A Behavioral Economics Approach to Uber's Surge Pricing

[DRAFT]

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Abstract

Service designers and user experience designers often rely on reasoning through how a consumer would behave in certain situations. To do this designers have developed tools and techniques such as personas and empathy. However, in some cases, especially those cases where persons are most likely to rely on cognitive shortcuts or cognitive heuristics, those tools are not only inadequate, but can lead to the wrong outcome.

An outstanding recent example of this is the introduction of Surge Pricing by Uber. Uber's model is sound from a traditional economics perspective and their user experience design to implement it is laudable in some respects. However, years later they are still consistently rated poorly by consumers because of Surge Pricing.

This paper shows how an applied behavioral economics approach to service design could have addressed some of Uber's core issues in Surge Pricing and resulted in higher customer satisfaction ratings. Specifically it looks and how *prospect theory* affects consumer perception of pricing and how prices can be presented to positively affect those perceptions.

Introduction

There has been a large push in the past decade to focus on personas and empathy on the path to good design. While this approach has resulted in anecdotal reports of better results than excluding the two approaches ceteris paribus would have [1,2], personas and empathy at the very least lack good evidentiary support and might even be misguided (2015 Bloom). Some of what makes these problematic is using them without ensuring that they are appropriate for the design problem or assuming that using them is likely to result in a better result than either not using them or using some other tool. Misuse is also a large problem. For instance, building out a rich persona and then attempting to empathize with that persona often takes the form of attempting to reason through a set of decisions from a particular view point. Concretely, suppose we had a persona of a statistician who was at the top of her field, published papers in statistics and taught statistics at a respected university. We could reasonably assume then that in contexts where she was presented with questions about probabilities that she would perform exceptionally well at them. But it turns out that if you put yourself in this persona's shoes and came to that conclusion, you would be wrong (Kahneman, 2011, p. 13).

One tool that is often overlooked by designers is behavioral economics research and the wider cognitive science theories that encompass principles of behavioral economics. Without taking into account the numerous findings by cognitive scientists, designers are setting themselves up to make avoidable and sometimes very costly mistakes. In addition, behavioral economics has the added advantage over other tools of strong empirical research.

Uber's Surge Pricing

Take for example Uber's Surge Pricing model. It is a reasonable solution to a problem with some difficult facets. The problem stems from the fact that Uber's drivers are all contractors who work under a model that allows them to set their own hours. An Uber driver can turn on her driver's app at any time of the day, any day of the week. However, this model results in some economic inefficiencies and some potential customer dissatisfaction. Specifically there is no way for Uber to ensure that they have enough drivers on the road at peak hours. That is, they do not have enough supply to satisfy the demand. Consequently, customers requesting rides at peak hours are likely to be disappointed when no rides are immediately available. And at the very least, not serving those customers results in Uber leaving money on the table that they might otherwise be able to pick up.

Uber needed a way to incentivize drivers to turn on the driver's app, and thereby be available to riders, at peak hours. So Uber introduced Surge Pricing. Surge Pricing is essentially a model that attempts to produce the minimum[1] additional amount of revenue to pass on to drivers that results in the optimal (or near optimal) number of drivers in a peak area during peak times[2]. This is a very reasonable solution to the problem and despite an avalanche of consumer complaints, even Uber's nearest competitor, Lyft, has adopted this approach. However, there are a few significant challenges and shortcoming with this approach. Some of which Uber handled well and some where they missed the mark.

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[1] The minimum is charitably assumed, it might be that it attempts to produce rates below or at the maximum that customers would pay or at some other optimal point to maximize profits. Either way for the purpose of this article it works out the same.

[2] Nicholas Diakopoulos did some analysis that shows that it works reasonably well http://www.washingtonpost.com/news/wonkblog/wp/2015/04/17/how-uber-surge-pricing-really-works/

One critical component that Uber handled well was a notorious user interface problem that plagues everything from EULAs to delete confirmations. The problem is *accept fatigue* where a user will click whatever affirmative button will allow him to continue with whatever he is doing. A study by Böhme and Köpsell showed that over 50% of users, and the number is likely much higher, do not read EULAs and merely click the agree button (2010). Uber should be praised for using an interaction pattern that does a great job of providing transparency into Surge Pricing and ensuring that users do not merely click accept. The way they do this is by introducing friction in the ride hailing process by requiring the user to type in the Surge Pricing multiplier. For instance, if the current Surge Pricing multiplier is 2.25x, the user must type in 2 2 5 to continue hailing a ride (Figure 1). By increasing friction, Uber is increasing cognitive load which leads to a higher likelihood that the user will attend to the relevant price increase(Kahneman, 2011, p. 151). If the user is attending to the price increase they can avoid sticker shock and opt out of the increase if they so desire.

Problems to This Approach and Their Behavioral Economics Solutions

Despite a laudable approach to the user interface for Uber's Surge Pricing, there was still a tremendous backlash resulting in an F rating from the Better Business Bureau which even resulted in waning support from drivers who benefit from an increased payout (Kerr, 2014 & 2015). The cause of the drivers' dissatisfaction was primarily that their customers were dissatisfied. And as the only human faces of Uber, drivers feel the brunt of Uber's deficiencies in customer satisfaction.

An initial and naive reaction to this situation is to point out that raising the prices would *necessarily* cause customer backlash and that Uber only had two choices: (1) bite the bullet and

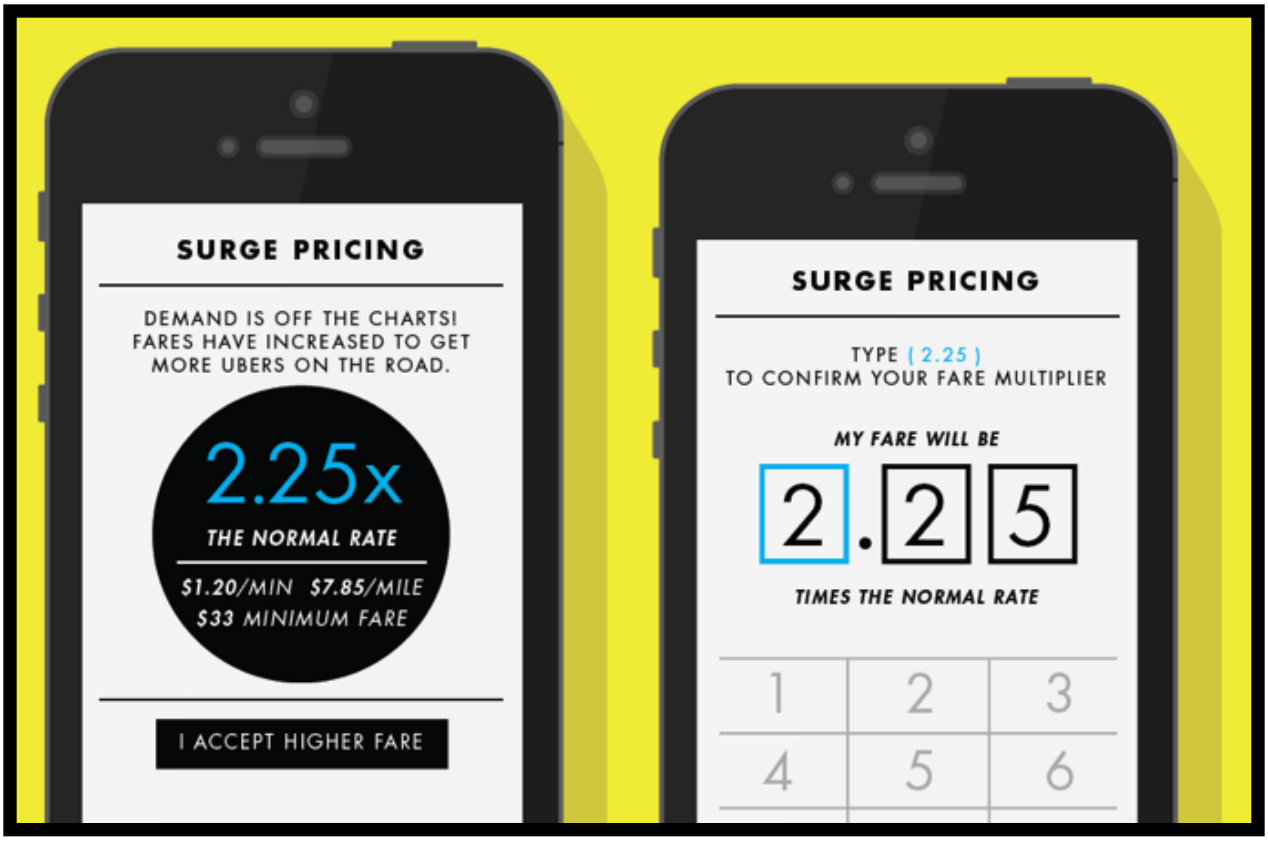

Figure 1. An illustration of the Uber UI for accepting Surge Pricing.

do just as they did or (2) don't do anything and accept the fact that sometimes there would be fewer drivers than needed to satisfy demand. But research in behavioral economics provides a third option.

Specifically the key principle at work here is prospect theory. When designed for, studies show that prospect theory would allow the presentation of Surge Pricing such that consumers gut reaction to it is more positive. Daniel Kahneman who won the Nobel Prize in 2002 for *prospect theory* succinctly captures the essence of it in this sentence: "the effect of price increases [on purchase decisions] (losses relative to the reference price) is about twice as large as the effect of gains" (Kahneman, 2011, p. 697).

Consider the following scenarios from Kahneman's book Thinking, Fast and Slow:

Scenario A: In addition to whatever you own, you have been given $1,000.

Now choose one of these options:

50% chance to win $1,000 OR get $500 for sure

Scenario B: In addition to whatever you own, you have been given $2,000.

Now choose one of these options:

50% chance to lose $1,000 OR lose $500 for sure (Kahneman, 2011, p. 657)

It turns out that people by and large prefer the sure thing in (A) and the gamble in (B) even though the sure thing in both scenarios results in the same economic outcome, e.g. $1,500 and the gamble in both scenarios also results in the same outcome, e.g. 50% chance of $1,000 or $2,000. The reason for the inconsistency in peoples behavior is because people don't make economic decisions on the economic outcome simpliciter (in the Uber example, the final cost) but on what the amount and direction of the change are from the reference point.

By presenting Surge Pricing as a multiplier on top of a reference point Uber is ensuring that they will always cause the consumer to perceive Surge Pricing as a monetary loss. This in turn results in extremely dissatisfied customers because they experience the change twice as much as they would a change in the other direction.

One behavioral economics based solution to this problem is to invert the cost structure so that consumers are given an inflated regular price[3], and then given a large discount in off-peak

[3] In fact some customers purportedly state this as a preference. Kerr 2015 quoted a driver as saying "I have had passengers who say they would be happy to pay a higher overall fare that was stable rather than the fluctuating fares caused by surges."

hours. One worry with this approach might be that there will be a large initial backlash to an across the board increase. But it is important to note that Uber is not a parity product with other transportation options like cabs and buses. Uber is not chosen primarily because it is cost effective and when Uber users are asked if they even know what the price per mile is for Uber, nearly 90% say that they do not[4]. This is likely because riders are not choosing Uber based on price, but based on convenience and service.

Another design based on behavioral insights, and perhaps a better one, is to change how the information is presented such that the exact same economic outcome obtains, but the consumer does not experience the change in price as a loss. In fact, in some cases they can experience it as an overall gain. The recommendation here is to show the price at the current time and set that in the user's mind as the reference point. From that reference point the app should then show future projected prices, say over the next thirty minutes (Figure 2). This can result in three possibilities: (1) the prices stays relatively the same over the next thirty minutes, (2) the price decreases over the next thirty minutes, or (3) the price increases over the next thirty minutes.

In the first case the app is now signaling to the user that the only trade off in hailing a ride now vs any other time over the next thirty minutes is the departure time. But in case (2) a more interesting economic decision happens, viz. the consumer now can choose to leave immediately or trade off a later departure time for a decreased trip cost. This should have the affect of not only giving the consumer a perceived choice where it was not obvious before, but allowing her to feel better about choosing the higher price as a trade off for the convenience of departing immediately. Moreover, since the price to leave immediately is the reference point, the

[4] Of 165 respondents who had used Uber 88.52% responded "No" and 11.48% responded "Yes" when asked "Off the top of your head, do you know how much the ride sharing service Uber charges per mile?" 2015, August 28th.

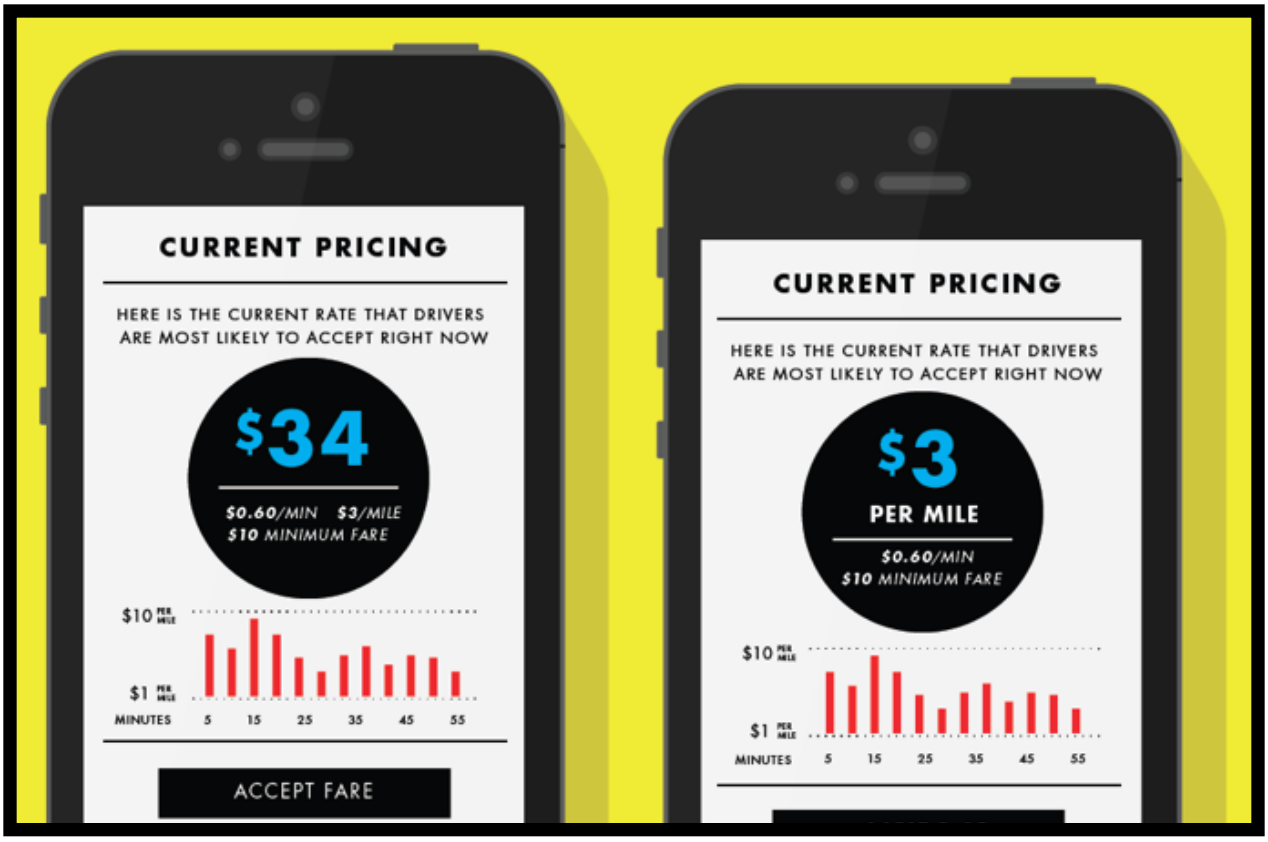

Figure 2. An illustration of what setting a reference point and future, over 60 minutes, forecasted costs might look like.

decreased cost over the next thirty minutes is perceived as a gain (think discount) rather than a loss as it is with Surge Pricing's multiplier presentation which would present the same price as, say, 1.2 times more than some base price.

Finally, in the third case the consumer should feel she's avoiding a loss and, recall, losses are twice as bad as an equal monetary gain. This feeling comes about because as the cost increases over the next thirty minutes, it signals to the consumer that she is avoiding a loss by requesting the ride immediately instead of waiting. Again the reference point is the current cost, so booking now is perceived as a positive experience rather than a neutral experience in the case of non-Surge Pricing moments in Uber's current experience. It is important to note that the reference point in the different cases are not the same base price, but rather the current market

price. Using this approach avoids the need to present any immediate ride as costing more than a reference point.

Conclusion

These is just one principle out of dozens in behavioral economics that can successfully be applied to marketing, user experience design, and service design. When providing consumers with economic decisions it is imperative that the design accounts for cognitive biases and cognitive shortcuts that are innate in consumers. If these are not accounted for then a fiasco such as the one that resulted from Uber's Surge Pricing is not only a reasonable possibility, but a likely one. Moreover, merely reasoning through consumer interactions is insufficient and suffers from some of the same shortcomings from which traditional economics suffers[5].

[5] "the failure of rationality that is built into prospect theory is often irrelevant to the predictions of economic theory, which work out with great precision in some situations and provide good approximations in many others. In some contexts, however, the difference becomes significant: the Humans described by prospect theory are guided by the immediate emotional impact of gains and losses, not by long-term prospects of wealth and global utility." (Kahneman, 2011, p. 672)

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