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Come On Down:

Investigating an Informational Strategy to Debias the Anchoring Heuristic

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Abstract

When individuals estimate the price of goods or services, irrelevant factors may affect the estimates. For example, irrelevant numbers in individuals' environments can cause participants to "anchor" to them as starting point price estimates, such that estimates tend toward the anchor (Tversky & Kahneman, 1974; Chapman & Johnson, 1994). In fact, anchored individuals may pay up to three times as much for a product and buy 32% more products (Ariely, Loewenstein, & Prelec, 2003; Wansink, Kent, & Hoch, 1998). Because anchoring affects purchases large and small, this study investigates how to debias, or reduce the negative effects of, the anchoring heuristic. Debiasing strategies are not easily implemented outside the lab where anchoring has the largest real world effects (Strack & Mussweiler, 1997; Chapman & Johnson, 1994; George, Duffy, & Ahuja, 2000). We therefore investigated an easily implemented informational debiasing strategy offering little disruption to an individual's daily routine. The debiasing had no effect on anchoring, but further investigation with a larger sample size and higher external validity is necessary before discounting the strategy completely.

Come On Down: Investigating an Informational Strategy to Debias the Anchoring Heuristic

Individuals make hundreds if not thousands of decisions daily. For example, the author of this thesis ordered a caffeinated beverage this morning from a menu with hundreds of potential options – impressively, she accomplished this while simultaneously making a mental list of her tasks for the day. Though it may not appear that impressive to choose a skim latte with sugar-free vanilla and hazelnut syrup in three seconds, given the myriad combinations of beverages (Americano, Frappuccino, Red Eye, Thai, steamer, macchiato, chai, etc.), flavors (mocha, caramel, gingerbread, peppermint, etc.) and milk types (skim, 2%, and soy), she could not choose so efficiently and at the same time focus her mind on other matters if not for decision-making short cuts. These short-cuts, known as heuristics, allow individuals to make rapid, mostly unconscious decisions by ignoring certain aspects of the problem at hand in order to focus on other important aspects of the problem. For example, a customer in line for coffee may not stop to ponder every single choice on the menu (Gigerenzer, 2008; Gigerenzer & Gaissmaier, 2011).

Individuals use heuristics to make decisions on purchases from mochas to mansions, and even though they are short cuts, and therefore may at first blush appear suboptimal, heuristics can often provide more satisfactory solutions than careful deliberation or weighing the options (Gigerenzer, 2008). For instance, heuristics may result in a willingness to pay higher prices for coffee if the store's décor appears expensive and sophisticated due to an assumption that the drink in a fancy coffee shop is worth more than a drink from the local donut shop (Ariely, 2009). It is perfectly reasonable that heuristics may lead to accurate conclusion that better décor reveals a greater focus on quality and therefore higher worth of coffee; this heuristic thus may in fact lead people to make more optimal choices. However, heuristics can sometimes lead us astray; for

example, it is possible that the fancy coffee shop sells the same brand of coffee as the local donut shop, and merely spends more money on better décor.

Therefore, heuristics can often be useful, but they are not always preferable to careful consideration, especially when irrelevant information influences heuristics, leading to less-than-ideal decisions (Metzger, Flanagin, & Medders, 2010). For instance, a decision to pay a higher price for the same cup of coffee at the fancier store may result in small losses that build up over time. Spending five extra dollars per week on coffee adds up to spending an additional $260 dollars more for the same coffee per year, or close to $10,000 over a lifetime. Though even this may not seem like a huge loss, the impact of heuristics is much broader than coffee; they impact day-to-day behaviors such as shopping at the grocery store, and expensive investment decisions including purchasing real estate or shares in the stock market alike (Lambson, McQueen, & Slade, 2004; Kaustia, Alho, Puttonen, 2008).

Therefore, to try to help people avoid the impact of these heuristics, scientists began exploring ways to debias, or greatly reduce, the negative effects of heuristics. Although the effects of debiasing could be quite far reaching, debiasing itself provides numerous challenges. Most notably, debiasing often does not work: most interventions fail to allow people to generalize to the world outside the lab where heuristics affect decision-making and result in real and profound mistakes (Chapman & Johnson, 1994; Strack & Mussweiler, 1997; George, Duffy, & Ahuja, 2000).

Here we will investigate an informational intervention that could potentially benefit individuals making real world purchasing decisions. First, we will discuss three heuristics that lead to suboptimal purchasing decisions, with special attention on the anchoring heuristic, the primary focus of this research. Following a discussion of the cognitive process underlying the

anchoring heuristic, we will document anchoring's negative effects in daily financial decisions. Lastly, we will discuss past debiasing techniques and describe the current study that builds on past research.

Heuristics and Financial Decisions

As we have seen, decision-making heuristics can lead to costly financial errors (Milkman, Chugh, Bazerman, 2009). Specifically, three heuristics affecting financial decisions include representativeness, effort, and anchoring. The representativeness heuristic allows individuals to sort objects and people into categories based on the object or person's attributes (Tversky & Kahneman, 1974). For example, if people hear that Tim owns a great deal of land, likes nature, and enjoys taking his children to 4H shows, the representativeness heuristic would prompt individuals to assume that Tim is more likely a farmer than an auto-industry engineer, as Tim's characteristics are more representative of farmers than auto-industry engineers.

The representativeness heuristic also operates during purchasing decisions. Consumers are more likely to purchase products and brands that are more representative of a product category than those that are less representative. For example, if Linda decides she wants to purchase a cola, she is more likely to purchase a Coke than an RC or store generic, for most individuals agree that Coke is the prototypical example of a cola (Nedungadi & Hutchinson, 1985). Individuals will pay on average 70 cents more for a Coke versus an RC or other cola brand name (Netemeyer et al., 2004). However, individuals cannot reliably discriminate between Coke and RC in blind taste tests (Bowles & Pronko, 1948). The amount of advertising, and therefore the awareness of a product, predicts brand preference and purchasing behaviors, and may be responsible for making a certain product prototypical in the minds of consumers (Cobb-Walgren, Ruble, & Donthu, 1995). Individuals who wish to reduce negative effects of the

representativeness heuristic should gather trustworthy information about a product, as consumers make better decisions when they possess a degree of accurate information on a product (Keller & Staelin, 1987). However, they should avoid gathering too much information, as this can reduce a decision's effectiveness by reducing a consumer's confidence in a decision and increasing the cognitive costs of a decision (Keller & Staelin, 1987).

Just as individuals will buy Coke over RC due to the representativeness heuristic, an individual's valuation of a product can also depend on perceptions of its production time or supposed quality. This effort heuristic helps individuals decide an object's worth or value based on how much effort and time they perceive went into creating an object. For example, participants price a poem they believe took only four hours to create significantly lower than the same poem if they believe it took eighteen hours to create (Kruger, Wirtz, Van Boven, & Altermatt, 2004).

The effort heuristic can be useful in many daily purchases, such as choosing a book of poetry one knows took far longer to compose over another collection that took a shorter time to create. However, the effort heuristic can also result in suboptimal decisions. For instance, due to the effort heuristic, an individual may decide an aged wine is a better deal than a young wine, even though the young wine was produced by a vineyard that uses superior ingredients.

Researching products before purchasing and understanding the quality of the materials, the rarity of the finished product, and even the reliability or desirability of its brand name may help reduce some negative effects of the effort heuristic by providing more information on which product truly required more effort (Keller & Staelin, 1987). Once again, consumers should avoid gathering large amounts of information of dubious quality simply for information's sake;

possessing too much information can reduce decision efficacy by increasing cognitive load and reducing confidence (Keller & Staelin, 1987).

As discussed, individuals can reduce the negative effects of some heuristics involved in purchase decisions through a degree of pre-purchase research. However, possessing even expert pre-purchase knowledge on a product is insufficient to reduce the negative effects of the anchoring heuristic (Northcraft & Neale, 1987). When using the anchoring heuristic, individuals asked to estimate a numerical value use irrelevant numbers from their environments as a starting point for their estimate. These arbitrary numbers, known as anchors (Tversky & Kahneman, 1974), can be telephone numbers, social security numbers, past prices paid for an object under different circumstances, or simply an arbitrary number written somewhere in one's field of vision (Scott & Lizieri, 2012; Lambson et al., 2004; Ariely, Loewenstein, & Prelec, 2003; Tversky & Kahneman, 1974). From this anchor, individuals estimating prices subconsciously adjust their estimates, increasing or decreasing their estimates until they are satisfied their estimates are close enough to the target value. For instance, if Sue anchored to the number 72 and had to estimate the price of a coffee gift package, she would start at 72 and add or subtract until she concluded her estimate of $55 was close enough to the price of the product. However, the final estimates of anchored individuals like Sue are generally too close to the original anchors, and while the gift package actually costs $35, Sue may estimate it is worth $55 (Tversky & Kahneman, 1974; Strack & Mussweiler, 1997; Chapman & Johnson, 1994; Ariely et al., 2003).

For example, in an especially creative study by Ariely and colleagues (2003), participants wrote the last two digits of their social security number (an irrelevant anchor) and then estimated whether the manufacturer's suggested retail price (MSRP) of a product was higher or lower than

the last two digits of their social security number before estimating the product's MSRP themselves. Participants with higher social security digits (75-99) gave larger estimates than participants with lower digits (1-25) did; in other words, participants with higher anchors were willing to pay an average of three times more money for an object than participants with lower anchors. For instance, participants with the lowest anchors would pay $11.73 for a rare bottle of wine, while the participants with the highest anchors would pay $37.55 for the same rare bottle of wine (Ariely et al., 2003). Interestingly, when asked to predict whether their estimates were too high or too low, participants reported they adjusted their estimate too far from the anchor, even though their adjustments were in reality too close to the anchor (Simmons et al., 2010). For instance, an individual anchored to the number 100 asked to estimate the value of a travel thermos may believe his estimate of $45 is too low, while it is in reality $10 too high. An individual anchored to the number 5 may believe her estimate of $25 was too high, while she was in reality was $10 too low. Participants' assumptions that they adjusted too far away from their anchor while they in fact did not adjust sufficiently demonstrates why anchoring can be so influential in the world outside the lab.

Findings on the effects of the anchoring heuristic outside the lab are especially troubling. For example, anchoring-based promotions, such as offers that advertise eight frozen dinners for $12.50 instead of one frozen dinner for $1.25, anchor participants to the given quantity. Although consumers often have the opportunity to pay the same $1.25 price for a frozen dinner if bought individually, anchor-based promotions increase sales by 32% (Wansink, Kent, & Hoch, 1998). Anchored individuals may purchase more product than they actually require, potentially resulting in wasted money on freezer burned or spoiled food. Further, house hunters often subconsciously base their estimated value of a property, and therefore their purchasing decision,

on peripheral information such as a telephone number or housing prices from their former city (Scott & Lizieri, 2012; Simonsohn & Loewenstein, 2006), potentially causing consumers to pay a higher price than necessary on a property. For example, an individual moving from the high prices of New York City may pay an inflated price on housing in Bloomington, IL, as he believes that the Bloomington property is low in comparison to the prices in New York City, when in reality, the price of the new property is far too high for the Bloomington market. An individual moving from Peoria, IL, on the other hand would not likely experience this anchored monetary loss, as her housing anchor would be similar to the prices in Bloomington.

Alarmingly, even professional realtors, who should base their estimates entirely on relevant factors, exhibit anchoring effects when estimating the prices of properties (Northcraft & Neale, 1987). Realtors should know numerous relevant aspects to evaluate property prices on, and yet they still produce anchored estimates. Possessing extensive knowledge on how prices of a product are determined is insufficient to protect individuals from the negative effects of the anchoring heuristic; this only increases the need to debias anchoring. Amateur and professional stock market investors alike can also make poor financial decisions due to anchoring. Investors' expectations for monetary return on their investments often anchor to their initial investment, which may not be realistic depending on the type of investment (Kaustia et al., 2008). Investors grow frustrated with their returns if they are not what they expected due to anchoring, and they may sell or fail to sell at an inopportune time and lose a great deal of money.

Even experts' estimates can be suboptimal due to anchoring. However, many of the numbers around individuals are either too high or too low to have any relation to an estimation task. It seems common sense that if an anchor is implausible to a task, an individual may not use it as a starting point for an estimate. Unfortunately, even the most implausible anchors can result

in an anchoring effect – for example, participants continued to demonstrate anchoring effects even when the anchor was 72 standard deviations away from the mean estimate obtained in pilot testing (Mussweiler & Strack, 2001). An implausible anchor, such as the number 2554 during a coffee maker price estimation task, therefore could result in anchoring effects – in estimates of the coffee maker costing $60 instead of $30. Random numbers therefore affect decisions even if the anchors are irrelevant (Chapman & Johnson, 1994; Luppe & de Angelo, 2010) and implausible to the task at hand (Mussweiler & Strack, 2001).

Past Debiasing Strategies

Because the anchoring heuristic has such staggering influence over purchasing behaviors and other financial decisions (Luppe & de Angelo, 2010), research has turned to exploring ways to reduce the negative influence of anchors on individuals' price estimates (Chapman & Johnson, 1994; Strack & Mussweiler, 1997; George, Duffy, & Ahuja, 2000). The ideal debiasing strategy would allow individuals to recognize when anchoring affects them in the real world and then adjust their behavior accordingly to stop anchoring (Gick & Holyoak, 1980). Individuals would then be able to develop more realistic estimates or purchase the number of items they actually need instead of allowing anchors to drive their decisions. This goal seems simple enough, but it has actually proven challenging (Gick & Holyoak, 1980; Furlong, Santos, & Levy, in prep). We will demonstrate this by discussing three anchoring debiasing strategies and the reasons why each is not an ideal intervention.

One debiasing strategy provides participants with an anchor in a different semantic category than the target estimate value. For example, participants told the height of the Brandenburg Gate did not anchor to the height when asked to estimate the width of the Brandenburg Gate (Strack & Mussweiler, 1997). While this strategy is effective, it is not

possible to control the knowledge categories of anchors in an individual's environment. This strategy is therefore unlikely to broadly debias consumers' anchoring behaviors outside the lab.

A similar debiasing procedure asks participants to think critically about an anchor and requested them to identify why the anchor and the target estimate are dissimilar. For instance, although participants usually anchor on rent of one apartment to estimate the rent of another, the effects of anchoring disappear when asked to point out the differences between two apartments (Chapman & Johnson, 1994). While this strategy, too, is effective at reducing the negative effects of anchoring in a laboratory setting, it is unclear how well consumers could integrate this strategy into their lives. In order to do so, participants would need to constantly identify ways in which the numbers in their environment are different from those they need to estimate, which would prove exhausting and tedious to average individuals.

A third strategy that successfully reduces anchoring effects involves warning participants in real-time that they are anchoring. For example, participants see an anchor price onscreen and then estimate the price of a piece of real estate. If they estimate a price within $20,000 of their anchor, a message in the computer program informs them that they are anchoring. Although this strategy did help to eliminate anchoring in the laboratory, having an 'anchoring warning system' alert at all times in the real world would be implausible and tedious (George, Duffy, & Ahuja, 2000). It would be nearly impossible to constantly give consumers feedback on their estimates, and therefore the blatant warning strategy would not debias anchoring outside the lab where consumers face real monetary losses due to the anchoring heuristic.

These three anchoring debiasing strategies, while successful in the lab, simply would not be successful in debiasing outside the lab. Individuals cannot control the knowledge category of the anchors around them. Likewise, individuals are unlikely to use the cognitive resources

necessary to compare why an anchor is unlike a target product. Furthermore, having a constant anchoring warning in the real world is tedious and difficult. While these strategies are successful in the laboratory (Chapman & Johnson, 1994; Strack & Mussweiler, 1997; George, Duffy, & Ahuja, 2000), they are not likely to be useful outside the lab, where the negative effects of the anchoring heuristic are most profound. However, developing a strategy that can be applied outside of the lab in daily life is not the only barrier to successfully debiasing the anchoring heuristic.

Challenges to Successful Intervention

As we have shown, a successful intervention for anchoring would need to be learned in the lab yet function properly outside the lab where consumers face real and possibly large monetary losses. This ability to apply information learned in the lab to real world situations is known as far transfer (Barnett & Ceci, 2002), and is it notoriously difficult to achieve (Gick & Holyoak, 1980; Furlong et al., in prep). Far transfer is difficult because it requires that participants (a) recognize structural similarities between the learning task and the real world situation (i.e. recognize anchoring in the real world when it occurs), (b) generalize across different contexts (i.e., learn about anchoring in the lab and recognize anchoring both at the supermarket and when purchasing a house), and (c) remember what they have learned across long time spans (i.e., continue to use their new knowledge well into the future; Gick & Holyoak, 1980).

Achieving far transfer is a lofty goal, and unfortunately, previous research suggests that such interventions may prove difficult, as individuals find it difficult to know when to use knowledge from informational debiasing strategies (Furlong et al., in prep). Interestingly, when participants are told to apply their new knowledge to a different task, they are willing and able to

do so. However, it is difficult for individuals to recognize on their own situations outside the lab in which an intervention is useful (Gick and Holyoak, 1980).

Gick and Holyoak (1980) demonstrated the best example of this concept by telling participants a story about a military general who wanted to attack a fortress. All the paths to the fortress contained landmines triggered by weight; if the entire army attempted to approach the fortress by one path, their combined weight would set off the landmines. However, the general decided to divide his army evenly across all paths going to the fortress, ensuring that there was not enough weight on any one path to trigger the mines. After this story, Gick and Holyoak (1980) told their participants about a doctor who had a patient with an inoperable tumor. The tumor could be killed with lasers, but the strength of laser necessary to destroy the tumor would also destroy the healthy tissue around it. Half of their participants were encouraged to apply what they had learned from the story of the general, while the other half were not given such a prompt. Without prompting, participants seldom arrived at the solution on their own – that is, to target several lasers from different directions on the laser – while with prompting participants nearly all provided the solution (Gick & Holyoak, 1980). Thus, far transfer is difficult because participants often fail to recognize the proper structural similarities across contexts without proper prompting.

Due to the challenge of eliciting far transfer, we decided to investigate a new simple informational debiasing strategy that, unlike previous strategies to debias anchoring, could be easily applied outside of the lab where consumers require it. We chose to investigate an informational intervention strategy because it is the ideal debiasing agent; if proven successful, researchers could distribute the information to participants, who would then in turn recognize situations in their daily lives when the negative effects of anchoring may affect them. Individuals

in turn would then find the motivation to carefully consider their estimates, which may result in better decision-making (Epley & Gilovich, 2006). There is some reason to expect that a simple informational strategy – in which participants are explicitly told about the bias and warned against making it – might prove effective. After all, researchers would be far less likely to write and individuals would be far less likely to read about decision-making biases in books such as *Predictably Irrational* (Ariely, 2009) if they did not expect learning about decision-making to improve their choices. The utility of informational interventions is supported by the literature; namely, participants explicitly taught about an suboptimal strategy in a gambling task avoided using that strategy after intervention, though they still frequently relied on it before intervention (Furlong, Santos & Levy, in prep). However, even here participants were not truly debiased, as they tended to over-apply their new knowledge to tasks that, though superficially similar, lacked structural similarity. In other words, participants applied a strategy to a situation that at first glance seemed fitting for the intervention strategy, but in fact was not a fitting situation, and one that suffered from the use of the strategy. These findings suggest that if given the right information, individuals may successfully apply some aspects of an intervention to a task and thus improve performance, though performance may not be perfect or may suffer in other areas.

Given the simplicity of the anchoring heuristic, and its lack of superficial overlapping features with other biases, we have reason to hope that an informational strategy might work better for anchoring tasks than for gambling tasks. Further, even if their debiasing strategy for anchoring is not perfect, the pervasiveness of anchoring effects in daily life necessitates an investigation of whether participants could apply an anchoring intervention when they understand what types of decisions could benefit from the intervention. Using an informational strategy like Furlong and colleagues (in prep) could allow us to easily distribute such an

intervention outside the lab environment to reduce the negative effects of the anchoring heuristic among the general population. We believe the simplicity of the informational strategy merits further investigation, which leads to the current study.

The Present Study

In the current study, participants completed an anchoring-based price estimation task similar to Ariely and colleagues' (2003) before and after reading one of three written intervention (explicit, abstract, and control) passages. The intervention passages were excerpts from *Predictably Irrational* (Ariely, 2009), a book targeted at educated lay audiences that uses anecdotes and studies conducted by Ariely and his colleagues to summarize the many heuristics and biases used in daily decision-making. It includes a passage describing Ariely and colleagues' (2003) social security number anchoring study (explicit), a passage about how peripheral information in one's environment such as décor may negatively affect one's purchasing decisions (abstract), and many unrelated decision-making biases such as the expectancy bias (control), the tendency for individuals' expectations to shape their experiences (Lee, Frederick, & Ariely, 2006; Ariely, 2009).

We thus investigated the ability of participants to apply new knowledge of the negative effects of the anchoring heuristic, or knowledge that peripheral information can affect purchasing decisions, to an estimation task. We hypothesize that participants who receive an explicit explanation of the anchoring heuristic will demonstrate debiasing effects, while abstract and control participants will demonstrate negligible debiasing effects.

Methods

Participants

The sample consisted of 84 participants, ranging in age from 18 to 24 years of age (M = 19.10, SD = 1.26) recruited from a small Midwestern university's subject pool system in exchange for class credit in General Psychology. Participants were informed they had the chance to win one of ten prizes if their price estimates were more accurate than those of any other participant in the study. Informed consent was obtained before the participants commenced their questionnaires.

Design & Procedures

To investigate numerical anchoring effects, we conducted a 3 (intervention: explicit, abstract, or control) x 2 (anchor: low or high) between-subjects factorial design. The dependent variable was the degree of anchoring effects before and after intervention as demonstrated by the difference of participants' estimates from the product's MSRP.

Participants were first given an explanation of the study and learned that if they provided the best estimates in the entire study, they could win one of ten products after the conclusion of the study. After giving informed consent, participants performed an initial 5-question pre-intervention price estimation task to assess initial anchoring behavior. Each product to be estimated (pictured in Appendix A and B, with MSRPs in Appendix C) was on a separate page. The first item on each page of the questionnaire asked participants to provide their "participant identification number," which the experimenter wrote prior to the study on the first page of each questionnaire. This participant ID number served as the anchoring manipulation - half of the participants received a high "participant identification number" (85 to 95), while the other half

received a low "participant identification number" (5 to 15). This anchoring technique was adapted from previous studies (Ariely et al., 2003).

After providing the participant ID number (anchor), the next question asked whether participants believed the MSRP of the product was higher or lower than their participant ID number. Finally, the questionnaire asked participants to estimate the MSRP of the product. We provided two product questionnaires containing different products both with MSRPs totaling about $138 (Questionnaire A: $146.92; Questionnaire B: $130.4). We counterbalanced the presentation of the questionnaires to control for order effects.

After answering their respective questionnaires, participants read one of three intervention passages (Appendix D) and then took part in a brief comprehension check (three multiple choice questions and a short summary of the passage). Participants who missed two or more true false questions were excluded from further analyses. None of these passages have been tested as interventions in a published study. Our passages were of roughly the same length (explicit: 630 words; abstract: 617 words; control: 625 words).

The explicit passage discussed the Ariely et al. (2003) product MSRP estimation study, explaining how the researchers influenced their participants' MSRP estimates using social security numbers, and why writing the number repeatedly affected their estimates (Ariely, 2009). We chose this passage to investigate whether receiving detailed and explicit information about the anchoring heuristic that used a procedure structurally similar to the current study could influence its effects in the next estimation task.

The abstract passage did not explicitly discuss numerical anchoring or name the anchoring phenomena, but instead implicitly described anchoring using an example of how anchoring can lead people to migrate from a cheap coffee shop to a pricier shop. Specifically, it

described how prices at the cheaper coffee shop originally served as anchors, causing a shopper to refuse to pay a larger sum for a similar beverage. If, however, by chance, the individual enters an expensive coffee shop with a nicer atmosphere s/he may buy a pricier coffee, assuming anything sold in such a tastefully decorated space must be far better in quality and taste than the cheaper beverage from the individual's usual plain shop (Ariely, 2009). We chose this passage to investigate whether participants could achieve far transfer and apply a story of one's choices being influenced by peripheral information (i.e. the décor of the expensive coffee shop) to an estimation anchoring task in which they may be influenced by peripheral information (i.e. their participant ID numbers).

The third passage, the control passage, was chosen for its structural similarity to the other intervention passages. We chose to include a control passage in order to have a measure for the anchoring heuristic variations, if any, between the two estimation tasks and to have a baseline to compare anchoring effects to when no intervention took place. The control passage discussed the expectancy bias by demonstrating how an individual's expectations can shape his or her perception of a new experience, and was not applicable to the current study (Lee et al., 2006). The control passage described a beer taste-test experiment by Lee and colleagues (2006) in which they found that when first informed that a type of beer was laced with vinegar, participants were less likely to prefer it over a commercial beer. However, participants who did not know of the vinegar beforehand preferred the vinegar-laced beverage. Because participants who were aware of the vinegar expected it to have an unappealing taste, they perceived it as having that unappealing taste, thus allowing prior information to color their perceptions, while participants unburdened with knowledge of the ingredients of the beer preferred it over the commercial beverage (Lee et al., 2006).

After intervention, participants were presented with more estimation questions. Just as in the pre-intervention task, the top of each page asked participants to write the same "participant identification number" that had been assigned in the pre-intervention portion of the study. After answering their second pricing questionnaire questions, participants were fully debriefed and dismissed.

Measures

Questionnaire A. Questionnaire A (see Appendix A for products and Appendix C for MSRPs) was adapted from Ariely and colleagues (2003). The average MSRP for each product in Questionnaire A was $29.38. In Ariely and colleagues' (2003), the researchers asked participants to repeatedly write the last two figures of their social security numbers before estimating the MSRP of each of six objects (2003). In the current study, the researchers forwent the presentation of items in person in favor of a paper based-questionnaire presenting one color photograph per page of five estimation products as seen in Appendices A and B. The survey asked for participant ID number atop each page, whether the participant number was higher or lower than the MSRP of the product, and then a numerical estimate of the MSRP of the product. The MSRPs of the products can be found in Appendix C.

Questionnaire B. Questionnaire B was identical to Questionnaire A with the exception of its five products (average MSRP was $26.08). The products can be found in Appendix B and their MSRPs can be found in Appendix C.

Data Analysis

To investigate anchoring effects, we transformed all participants' estimates before and after intervention into difference scores by subtracting participant estimates from the MSRP of the product (MSRP – Estimate = Difference Score). For instance, if a participant estimated a $5

back scratcher was valued at $10, the respective data point was -5. We then obtained the average difference scores per condition for estimates before intervention and after intervention. In addition, to assess change after intervention, we subtracted the participants' difference scores before intervention from their difference scores after intervention to investigate changes in anchoring behavior following intervention (Difference Score After Intervention – Difference Score Before = Change). A positive mean change indicated participants anchored less after intervention, while a negative mean change indicated participants anchored more after intervention.

We counterbalanced the order of presentation of the products, so therefore we collapsed the data over questionnaire type, resulting in a 2 (anchor: low, high) X 3 (intervention type: explicit, abstract, or control) between-subjects Analysis of Variance.

Results

Six participants (2 in the explicit condition, 3 in the abstract condition, and 1 in the control) missed two or more of the three true false questions about their respective passage and were therefore excluded from the analyses. We excluded one participant (abstract condition) for not completing the task. The final sample consisted of 77 undergraduate participants. See Table 1 for a distribution of participants per condition.

Intervention	Anchor	Final Sample Per Condition
Explicit	Low	13
	High	14
Abstract	Low	12
	High	13
Control	Low	13
	High	12

Table 1. Participants per condition. This table demonstrates how many participants were in each condition in the final sample.

As a manipulation check, we first investigated whether participants anchored before intervention by comparing their difference scores to zero – a zero difference score would mean that participants' estimates did not differ from the MSRP, whereas a positive (participants underestimated prices) or negative (participants overestimated prices) value would indicate anchoring. Low anchor (M = 3.58, SD = 10.81; t[37] = 2.04, p = 0.05, 95% CI [0.02, 7.12]) and high anchor participants' difference scores (M = -14.28, SD = 20.48; t[38] = -4.35, p < 0.01, 95% CI [-20.92, -7.64]) both differed from zero prior to intervention. A one-way ANOVA showed participants' estimates prior to intervention differed on whether they received a low or high anchor (F[1,75] = 22.71, p < 0.01, η_p^2 = 0.34). Prior to intervention, high anchor participants' estimates (M = -14.28, SD = 20.48) were on average 4 times further from the MSRP than low anchor participants' estimates (M = 3.58, SD = 10.81).

When averaging difference scores both before and after intervention, participants with high anchors (M = -14.01, SD = 18.73) estimated that products were 4.03 times more expensive

than participants with low anchors (M = 4.62, SD = 9.24). High anchor participants estimated values that were on average 3.03 times further from the products' MSRPs than participants with low anchors. This difference between estimates given by low anchor participants and high anchor participants was significant (F[75] = 12.11, $p < 0.01$).

To investigate whether intervention resulted in a change in anchoring, we ran a 2 (anchor type: low, high) X 3 (intervention type: explicit, abstract, control) ANOVA with change in anchoring as the dependent variable. There was no main effect of intervention type (F[2,76]=0.53, p = 0.59, η_p^2 = 0.02) or anchor (F [1,76] = .33, p = 0.57, η_p^2 = 0.01) on change in anchoring effects. There was no significant interaction between anchor and intervention type (F[2,76] = 0.13, p = 0.88, η_p^2 = 0.004). See Figure 1 for the change per intervention and direction towards or away zero anchoring effects.

	Anchor	Before Intervention	After Intervention	Change Value	Towards or Away from Zero Anchoring
Explicit	Low	5.15 (12.11)	7.51 (6.09)	-2.36 (11.09)	Away
	High	-16.78 (23.57)	-14.48 (18.35)	-2.29 (13.59)	Towards
Abstract	Low	4.55 (6.69)	7.65 (5.15)	-3.10 (5.10)	Away
	High	-19.12 (22.66)	-17.44 (24.68)	-1.68 (20.62)	Towards
Control	Low	1.10 (12.74)	2.01 (13.68)	-0.91 (7.67)	Away
	High	-6.11 (11.13)	-8.89 (17.85)	2.77 (11.18)	Away

Figure 1. Mean anchoring before and after intervention with change and direction. A negative mean difference score indicates participants overestimated the value of the products; standard deviations are in parenthesis.

Discussion

Over a lifetime, the influence of the anchoring heuristic may cost consumers hundreds if not thousands of dollars. Most interventions designed to reduce the negative effects of the anchoring heuristic (Chapman & Johnson, 1994; Strack & Mussweiler, 1997; George, Duffy, & Ahuja, 2000) would be difficult to apply outside the laboratory setting where consumers encounter the negative effects of the anchoring heuristic. It is essential to investigate easily

applied strategies to reduce the negative effects of anchoring outside the laboratory. The current study thus investigated the efficacy of reading easy to distribute passages. One of our interventions explicitly explained the anchoring heuristic and its effects, while the other explained how peripheral information can affect various daily purchase decisions in a more abstract sense.

We replicated Ariely et al.'s (2003) findings that participants with high anchors estimate product values several times (in our case, 4.03 times) higher than participants who receive low anchors. Estimating values four times higher than a different anchor group is not in and of itself the most groundbreaking finding. However, we found that high anchor participants gave estimates three times further away from the MSRP of the product than low anchor participants. An inclination to underestimate a product's value by $4.62 when anchored to a low number would most likely not result in many negative consequences. However, a tendency when anchored to a high number to estimate that a product is worth around $14.01 more than its actual value could easily result in a compilation of considerable monetary loss over time. The difference between the anchoring effects of low and high anchors found in this study may be because the average MSRP in the study was $27.73, and the low anchors (5 - 15) were closer in magnitude to this average MSRP than the high anchors (85 – 95). Low anchor participants thus had less need to adjust their anchors. Further research to determine whether replication of this pattern is possible when high and low anchors are equidistant from the mean MSRP is essential.

However, our intervention passages did not affect anchoring as we expected. While we predicted that participants in the explicit intervention condition would exhibit the greatest absolute change in anchoring effects after intervention, followed by the abstract intervention condition, neither intervention passage had any significant effect on participant estimates.

Though we failed to reject the null hypothesis, these data are valuable. One interpretation is that the anchoring heuristic is so automatic that reducing its negative effects both inside and outside the laboratory will require strategies more complex than merely teaching participants about the anchoring heuristic. These findings therefore support a growing body of literature that suggests that debiasing heuristics requires extensive mental concentration beyond rote learning. Research by Furlong, Santos, and Levy (2012) on an informational debiasing strategy found that participants shown math supporting a strategy to perform better did not perform better on the task following intervention. However, participants who did the math themselves improved performance on the task following intervention (Furlong et al., 2012). This suggests that highly involved strategies, such as performing calculations or otherwise participating firsthand an example of how cognitive heuristics can negatively affect individuals, may be necessary to reduce the negative effects of automatic cognitive processes. We will discuss an application of these findings to anchoring in the next section.

Future Directions

While research suggests that future intervention researchers should investigate more involved strategies to reduce heuristics' negative effects (Furlong et al., 2012), the convenience and wide applications of a successful informational intervention warrant further investigation of such strategies before deciding they are truly without value. Future studies should incorporate this study's strengths, such as controlling for order effects, average MSRP per questionnaire, and intervention passage length. They should also ensure no numbers save the desired anchor appear on participant surveys.

The current study contained limitations that future procedures should avoid. Because of our small sample size, we did not have many participants per condition. Some of our

insignificant findings may be in part due to low power, and future studies would benefit from a far larger sample size. Furthermore, our explicit and abstract interventions, while pertinent, did not tell participants to apply the information they learned to the task. Research suggests participants would benefit from a hint or command to apply their new information to the task (Gick & Holyoak, 1980). Our investigations may successfully debias individuals if they know to apply the information within, so future investigation of these passages with an added sentence asking participants to apply the information to the post-intervention task may reduce anchoring effects.

Successful debiasing may require participants to have higher involvement in their interventions (Furlong et al., 2012). Participants in a past study were more successful after intervention when they performed calculations that supported a better strategy for a gambling task as opposed to simply watching the calculations performed (Furlong et al., 2012). Involving participants in their informational intervention may strengthen an intervention's debiasing effects. For instance, a future study could use the explicit intervention passage and afterwards either continue on to the estimation task or have participants play an anchoring game similar to Tversky and Kahneman's (1974) wheel study in which researchers asked participants to estimate values after spinning a wheel fixed to stop at either a high or low anchor. After participants complete their estimates, participants would learn the correct answers and see for themselves how far anchoring brought them from the correct answers. After seeing their mistakes, participants would participate in another estimation task to measure degree of anchoring. This involvement in an anchoring-based estimation game may raise participants' motivation and perhaps ability to provide better answers on a later estimation task.

This study may also not address how an informational strategy would affect actual consumer willingness to pay decisions. Although our participants could receive a prize, the stakes of winning or not winning a prize may not be similar enough to losing actual money to investigate whether an informational strategy would be sufficient to reduce anchoring effects outside the laboratory. Potential losses tend to affect individuals' decisions more strongly than potential gains, and thus consumers outside the lab may be more motivated when a loss is at stake than when the gain of a prize is at stake (Tversky & Kahneman, 1991). One procedure that could address this would give participants money, anchor them, ask them to estimate the MSRP of a product, and then give them the opportunity to buy the same product at a fixed cost. One third of products would have fixed costs that are the actual MSRP of the product, one third would have fixed costs around $15 over the MSRPs, and one third would have fixed costs around $15 under the MSRPs. If a participant wished to buy a product for its fixed price, he could purchase it. If he believed it was overpriced, he could choose not to purchase the product and instead keep the money for a future purchase or to keep after the study. The added motivation of losing actual money may add to the external validity of investigations of informational interventions.

Though there was no interaction between change in anchoring effects and anchor type following intervention, the average difference score pre-intervention for low anchor participants was just barely significantly different from zero anchoring effects and contained wide 95% confidence intervals. This suggests that low anchor participant estimates may not have been as strongly influenced by their anchors as high anchor participants, which may be due to the fact the average MSRP was closer to the low anchors than the high anchors. Future studies would benefit from using products with MSRPs equally from the low anchors as the high anchors. For instance,

a future study could use products with MSRPs ranging from $75 to $125 and use 50 as a low anchor and 150 as high anchor. This design would ensure that or perhaps even investigate whether low anchors create anchoring effects as strong as high anchors when both anchors are more or less equally plausible.

One final limitation of this study was its inability to capture whether the pretest affected participant estimates, as all participants estimated product values before intervention. It is possible that participants anchored to their estimates prior to intervention, resulting in similar anchoring effects before and after intervention. A potential future direction to determine whether informational interventions truly have no effect would involve using a Solomon Four Group Design as pictured in Table 2 to test an informational intervention's effect on anchoring (Solomon & Lessac, 1968).

	Pre-Intervention Estimation Task	Intervention	Post-Intervention Estimation Task
Group 1	Yes	Yes	Yes
Group 2	No	Yes	Yes
Group 3	Yes	No	Yes
Group 4	No	No	Yes

Table 2. Solomon Four Groups Design. A visual representation of the groups in a Solomon Four Groups Design.

In this design, Group 1 would estimate product values before and after receiving their intervention. Group 2 would not perform a pre-intervention estimation task, but would receive an

intervention and estimate prices after intervention. Group 3 would estimate product values twice but receive no intervention. Group 4 would only estimate product values once and receive no intervention. This design would allow researchers to compare the anchoring effects of participants who did not estimate products before intervention to participants who did estimate products before intervention, thus ensuring that estimating product values before intervention did not negate any benefits of the intervention (Solomon & Lessac, 1968).

Conclusion

This study found no evidence that simple informational interventions can reduce or affect anchoring. However, because the procedure may not have captured the decisional processes consumers associate with potential loss, it does not necessarily provide evidence that a direct informational strategy would have no effect on anchoring outside the laboratory. Further investigation of informational strategies through procedures with larger sample sizes and higher external validity is necessary before discounting this potential intervention completely. Furthermore, the findings that high anchor participants would pay $14.01 more than a product's value adds to the growing body of research suggesting that the potential monetary losses due to anchoring heuristic could easily build up over time. Further investigation of strategies to debias the anchoring heuristic and prevent financial loss are therefore essential.

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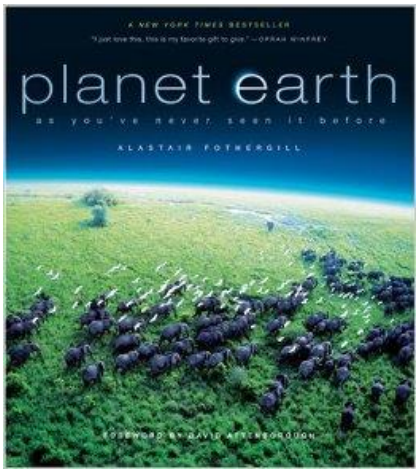
Appendix A

MSRP Questionnaire A

Please Note: The numbers were not pictured on the original questionnaire.

1) What is your participant ID number? _____



a) Circle one: is your participant ID number higher or lower than the MSRP of this coffee table book?

b) Please estimate the MSRP of this coffee table book.

- Astounding nature photographs
- Coffee table book
- Jaw dropping photos

2) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this personal blender?

b) Please estimate the MSRP of this personal blender.

- Compact design ideal for small living spaces and on-the-go portability
- Great for making smoothies, shakes, baby formula, marinades and salad dressings
- Blending jar also functions as portable travel cup that fits most car drink holders

3) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this back scratcher?

b) Please estimate the MSRP of this back scratcher.

- Comfortable cushion grip handle
- Bear paw shaped metal claw.
- Sure to provide itch relief in those hard to reach places

4) What is your participant ID number? _____

   a) Circle one: is your participant ID number higher or lower than the MSRP of this artificial tree?
   b) Please estimate the MSRP of this artificial tree.

- Finally, a Bonsai tree that's easy to maintain.
- Enhances décor and creates a peaceful and elegant atmosphere
- Lives forever without the hassle of ever having to water, trim or maintain

5) What is your participant ID number? _____

   a) Circle one: is your participant ID number higher or lower than the MSRP of these headphones?
   b) Please estimate the MSRP of these headphones.

- Lightweight and comfortable economical headphones
- Features smooth silver design and leatherette ear pads
- Delivers powerful, bass-driven sound

Appendix B

MSRP Questionnaire B

Note: The numbers did not appear in the original questionnaire.

1) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this multi-function keychain tool?

b) Please estimate the MSRP of this multi-function keychain tool.

- With the utili-key, you can open bottles, packages, letters, and most screws
- Polished stainless steel finish
- Multiple screwdrivers, including a flat screwdriver, Phillips screwdriver, and micro-sized screwdriver

2) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this LED flashlight?

b) Please estimate the MSRP of this waterproof LED flashlight.

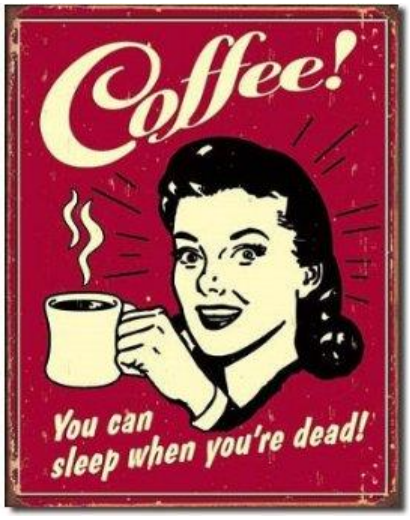
$_____

- Super mini size, bright, blinding effect
- Skid-proof design & waterproof design.
- AA batteries

3) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this tin sign?

b) Please estimate the MSRP of this tin sign.



- professional quality metal / tin sign
- enameled paint is attractive and very durable
- measures a foot by a foot and a half

4) What is your participant ID number?

a) Circle one: is your participant ID number higher or lower than the MSRP of this filtered water bottle?

b) Please estimate the MSRP of this filtered water bottle.

- All natural filter made from coconut shell
- Leak resistant lid with built in straw
- BPA free and FDA compliant materials used throughout

5) What is your participant ID number? _____

a) Circle one: is your participant ID number higher or lower than the MSRP of this portable speaker?

b) Please estimate the MSRP of this portable speaker.

- Ultra-portable and light weight design
- Built-in High Capacity rechargeable built-in lithium battery.
- Bluetooth Version with Built-in Microphone + DER for high fidelity audio transmission

Appendix C

Product Prices

Product	**MSRP**
Bear Claw Back Scratcher	$5
Utili-key Multi-function Tool	$10
Smart Planet Water Bottle	$15
Personal Blender	$21.99
Coffee Tin Sign	$25
Sennheiser HD201 Headphones	$29.99
Waterproof LED Flashlight Torch 8	$35.40
Planet Earth: As You've Never Seen It Before	$39.95
Bluetooth Speaker	$45
Artificial Bonsai Tree	$49.99

Table 3. Product MSRPs. This table lists the MSRPs of each product used in the study.

Appendix D
Intervention Anchoring Passages

Explicit Passage

"A few decades ago, the naturalist Konrad Lorenz discovered that goslings, upon breaking out of their eggs, become attached to the first moving object they encounter (which is generally their mother). Lorenz knew this because in one experiment he became the first thing they saw, and they followed him loyally from then on through adolescence. With that, Lorenz demonstrated not only that goslings make initial decisions based on what's available in their environment, but that they stick with a decision once it has been made. Lorenz called this natural phenomenon imprinting.

Is the human brain, then, wired like that of a gosling? Do our first impressions and decisions become imprinted? And if so, how does this imprinting play out our lives? When we encounter a new product, for instance, do we accept the first price that comes before our eyes? And more importantly, does that price (which in academic lingo we call an anchor) have a long-term effect on our willingness to pay for the product from then on?

…"Now here we have a nice Cotes du Rhone Jaboulet Parallel," said Drazen Prelec, a professor at MIT's Sloan School of Management.....At the time, sitting before him were the 55 students ... We … ask[ed] them to jot down the last two digits of their social security numbers and tell us whether they would pay this amount for a number of products, including the bottle of wine. Then, we would ask them to actually bid on these items in an auction.

What were we trying to prove? The existence of what we called arbitrary

coherence. The basic idea of arbitrary coherence is this: although initial prices are arbitrary, once those prices are established in our minds they will shape not only present prices but also future prices. So, would thinking about one's social security number be enough to create an anchor? And would that initial anchor have a long-term influence? That's what we wanted to see.

... In turn, Drazen held up four other items: a cordless trackball, a cordless keyboard and mouse, a design book, and a one-pound box of Belgian chocolates. ..."Now I want you to write the last two digits of your social security number at the top of the page," he instructed. "And then write them again next to each of the items in the form of a price. In other words, if the last two digits are twenty-three, write twenty-three dollars. Now when you're finished with that, I want you to indicate on your sheets - with a simple yes or no - whether you would pay that amount for each of the products."

When the students had finished answering yes or no to each item, Drazen asked them to write down the maximum amount they were willing to pay for each of the products (their bids).

...The students with the highest-ending social security digits bid highest, while those with lowest-ending numbers bid lowest. …Social security numbers were the anchor in this experiment only because we requested them. We could have just as well asked for the current temperature or the MSRP. Any question, in fact, would have created the anchor. Does this seem rational? Of course not, but that's the way we are - goslings, after all.

…In life we are bombarded by prices…But price tags by themselves are not necessarily anchors. They become anchors we contemplate buying a product or service at

a particular price. That's when the imprint is set. From then on, we are willing to accept a range of prices – but as with the pull of a bungee cord, we always refer back to the original anchor. Thus the first anchor influences not only the immediate buying decision but many others that follow. … [Thus] anchoring influences all kinds of purchases."

From Dan Ariely's Predictably Irrational

QUIZ (You may look back at the passage)
Circle One:
True or False: Peripheral numbers unrelated to a task can affect our decisions
True or False: The anchoring bias affects our daily decisions
True or False: Random numbers in our environment can affect us in the long-term.

In your own words, please summarize the above passage in 2-3 sentences.

Abstract Passage

"A few decades ago, the naturalist Konrad Lorenz discovered that goslings, upon breaking out of their eggs, become attached to the first moving object they encounter (which is generally their mother). Lorenz knew this because in one experiment he became the first thing they saw, and they followed him loyally from then on through adolescence. With that, Lorenz demonstrated not only that goslings make initial decisions based on what's available in their environment, but that they stick with a decision once it has been made. Lorenz called this natural phenomenon imprinting.

Is the human brain, then, wired like that of a gosling? Do our first impressions and decisions become imprinted? And if so, how does this imprinting play out in our lives? When we encounter a new product, for instance, do we accept the first price that comes before our eyes? And more importantly, does that price (which in academic lingo we call an anchor) have a long-term effect on our willingness to pay for the product from then on?

Recall your first introduction to Starbucks, perhaps several years ago. (I assume that nearly everyone has had this experience, since Starbucks sits on every corner in America). You are sleepy and in desperate need of a liquid energy boost as you embark on an errand one afternoon. You glance through the windows at Starbucks and walk in. The prices of the coffee are a shock - you've been blissfully drinking the brew at Dunkin' Donuts for years. But since you have walked in and are now curious about what coffee at this price might taste like, you surprise yourself: you buy a small coffee, enjoy its taste and its effect on you, and walk out.

The following week you walk by Starbucks again. Should you go in? The ideal decision-making process should take into account the quality of the coffee (Starbucks versus Dunkin' Donuts); the prices of the two places, and of course, the cost or value of walking a few more blocks to get to Dunkin' Donuts. This is a complex computation - so instead you resort to the simple approach: "I went to Starbucks before, and I enjoyed myself and the coffee, so this must be a good decision for me." So you walk in and get another small cup of coffee.

...As the weeks pass, you enter again and again and every time, you feel more strongly that you are acting on the basis of your preferences. Buying coffee at Starbucks has become a habit for you.

But the story doesn't end there. Now that you have gotten used to paying more for coffee, and have bumped yourself up onto a new curve of consumption, other changes also become simpler. Perhaps you will now move up from the small cup for $2.20 to the medium size for $3.50 or to the Venti for $4.15. Even though you don't know how you got into this price bracket in the first place, moving to a larger coffee at a relatively

greater price seems petty logical. So is a lateral move to other offerings at Starbucks: Caffe Americano, Caffe Misto, Macchiato, and Frappuccino, for instance.

If you stopped to think about this, it would not be clear whether you should be spending all this money on coffee at Starbucks instead of getting cheaper coffee at Dunkin' Donuts or even free coffee at the office. But you don't think about these trade-offs anymore. You've already made this decision many times in the past, so you now assume that this is the way you want to spend your money. You've herded yourself - lining up behind your initial experience at Starbucks - and now you're part of the crowd."

From Dan Ariely's Predictably Irrational

QUIZ (You may look back at the passage)
Circle One:
True or False: Would someone who entered a fancy coffee shop be immediately willing to pay the higher price?
True or False: Did the atmosphere of Starbucks influence this person's decision to change coffee shops?
True or False: Do you think one's surroundings can affect judgments of quality?

In your own words, please summarize the above passage in 2-3 sentences.

Control Passage

"You reach the entrance to Walker by climbing a set of broad steps between towering Greek columns. Once inside, you enter two rooms with carpeting that predates the advent of electric light, furniture to match, and a smell that has the unmistaken promise of alcohol, packs of peanuts, and good company. Welcome to the Muddy Charles - one of MITs two pubs, and the location for a set of studies that Leonard, Shane, and I would conduct over the following weeks. The purpose of our experiments would be to determine whether people's expectations influence their views of subsequent events,

more specifically, whether bar patrons' expectations for a certain kind of beer would shape their perception of its taste.

One of the beers that would be served to the patrons of the Muddy Charles would be Budweiser. The second would be what we fondly called MIT Brew...Budweiser plus a "secret ingredient" - two drops of balsamic vinegar for each ounce of beer.

"Can I offer you two small, free samples of beer?"

Without much hesitation, Jeffrey agreed, and Leonard led him over to a table that held two pitchers of the foamy stuff, one labeled A and the other B. Jeffrey sampled a mouthful of one of them, swishing around thoughtfully, and then sampled the other. "Which one would you like a large glass of?" Jeffrey chose beer B as the clear winner.

...A few minutes later, Mina dropped in. This time, Leonard offered more info. Beer A, he explained, was a standard commercial beer, whereas B had been doctored with a few drops of balsamic vinegar. Mina wrinkled her nose at the vinegar-laced brew B and chose a free glass of Budweiser.

...Mina and Jeffrey were only two of hundreds of students who participated in this experiment. But their reaction was typical: without foreknowledge about the vinegar, most of them chose the vinegary MIT Brew. But when they knew in advance that the MIT Brew had been laced with balsamic vinegar, their reaction was completely different. At the first taste of the adulterated suds, they wrinkled their noses and requested the standard beer instead. If you tell people up front that something might be distasteful, the odds are good that they will end up agreeing with you - not because their experience tells them so but because of expectations

... Expectations enable us to make sense of a conversation in a noisy room, despite

the loss of a word here and there, and despite the fact that some of the words are scrambled. And although expectations can make us look foolish from time to time, they are also very powerful and useful.

...The problem is that these same biased processes can influence how we experience other aspects of our world. These biased processes are in fact a major source of escalation in almost every conflict, whether Israeli-Palestinian, American-Iraqi, Serbian-Croatian, or Indian-Pakistani.

In all these conflicts, individuals from both sides can read similar history books and even have the same facts taught to them, yet it is very unusual to find individuals who would agree about who started the conflict, who is to blame, who should make the next concession, etc. in such matters, our investment in our beliefs is much stronger than any affiliation to sports teams, and so we hold on to the beliefs tenaciously. Thus the likelihood of agreement about "the facts" becomes smaller and smaller as personal investment in the problem grows. This is clearly disturbing. We like to think that sitting at the same table together will help us hammer out our differences and that concessions will soon follow. But history has shown us that this is an unlikely outcome - and now we know the reason for this catastrophic failure."

From Dan Ariely's Predictably Irrational

QUIZ (You may look back at the passage)
Circle One:
True or False: Participants with no knowledge of the vinegar prefer MIT Brew.
True or False: Participants with knowledge of the vinegar prefer MIT Brew
True or False: Previous knowledge and expectations can change our perceptions.
In your own words, please summarize the above passage in 2-3 sentences.