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Anchoring in willingness-to-pay decisions: An experimental comparison of two research approaches

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Abstract

Businesses can increase customers' willingness to pay by simply displaying multi-digit numbers, utilizing the anchoring effect. This paper compares two methodological approaches to test for the anchoring effect experimentally: a hypothetical one (subjects answering what-if questions) and a real situation (subjects making decisions involving their own real money). Although previous studies have examined anchoring in each of these settings separately, no direct comparison is available to date. In this paper, we conduct an experiment to compare anchoring in a hypothetical and a real-purchase setting. As hypothesized, the anchoring effect is more prevalent in the hypothetical than in the real-purchase condition. This produces some concerns regarding the suitability of the methods used to examine the anchoring effect.

Keywords

Anchoring, experiment, methodology, willingness to pay.

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1. Introduction

The anchoring heuristic is one of the cognitive shortcuts that help to speed up and simplify humans' the decision-making process. It was introduced, along with other heuristics, by Tversky and Kahneman (1974). They demonstrated the ability of an arbitrary number (*the anchor*) to influence people's judgements. In their classic experiment, a wheel of fortune was spun, a number was retrieved and the subjects were first asked whether the percentage of African nations in the UN was larger or smaller than the seemingly random number (the wheel was manipulated to produce either 65 or 10). Next, the participants were asked to write down their guesses on how large the share really is. Those who were faced with 65 first guessed 45% on average, while the average guess of those who were faced with 10 was 25%.

The anchoring effect was later shown to be influential in multiple areas of judgement and decision making: guessing the correct answer (Epley and Gilovich, 2001), making predictions about future events (Chapman and Johnson, 1999), business negotiation outcomes (Galinsky and Mussweiler, 2001), promotion decisions in academia (Chen and Kemp, 2015), purchase quantity decisions (Wansink et al., 1998), judgements of person's recent behaviours (Cheek et al., 2015) and finally willingness to accept (WTA) – the minimal amount one is willing to accept for performing a given task (Ariely et al., 2006; Shen and Tonai, 2012) – and willingness to pay (WTP) – the maximum amount one is willing to pay for a given product or service (Ariely et al., 2003; Hardesty and Suter, 2012; Simonson and Drolet, 2003).

Mostly, the anchoring effect on WTP and WTA decisions was examined by asking subjects how much they would pay for a described product. This hypothetical setting was used in experiments by Hardesty and Suter (2012) and Simonson and Drolet (2003), to name a few. In the study by Ariely et al. (2003), however, the subjects were able to buy the presented products with their own money, thus bringing the experimental situation closer to real life in terms of motivation and elaboration likelihood.

The aim of this paper is to investigate whether there is a significant difference between hypothetical and real-purchase settings in anchoring research. We hypothesize that the anchoring effect is more prevalent in plain-questioning situations than in real-purchase situations. Because we were not able to find any existing studies on this matter, we conducted an experiment to test the hypothesis. The results of the experiment support the hypothesis, with implications for both anchoring (and other fields) research methodology and for marketing research and practice.

In marketing research, respondents are often asked about their willingness to pay for a certain product or service. How valid can we consider this kind of research if the responses can so easily be manipulated by the researchers by something as unexpected as the anchoring effect? If it were shown that the responses in questionnaires are more prone to distortion than when one's own real money is considered, then we should take a sceptical look at questionnaires and consider other, more robust and real-life-like methods of research.

The rest of the paper is organized as follows: Section 2 provides an overview of related research and discusses some implications; in Section 3, the research methodology is described; and Section 4 presents the results and provides the general conclusions of this paper.

2. Theory

Ariely et al. (2003) showed a strong anchoring effect of an arbitrary anchor on WTP in a real-purchase setting, with correlations up to 0.52. In their experiment, a group of subjects was shown six items and for each item two questions were asked: *Would you be willing to pay X dollars for this product?* (yes/no question) and *How much would you be willing to pay?* (WTP question), in which X was the last two digits of the subject's social security number. The subjects were told that there was a chance that they would really be able to buy the product. Who the product was sold to and for what price was determined using the incentive-compatible Becker–DeGroot–Marschak procedure.

Anchors in WTP studies are usually presented to subjects in different ways: one way is to include the anchor as part of the environment or instructions, without drawing the subjects' attention to it directly (e.g., as part of a product name). For more information on these incidental environmental anchors, see Critcher and Gilovich (2008). Another method is to present the anchor in such a way that it cannot be perceived consciously (e.g. using a tachistoscope) (Mussweiler and Englich, 2005). Yet another method, the most widely used one, is to ask two consecutive questions: the first is a yes/no question that includes the anchor (*Would you buy this item for X dollars?*) and the second is a WTP question for which the subject writes down her own response (*How much would you pay for this item?*). This approach with two consecutive questions is used in this study as well.

There is no exact agreement on the processes behind anchoring – for a literature review see Epley and Gilovich (2010) or Furnham and Boo (2011) – and thus also no agreement on whether the anchoring effect can be mitigated and how. Tversky and Kahneman (1974) tried to diminish the effect in their spinning wheel experiment by promising a monetary reward for correct answers but with no success. Wilson et al. (1996) reported that informing subjects about the anchoring effect and how it works was not successful in diminishing the effect either. Simonson and Drolet (2003) were successful in diminishing the anchoring effect by imposing time pressure on the subjects. In this study, the possible effect of introducing the subjects' own money into the frame is examined. Although it might be tempting to think that people with certain personality traits (such as cognitive ability) are more prone to fall for the anchoring effect, Welsh et al. (2014) find no such relationships. They did, however, find that the greater one's experience in a certain domain is, the lower one's proneness to anchoring is.

According to the elaboration likelihood model (ELM) proposed by Cacioppo and Petty (1984), when making decisions or forming attitudes, people follow either the central route (high elaboration, thoughtful processing and careful argument valuation) or the peripheral route (no extensive cognitive processing and spontaneous decisions). Two factors that determine which route is used are ability and motivation, and it is motivation for extensive elaboration, this author argues, that is lacking in studies that only ask subjects questions to find out about their WTP. In real life, people (mostly) tend to be motivated to elaborate when purchasing products and this, the author suggests, should be reflected in experiments as well if the researcher wishes to obtain data that are useful for explanations and predictions of the real-life behaviour observed.

3. Methods

To examine the anchoring effect in different situations, the procedure of Ariely et al. (2003) was adopted and altered. A total of 52 participants, students at Masaryk University, participated in the experiment. In accordance with the previous literature, this sample size should be large enough to detect statistically significant results. The theory puts no constraints on subjects' demographics; therefore, if anchoring principles are universal, they will apply to university students too. However, we do not intend to claim that results gained using student participants are valid for all age groups or occupations.

The subjects were assigned to two groups (real purchase and plain questioning) of equal size by random distribution of two different kinds of answer sheets. All the subjects were seated in one room at the same time, to isolate possible interfering variables. Caution was taken to prevent the subjects from recognizing the goal of the study; therefore, only general oral instructions were given to both groups. The subjects were told that they had been divided into groups (not indicating how many) and that they should remain calm and attentive during the whole experiment. More specific instructions, describing either the purchase procedure or the questioning procedure, were written in the respective answer sheets.

During the experiment, five items were presented to the subjects in this order: a bottle of wine, a jar of marmalade, a computer accessory, Swiss chocolate and a head massager. To determine the actual purchase price, a slightly altered version of the Vickrey auction procedure was used. Each item was sold to that member of the real-purchase group who indicated the highest WTP for a price that equalled the second-highest bid plus 1 CZK.

As an anchor, the last two digits of the university personal number were used (number U). Both groups answered for each item whether they were willing to purchase the item for U CZK first and how much they were willing to pay for the item second. The intergroup difference was that one group answered what-if questions with no consecutive purchase opportunity, while the members of the purchase group knew that they could be the ones who, in the case of winning the auction, had agreed to buy the item for real money.

At the end of the experiment, the subjects were debriefed and thanked and the purpose and methods of the study were explained. None of the subjects reported or showed any sign of emotional distress and no one was able to reveal the true purpose of the study by him/herself.

The data were analysed with the SPSS software package. The size of the anchoring effect was

operationalized as the difference between the anchor value and the indicated WTP value for each participant. To compare the groups, the average differences for both hypothetical and purchase groups were calculated for each product and t-tests were conducted.

4. Results

An experiment was conducted to examine the anchoring effect in a hypothetical questioning situation and in a real-purchase situation. The author hypothesized that the anchoring effect would be larger in the situation of hypothetical questioning than in the real-purchase situation.

The anchoring effect size was measured as the difference between the numerical anchor provided to the subject and the subject's response to a willingness-to-pay question. The larger the difference, the smaller the anchoring effect is. Additionally, as an illustrative measure, the anchor–response correlations are presented.

The average anchor–response differences for each item in the plain questioning condition, together with the anchor–response correlations, are presented in Table 1, and Table 2 provides the same for the real-purchase condition. For reference, the products used were: a bottle of wine (A), a jar of marmalade (B), a PC accessory (C), Swiss chocolate (D) and a head massager (E).

Table 1 Mean anchor–response differences and correlations in the real-purchase condition

Product	A	B	C	D	E
N	27	27	27	27	27
Mean diff.	26.04	36.41	39.15	29.33	37.70
Std. dev.	27.79	25.63	37.23	22.58	29.50
Correlation	0.158	0.218	−0.022	0.271	0.149

Table 2 Mean anchor–response differences and correlations in the hypothetical questioning condition

Product	A	B	C	D	E
N	27	27	27	27	27
Mean diff.	13.63	26.30	20.41	14.85	18.48
Std. dev.	18.57	19.33	29.24	13.91	18.79
Correlation	0.603*	0.346	0.575*	0.723*	0.514*

* Correlation is significant at the 0.05 level

First, looking at the correlations, we can observe a strong anchoring effect in the plain questioning condition. The anchor and the subject's WTP are significantly correlated in 4 out of 5 items, with values up to .72 for chocolate. In the real-purchase condition, subjects with higher anchors tend to provide higher WTP responses as well; however, the correlation

coefficients are smaller than those in the plain questioning condition and none are statistically significant.

The average anchor–response differences for each item in each condition are presented in Figure 1; the diminishing anchoring effect in the real-purchase situation (the subjects' responses tend to be further away from the numerical anchors presented) is clearly visible for all the items.

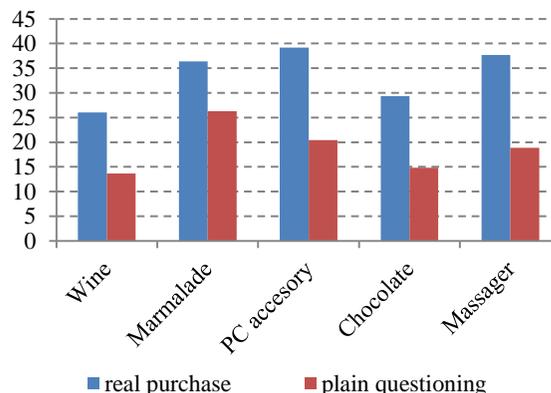


Figure 1 Average anchor–response differences for each item in each condition. Higher values stand for a larger deviation from the anchor and a smaller anchoring effect

To examine whether there are significant differences between the two conditions in terms of the anchoring effect's size, t-tests were conducted for each item presented to the subjects. The results are presented in Table 3. Levene's test showed unequal variances for the marmalade and the PC accessory; therefore, results for equal variances not assumed are presented for these two items.

As shown in Table 3, the average anchor–response differences differ significantly between conditions for the following three items: the PC accessory, chocolate and head massager. The differences for marmalade and for wine (for wine, however, the p-value is very close to 0.05) are not statistically significant.

We can conclude that, in the real-purchase situation, the anchoring effect was (for three out of five items) significantly smaller than in the plain-questioning situation. In other words, we were able to diminish the manipulative power of the numerical anchor by introducing subjects' own financial considerations into the decision-making process.

These results can be interpreted in two ways: first, the anchoring effect can be successfully diminished by introducing a decision-making task that has an effect on one's own budget; second, how seriously can we take people's responses to WTP questions with no real money involved when they can so easily be manipulated by something as simple as anchoring?

Table 3 Independent samples t-test for the anchoring effect's size in the two conditions

Product	t	df	p
A	1.98	52	0.054
B	1.64	48.35	0.108
C	2.06	49.24	0.045*
D	2.84	52	0.006*
E	2.86	52	0.006*

* p-value < 0.05

5. Discussion

Based on previously published studies that examined the anchoring effect on willingness-to-pay decisions either in a plain-questioning condition or in a real-purchase condition, we decided to compare these two settings directly. Accordingly, an experiment with two groups was conducted and it was shown, as hypothesized, that the anchoring effect is less pronounced in a real-purchase situation than in a hypothetical one.

This finding poses some questions about the validity of WTP studies that use no monetary incentive or operate without the subjects' real money. The introduction of a real monetary impact of the decisions observed in this experiment is one of the measures that researchers can take to obtain more life-like results. From reading the existing studies, one easily gains the idea that anchoring is a very robust effect that influences our buying decisions in real life. It seems, however, that once people think in terms of their own money, the anchoring effect is diminished by more elaborate decision-making processes.

Using real monetary incentives in willingness-to-pay experiments has its caveats too. In this case, the first threat is the possibility that the subject simply does not have enough money on hand. It is also possible, that, by design, the subject has to state her WTP but does not want to buy the item at all. In addition, using anchor–response differences to assess the anchoring effect forces us to consider the so-called floor effect – subjects with high anchors can deviate in their responses both upwards and downwards from the anchor, whereas subjects with anchors close to zero can deviate almost only upwards.

We have already discussed the anchoring research and how its results could be invalid in relation to real-life decisions. Let us think about marketing research now: the common practice here is to ask people how much they would pay for a given product, without actually giving them the opportunity to buy it. This may, as this paper suggests, result in tenuous responses (i.e. they are easily distorted by external influences such as anchoring and thus cannot be considered to

represent one's true preferences or to predict one's future purchase decisions). Thus, designs that encourage more life-like behaviour by introducing monetary motivation for subjects are recommended for marketing research on willingness to pay.

In this paper, we directly compare two research approaches to the anchoring effect in willingness-to-pay (WTP) decisions. Although the two approaches followed to examine anchoring in WTP decisions are both used in previous research, no study concerned with their direct comparison has been published yet. Based on the theory, we hypothesized that in a real-purchase situation the anchoring effect would be diminished compared with hypothetical questioning. An experiment with two randomly assigned groups of participants was conducted to investigate the differences in the anchoring effect between the two research settings. In a hypothetical-questioning setting, the researcher simply asks what-if questions about subjects' WTP. In a real-purchase setting, the subjects are required actually to purchase the presented item in the case of being the highest bidder in an auction.

As hypothesized, the anchoring effect, which was pronounced in the plain-questioning setting, was found to be significantly diminished in the real-purchase situation. It was thus shown that introducing one's own money into the decision-making process successfully reduces the anchoring effect. This finding should be considered when designing anchoring research procedures in the future. Furthermore, the fact that, *ceteris paribus*, the anchoring effect is significantly larger in a plain-questioning situation should be kept in mind when reading papers that utilize this research method and when conducting marketing research with the aim of revealing subjects' willingness to pay.

6. Conclusion

In this paper, we hypothesized that the anchoring effect in willingness-to-pay decisions is more pronounced when subjects are asked hypothetical *how much would you pay* questions than when they have the chance actually to purchase items with real money. The experimental results support the hypothesis, suggesting the need to re-evaluate the way in which experiments in behavioural science and marketing research are conducted when it comes to inferring people's willingness to pay for goods.

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