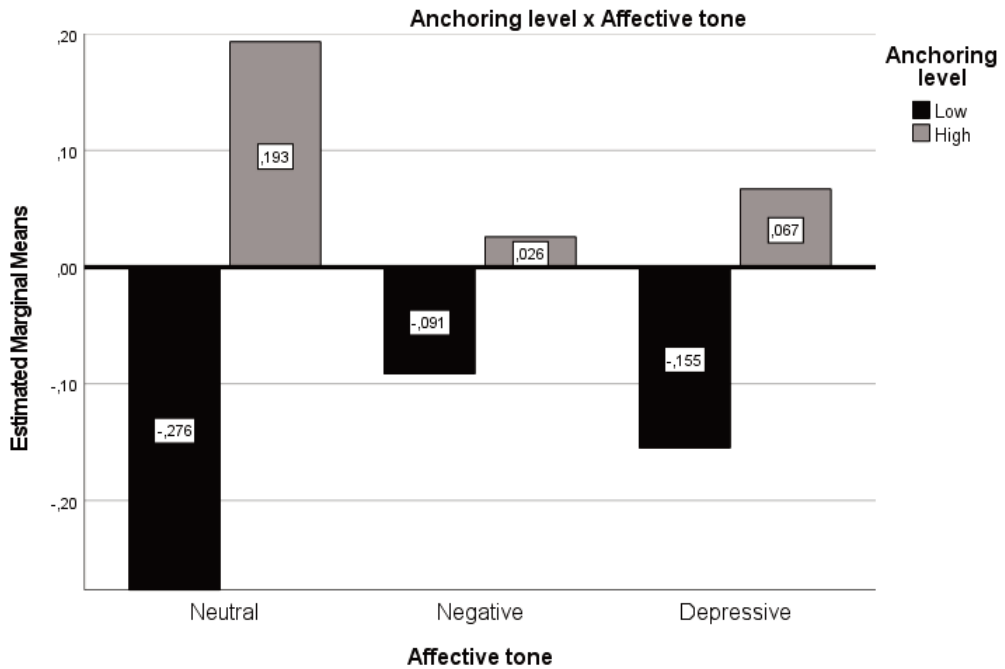


Figure 1. Anchoring level x Affective tone

Moderation

For testing the relationship between anchoring effects and depression scores, we first compute anchoring effects estimates for each set (neutral, negative, depressive) for each individual, by subtracting the mean of estimation made with high anchors from low anchors. This allowed to relate this variable with individuals' features (levels of depression and the tendency to ruminate), in order to test if these individual features moderate the effects at each affective tone level. For this, we run two separate General Linear models having type of events as levels of a within factor and depression or rumination as a continuous predictor and the anchoring effect as a dependent measure.

Depression

When the depressive scores (mean of 9 items responses; $\alpha=.89$) were entered as a continuous predictor in the previous analysis, the main effect of the level of depression was shown to be significant, $F(1,144)=4.21$; $p=.042$; $\eta_p^2=.03$, suggesting that, as expected, anchoring effects were stronger for those with higher levels of depression.

Contrary to our expectations the effect of depression over anchoring effects was not moderated by the type of event, $F < 1$, which the main effect was also not significant, $F < 1$. Nevertheless, for a better understanding of the data, we partialized the effect, running a more focused analysis, by calculating the correlation that levels of depression established with anchoring effects separately for each type of event. This analysis informs that the only significant positive relationship occurs for neutral events ($r = .17$, $p = .042$), indicating that the higher the level of depression the greater the anchoring effect was only clearly found for neutral events. Anchoring scores show no significant relationship with depression levels both for the negative ($p = .366$) and depressive events ($p = .547$).

Rumination

The rumination scores were computed by aggregation of the responses to all the items of the scale ($\alpha = .78$). We first test the relationship between the levels of rumination and of depression. As expected, these two individual variables were highly related in such that those with higher depression were also those who reported having more rumination ($r = .55$, $p < .001$).

A General Linear approach was then performed for individual levels of rumination. Then the rumination scores were entered as a continuous predictor in the analysis having the type of events as a repeated measure factor. Levels of rumination play an important role in moderating the anchor effect given that the main effect of rumination was significant, $F(1,143) = 9.15$; $p = .003$; $\eta^2_p = .06$. Rumination effects were not dependent on the type of event, $F < 1$. In addition, the analysis rendered the main effect of the type of events nonsignificant $F(2,286) = 1.02$; $p = .363$; $\eta^2_p = .01$, suggesting that levels of rumination could explain the differences found between those conditions. We further analyzed the effect of rumination on anchoring within each type of event. The correlation between the rumination scores and anchoring effects was positive and occurred strongly for negative events ($r = .15$, $p = .064$) and depressive events ($r = .14$, $p = .097$) than for neutral events ($r = .13$, $p = .112$).

We further test the hypothesis that the effects of depression could relate to participants' levels of rumination, by testing if depression could moderate the rumination effects and the hypothesis that ruminative tendencies could mediate the effects of depression, via *PROCESS* v. 4.1. We found no support for both hypotheses, suggesting that the two individual features contribute independently to a general increase in anchoring effects.

General discussion

In this study, we address the hypothesis that individuals' levels of depression and levels of rumination are related to a greater susceptibility to anchor effects. We further test if and how these relationships could be moderated by the affective nature of the events.

Results indicated that, indeed, the magnitude of the anchoring effect increases with increasing levels of participant depression, replicating the data obtained in studies with manipulation of negative mood states (Bodenhausen et al., 2000; Chen, 2013; English & Soder, 2009). It also corroborates our expectation, showing for the first time that individuals' levels of negative rumination are also positively related to the magnitude of the anchoring effect. In addition, the results show that although depression and rumination levels are positively related their relationship with anchoring effects are independent.

We expected that the relationship between levels of depression and anchoring effects was moderated by the type of the event. Contrary to our expectations the results were not clear supporting this hypothesis. Although results show that the magnitude of the anchoring effect is

greater for neutral trivial events than for negative events and depressive events (being smaller in the latter two) this factor did not qualify the relationship between depression and anchoring. As such, data does not corroborate the hypothesis that the effect of depression would be reduced in the face of events for which depressed people could be considered experts (depression topic).

Bellow we discuss how these results inform the literature on anchor effects and depression and ruminative states.

Anchor effects

Our data replicates anchoring effects, confirming their status as a prominent cognitive bias. In addition, it shows that the effects are weaker when the information being processed is negative or depressive. The strength of the effect for the nonnegative information over the negative information was previously shown in Bodenhausen et al.'s (2000) studies and so the results are replicating that effect. In that paper, the authors suggest that this occurs because people prefer to think more about positive than negative topics, referring to the selective-accessibility model (Mussweiler & Strack, 1999a, 2001), which implies a larger anchoring bias for positive topics than for negative ones. An alternative account may be suggested by the fact that valenced information has a differential density representation in memory (Unkelbach et al., 2008). Assuming that the anchor effect occurs because the availability of information made accessible in memory interferes with the magnitude of the effect (e.g., Mussweiler & Strack, 2001), we may assume that negative information is less likely to become accessible in the presence of an anchor than positive information, leading to the differences observed in the magnitude of the effect. A hypothesis that will deserve to be tested in the future.

Rumination effects

The association of levels of rumination with levels of anchoring was independent of participants' levels of depression. This may suggest that the effect is more related to the overload promoted in working memory by rumination than to the negativity of the accessible information led by the depressive state. As such these results corroborate previous research showing that to overcome anchor bias we need the availability of cognitive resources. These resources are assumed by the anchor-adjustment explanation (Tversky & Kahneman, 1974) as necessary for individuals performing an appropriate adjustment of the initial estimation to the current context (Epley & Gilovich 2006). For the alternative view, offered by the selective accessibility approach (e.g., Mussweiler & Strack, 2001), it is less clear why a working memory overload would lead to less sensitivity to the effect.

The alternative hypothesis suggested by the selective accessibility approach (e.g., Mussweiler & Strack, 2001), that rumination could facilitate memory accessibility of relevant information, is also informed by the fact that the type of event did not reliably moderated the relationship that the levels of rumination established with anchoring effects magnitude.

Depression

Our results show that depression increases the cognitive bias known as the anchoring effect. This is in line with evidence showing that more cognitive biases are found to occur in a depressive state than in a non-depressive state (see Cáceda et al., 2014). As such, if this bias was only associated with evidence of more superficial processing, we could argue that our evidence would invalidate the assumption that depression leads to more careful/precise decision-making, lowering

cognitive errors (Alloy & Abramson, 1979; Lewinsohn et al., 1980; Rozensky et al., 1977). However, since Wegener et al. (2010) demonstrate that the bias may also occur via an elaborative pathway, we should also consider the possibility of this occurring. Nevertheless, future research should understand if that is the case, for instance, by testing conditions that would disrupt such elaboration and by testing if an activated thought process underlies the emergence of the bias, as postulated by the selective accessibility model (Mussweiler & Strack, 1999a, 2001).

Previous evidence that a sad mood state may induce more susceptibility to the anchor effect (Bodenhausen et al., 2000), has also postulated that this occurs because a sad mood induces more elaborative processing and that by bolstering more thought about the anchor sad mood induces more bias.

Although Bodenhausen et al. (2000) have shown that the impact of mood on anchoring was not moderated by the valence of the events being evaluated by participants (Study 2), we assume that this could occur when the topic of the information was related to participants expertise, that is for depressive events. However, we have no reliable data to support this hypothesis, so our results simply corroborate what the authors had already found; a null effect of type of event.

Importantly, although several studies document that levels of knowledge moderate the magnitude of the anchoring effects (Mussweiler & Englich, 2003; Mussweiler & Strack, 2000; Wilson et al., 1996), also several anchoring studies, show that professional experience, akin to expertise, did not reduce this bias (e.g., Englich et al., 2005; Joyce & Biddle 1981; Northcraft & Neale, 1987; Wright & Anderson, 1989). The fact that several studies lack evidence about the general expertise effect (see Furnham & Boo, 2011) leads researchers to hypothesize that only task-specific knowledge is related to less anchoring (e.g., Welsh et al., 2014; Wilson et al., 1996; Wright & Anderson, 1989). As such if one reason why null effects may occur is because there is equal expertise on negative and depressing topics, another reason may be that the effect should not be one to expect.

Limitations

It is important to highlight that the relationships uncovered in this study are far from having a causal link given the correlational nature of the study, defining depression as an individual feature. In addition, our results are likely to be partially determined by the specific distribution of levels of depression of participants, creating some restriction of the range given that highly depressive individuals were not fully represented in our sample. The fact that we did not have a clinical population (individuals diagnosed with depression), may mean that our depression measure is capturing just a sad mood state and not a depressive state with all the symptomatology able also to interfere with the magnitude of the anchoring effect. In addition, this could be the reason why those higher in depression did not show evidence of being an expert on the subject of depression. As such, this feature of our sample presents strong restrictions in the interpretation of our null results. Future studies would help in comparing a non-clinical population with a clinical population in order to understand the validity of these effects.

Although we have challenged our assumption regarding the effects of expertise on depression, we acknowledge that the null effects we found may also be related to the nature of the materials. We constructed the selected depressive events based on the definition of symptoms associated with the syndrome. However, there is no reason to believe that individuals with depression are completely aware of all their symptoms, and it is possible that these events were not perceived as genuinely depressive by a population experiencing depression. Given that individuals with depressive symptoms tend to be self-centered and ruminate on their own suffering and negative events, this is a hypothesis that should be better addressed with pre-tested materials among a clinical population.

Conclusion

This study shows that those individuals with higher levels of depression are more susceptible to anchors and that the tendency for rumination exerts a role in the magnitude of the anchoring effect.

These results are of special importance in the dignotic process, since individuals suffering from high levels of depressive symptoms will be more susceptible to any anchoring effects when the doctor asks for their daily estimates (e.g., distance and/or time needed to reach an appointment; average hours of sleep in the last month; estimated duration of treatment). Future studies should approach if this bias is only relevant when the estimates are about their neutral life events since data points to be possibility that the effect has a smaller magnitude for negative events.

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Authors contribution

Conceptualization: DCS, TGM; Supervision: TGM; Data curation: DCS; Formal analysis: DCS; Writing – Original draft: DCS; Writing – Review and edit: TGM.

All the authors read and approved the final manuscript.

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Depressão e a suscetibilidade ao efeito de ancoragem

Resumo: Indivíduos com depressão são mais suscetíveis aos efeitos de ancoragem? Essa susceptibilidade depende da natureza afetiva do evento? A tendência de pensamento ruminativo dos indivíduos desempenha um papel nesses efeitos? Abordamos estas questões ao ter participantes ($N=146$) num estudo a realizar uma tarefa de ancoragem (ver Mussweiler & Strack, 2001) com eventos neutros, negativos e depressivos e, posteriormente, a indicarem o seu nível de sintomatologia depressiva, através do Patient Health Questionnaire, e os seus níveis de ruminação, através da Ruminative Response Scale. Os resultados mostram que os efeitos de ancoragem são mais fortes para eventos neutros do que para eventos negativos ou depressivos. Tanto a depressão como a ruminação interferem positivamente com a ancoragem, de modo que quanto mais elevados os níveis de depressão e de ruminação, maior a susceptibilidade às âncoras. Ambos os efeitos mostraram ocorrer independentemente e não são confiavelmente moderados pela natureza neutra, negativa ou depressiva dos eventos.

Palavras-chave: Ancoragem, Viés, Tom afetivo, Sintomas depressivos, Ruminação.