How Consumers Make Impulse Purchases and the Influence of Peers and a Market-Based Setting

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Abstract

Many organizations are designed to protect, educate and helping consumer with their financial decision-making. This paper examines the valuation of various non-essential goods in both a marketplace setting and slider-based setting, and in both a neutral influence and social influence condition. In a marketplace valuation setting, it is found that prices and price-searching behavior are the most significant predictors of a decision to checkout a good. In the slider-based valuation setting, it is found that the condition and a psychological impulsive measure are the most significant indicators of willingness-to-pay. Price-searching behavior indicated that the influence of responsible peers is as effective at reining in impulsive decisions as the more conventional, neutral method. Finally, a phenomena of paying more in the marketplace schema compared to the slider based schema appeared, despite the incentives being exactly the same. This was likely due to anchoring effects of the presented prices and list price.

JEL Classification: D12, D47, D79, D83

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I. Introduction

People don't always make the optimal decisions, including when it comes to money. A lack of financial acumen and judiciousness affects the average American, as evidenced in research by Annamaria Lusardi (2008) which argues that there is "widespread financial illiteracy among the U.S. population," costly on both an individual and societal level. Improving financial acumen and decision-making is a much more complex question. Willis (2008) argues, "For some consumers, financial education appears to increase confidence without improving ability, leading to worse decisions." Beyond that lack of education and preparation, the widespread biases common in decision-making appear robustly in consumer purchases. It is common knowledge that many Americans do not save enough for retirement, but simple changes in choice presentation can affect their decision (Benartzi and Thaler 2013). Financial decisions, including impulse consumer purchases, are often made from a position with less than optimal education or from heuristic considerations.

Are there ways to improve the monetary choices that consumers and investors make? Importantly, a study by Chang (2005) also shows that the rich and the poor approach their financial lives differently. The rich can afford to turn to financial professionals, while the poor turn to social networks. Therefore, understanding the importance of these financial networks should be a priority for those who want to improve financial decision-making on a mass scale. Could other solutions, such as the influence of a responsible friend, lead to consumers to make better choices in impulsive consumer environments?

A question of this much importance has engendered much research on the various factors that influence financial decisions. These are split up into three main research categories: informational illiteracy, or the lack of knowledge about financial instruments, behavioral non-social, the heuristics that impact the valuations of goods, and behavioral social, or any social influences that change the valuation of goods.

The literature on informational illiteracy finds that attempts at education have little to no effect on improving consumer decisions. They are only effective in particular instances when the education will be immediately applicable, for example, educating a consumer about a mortgage, right before they buy a mortgage (Fernandes, Lynch Jr., and Netemeyer 2013). In this study, some "just-in-time" education is provided, through information on savings and interest rates. Generally, the information is not enough, forgotten, or not applied. This indicates a strong role for others sorts of efforts in improving decision-making, including social influence.

Research on behavioral non-social effects on financial decisions, also an extensive body of literature, indicates that consumers can be affected by all kinds of changes in framing. In particular, the anchoring effect, or the effect of an initial reference price on the valuation of an object, pervades all types of consumer decisions (Furnham, Boo 2010). In this study, there will necessarily be some behavioral non-social effects, but that will incorporated into the models and is consistent across conditions.

Finally, the most applicable bit of research to this paper, social influences on consumer behavior, is emerging, especially with the advent of online purchases. Ingrained values, as passed down by family and culture, have a strong effect, as does peer pressure and 'soft' social influence (The World Bank 2015, Kim & Srivastava 2007).

However, experimental research, especially direct intervention on consumers, is sparse. One study by Luo (2005) shows that consumers will make more responsible decisions with family, and less responsible decisions with peers, suggesting that value calculations can be made differently based on the presence of a social influence. This paper hopes to expand on those results and show that "responsible" peers can also have a positive influence on the types of financial decisions that are made in our economy everyday.

In this paper, I will examine the results of an experiment on impulse purchases. In particular, this experiment uses the paradigm of an impulse-purchasing task, to investigate the impact of a 'responsible' friend on an individual. Specifically, this paper could help to understand whether, in an experimental setting, a friend's 'intervention' could be effective in generating responsible financial decisions, at least in the short-term. In these experiments, consumers make valuations and purchasing decisions on gift cards and common consumer items within a $20 dollar budget. The consumer is also able to update the prices to attempt to find a better price. The data that will be explored include the consumer's decision to skip, update, or buy, how long it takes to make those decisions, as well as the differences between those choices in either a social or a neutral condition. The neutral condition asks the consumer to define their own goals, make plans to reach those goals and take action until they become a reality. This is similar to the tactic used by most financial education interventions. The social condition asks consumers to make purchasing decisions using a process in which they identify a friend who makes responsible financial decisions, think about that friend’s advice, and implement that advice. In both conditions, the consumer is briefly educated, and behavioral non-social cues are standardized. Experiments on social influence on

consumer purchases are rare, and the results in this study may provide evidence that peer groups can make an impact on improving the financial decisions of consumers.

The experiment will also delineate between a market valuation setting, in which a consumer is offered a good at a series of prices, and a slider valuation setting, in which a consumer inputs their valuation of a good at the slider. The crux of the analysis rests on the fact that these two scenarios are economically equivalent, and differs only in ostensibly non-relevant influences.

In Section II of this paper, I'll review the literature surrounding these questions of financial decision-making. In Section III, I'll look at the experiment from which the data is drawn. Section IV will explore the theoretical framework, setting up the exploration of the data. Section V will discuss the results. Finally, in Section VI, I'll provide concluding remarks and a path forward.

II. Literature Review

This paper covers the various factors that impact consumer impulse purchases, as operationalized through this experiment. The paradigm of decision-making falls into three major categories, informational illiteracy, behavioral non-social, and behavioral social. This latter category is the focus of this research paper, and would incorporate the influence of a friend on an impulse consumer purchase. The lit review will cover the concept of impulse purchasing, research into informational illiteracy and behavioral non-social effects, and finally, the various categories that cover behavioral social research, including family and cultural influences, peer pressure, and social intervention.

a. Impulse Purchasing

There has been a great deal of research on impulsive purchasing since the 1950s, but a consensus construct has been difficult to define. Madhavarm & Laverire (2004) proffer one in light of this issue is "Impulse buying is a result of a purchaser's immediate reaction to external stimuli that is often hedonically charged." Their understanding of impulse purchasing relies on the outside factors changing purchasing behavior, i.e. the consumer being driven somewhat by indulgence beyond the intrinsic value of the good. These purchases can be influenced by a host of factors, including the type of stimuli, personality traits or the agent's mood at the moment. In the context of this paper, a "responsible" consumer is one who engages less in impulse purchasing, as, described below, this is often affected by impetuses outside of the traditional economic valuation.

Lord and Yeoman (2011) studied the affect of prices on holiday purchasing decisions. These would be considered traditional consumer impulse purchases, as they are ripe to be affected by stimuli, and the uncertainty of the purchasing outcome. The behavior in this study could be very useful in understanding the study at hand. The researchers show that even when consumers plan far ahead, price sensitivity is a key factor in consumer's decision to purchase or not purchase. In fact, they found that at less than 10% price increases, consumers would balk and switch brands. (Lord & Yeoman 2011).

Under stochastic price determination, or random price determination, the consumer should behave differently than a normal marketplace where an agent sees a set of goods and a set of prices. Hu, Munson and Fotopoulos (2015) introduce a model where the agent compares a "time strategy" and a "target strategy". The former captures the idea

of whether the good should be purchased now, or in the future, at which point the cost might be lower, and the decision to purchase would become more attractive. The latter answers the question of whether the decision presented at this time is worth pursuing. Basically, if this was a onetime scenario presented in the traditional marketplace, is the cost of the good worth the expected benefit? Finally, these are combined into an "adaptive target strategy", which takes the information about the last few rounds, analyzes whether it fits those valuations fit the agent's target, and the target then adjusts their expectations. (Hu, Munson & Fotopoulos 2015).

It's worth discussing a tenet of the impulse purchasing paradigm as operationalized in this paper. In particular, this experiment involves a consumer who is able to update and search for better prices. Basic microeconomic theory suggests that a consumer would keep updating prices until the marginal benefit was equal to the marginal cost of searching. As Kogut (1990) explains, it appears that price-searching behavior is not necessarily coherent with this belief, and that consumers may be making decisions based on the total, rather than marginal return from another update. Although inferring the cost-benefit analysis of the participant is impossible, the evidence that consumers may not make an optimal decision in that 5-second decision time frame can help to inform the analysis in this experiment.

b. Informational Illiteracy

Informational illiteracy, or a lack of knowledge that may lead to a poor decision, may manifest in financial decisions as a failure to understand terms of a mortgage, improper understanding of interest rates, or any other host of financial instruments. Many organizations believe that curbing consumers' informational illiteracy is of paramount

importance, and have specifically targeted financial education as the path to improving financial decision-making.

Fernandes, Lynch Jr., and Netemeyer (2013) conducted a meta-analysis on these studies, and their conclusion, perhaps somewhat surprisingly, is that financial literacy programs only have effects in very specific scenarios. In fact, out of 188 studies, interventions explain only .1% of variance in financial behavior. In response, the authors advocate the development of soft skills, such as planning, being proactive, and taking certain investment risks, as well as "just-in-time" education, an intervention conducted right before a particular decision has to be made. Despite the public outcry over lack of financial acumen, it appears that most financial education does not have the tremendous effect on improving financial decision. This leaves a space for research into improving financial decision making in the next two fields.

c. Behavioral Non-social

The behavioral non-social component of this literature explores various human biases. In general, behavioral non-social research is a massive topic that covers a range of effects, including prospect theory, bounded rationality, dual-system theory, and temporal dimensions, and the influence of these effects waxes and wanes based on study design.

Framing effects are persistent in financial decisions. A study on choice bracketing shows that narrowing the scope of a decision can cause an individual to evaluate on a micro instead of a macro level (Read et al. 1999). Ambiguity aversion can cause decision makers to avoid situations with unknown risk (Osmont et al. 2015). Meanwhile, risk tolerance and risk perception are both major factors in investing, with risk perception being more influenced by major economic events (Roszkowzki 2010). In addition, a

study on annuities shows that framing is influential in financial decisions, and that men and women respond different to frames (Agnew et al. 2008).

The effect of anchoring (or the presentation of information, even subtle cues, before a decision) has shown to be particularly influential and robust even when the information presented is deliberately unrelated to the actual value of the product (Furnham, Boo 2010; Wu & Cheng 2011). Wu and Cheng (2011) studied a host of framing and anchoring effects on the purchasing decisions of Internet consumers. They found that framing the same attribute negatively or positively had a significant effect. They also found a significant effect of anchors in advertisements. In particular, those with little prior knowledge of the product were the most vulnerable to these effects.

There is some debate on the effect of anchoring in reservation price experiments (like the one detailed in this paper). A study by Mazar, Koszegi and Ariely (2013) shows that "market-dependent valuations cannot be fully explained by rational inferences consumers draw about a product's value... Rather, the market dependence of valuations likely reflects consumers' focus on something other than the total benefit that the product confers to them." The context in which these anchoring effects take hold is still under debate. Field experiments by Alevy, Landry and List (2015) show that while consumers placed in novel or unexpected situations are significantly affected, there is no evidence experienced agents are affected by non-valuable information or anchors. This divergence in behavior, if true, has significant implications for the applicability of this study. If experienced agents are better at avoiding these cues because of knowledge, rather than experience, it is important to note that non-knowledgeable individuals would still be

susceptible in the consumer marketplace, and that social interventions may have a significant impact.

There is also a strong body of research that shows that low-income people have a unique relationship with finance, similar to these experienced agents. Poor people seem to be better financial decision makers by necessity. The scarcity of money means they have to be better with their budgets, and that the effects of framing, as described above, become normal goods. Poor people, unlike their wealthier counterparts, can't afford to indulge in framing effects. (Mullainathan, Shafir 2013, Sawady, Tescher 2008). As discussed before, education may not be the simple answer, and it is not a specific class of people, for example the poor or the uneducated that need social interventions - many effects seem to have a role to play in our impulse purchases, acting differently across subgroups, a fact that has significant implications for the economy.

The literature on framing and anchoring effects is both extensive and robust and this research is necessary to get a sense of the many factors that influence a financial decision, and those factors will be in play in this experiment, as well. However, even a hypothetical all-knowing individual making a decision in a vacuum would still be affected by social influences.

d. Social Influence

Family and cultural influences, peer pressure, and social intervention all affect financial decisions. And although there is a lot of literature on social influences on decisions, there is limited research on social influences in financial decision-making (The World Bank 2015). However, there is intuition, as well as empirical evidence, that communities can have a major influence on decisions made by individuals. For example,

consumers are more likely to make an impulse purchase when they find a store is crowded, but the employees are being extra friendly (Mattila, Wirtz 2008). Beader, Netemeyer and Teel (1989) went so far as to develop a scale to measure "consumer susceptibility to interpersonal influence" almost 3 decades ago. This scale was theorized through the desire to improve social image through the purchase of certain products, the desire to conform to social norms through the purchase of certain products, or the use of other's to determine the value of a product. Still, there is a significant gap in the literature as it relates to the impact of others on financial decisions, and specifically as to whether friends can have a positive influence on financial decisions.

Family and Cultural Values

Family and cultural values may not be considered social intervention, but it indicates a clear role for social norms and the influence of others on financial decisions, and is worth briefly discussing.

These social norms affect preparation for retirement (Payne et al. 2014). They also affect actions in a business environment, including views on ethics (Rodriguez & Rodriguez 2013), capital (Mac an Bhaird & Lucey 2014) and risk (Edu et al. 2014, Lievebrück & Schmid 2014). As the World Bank (2015) asserts, "Social norms—broadly shared beliefs about what group members are likely to do and ought to do—are informal governance mechanisms that exert a powerful influence on individual decision making and behavior."

Peer Pressure

Peer pressure has robustly been shown to be able to alter the perception of various factors in a situation, both negatively and positively. Implicit peer pressure can affect

views of compensation (Barron & Gjerde 1997) and risk (Gardner & Steinberg 2005, Anacker et al. 2011). Social influences can also alter productivity (Barron & Gjerde 1997) and consumption (Anacker et al. 2011). Most studies, however, do not incorporate a financial decision making paradigm.

There is a line of research, through microfinance, that does connect to certain aspects of financial decision-making. The World Bank Report (2015) argues, "The success of microfinance in developing countries, for instance, is often attributed in part to the close relationships among borrowers that channel social pressure to encourage repayment...Yet development goals are also achieved with technologies such as commitment devices that encourage savings by insulating people from social demands for financial assistance... Interventions achieve their objectives by harnessing some social pressures and diminishing others." However, this is in a more explicit situation, where the demands of failure to repay are more blindingly obvious. Would the same thing happen if their peers were not directly affected by the individual's failure?

It appears that the answer is yes. For example, consumer-purchasing decisions are affected by online influences of people that the individuals know and trust, including friends (Kim & Srivastava 2007). This implies that at some level, people either are considering social norms, trust others to evaluate goods, or will purchase goods for the social benefit. Research also shows that people trade off general social influence at a steady rate with influence from specific friends (Abbassi et al. 2012). This is particularly interesting because this indicates that the influence of a specific friend will be greater than the general crowd when applied to the current experiment. A study on the television show *Scandal* demonstrates that fictional influences can also increase financial literacy

(Berg 2013). However, none of these studies attempted to address the question of consumer's impulses purchases with an experimental paradigm, let alone, an economically experiment rigorous paradigm.

Social Intervention

The financial research for positive influence of friends in the moment of the decision is sparse, and mostly non-experimental and that is what the experiment in this paper attempts to correct. One study shows that the decision to stop driving (in old age) was strongly affected by the support of friend's and family (Johnson 1998). This indicates that social influence can have a significant impact on decisions.

The closest study to the one in this paper is Luo's study in 2005, which relied on the consumer imaging a scenario (this may even be more akin to peer pressure than acive intervention) but comes closer than the large body of literature in the field. His study required the subjects to 'place' themselves in a vignette, detailed in the third person and then to indicate the urge to buy the good presented in the vignette. The vignettes differed with the person being with family or peers, as well as high cohesive and low cohesive groups. He studied these urges to purchase the goods, and found that there was a reduced urge to purchase in the presence of a family group, and an increased urge to purchase in the presence of a peer group (the magnitude of the effect was moderated by the feeling of 'closeness' with the friend). Luo argued that this was presumably because of the 'responsible' influence that family has compared to the negative influence that friends often have. If that assumption is correct, that lends credence to the hypothesis that responsible friends can also have a positive impact on financial decisions. (Luo 2005).

The experiment discussed in this paper borrows some elements of Luo's paper, and improves upon it in many ways. Crucially, it expands the research beyond just types of social influence and incorporates the general urging of responsibility into the purchasing task. This allows the research to go beyond the effect of different peer groups to actually understand whether this may be a useful strategy for improving financial decision making societally. This paper also utilizes regressions to explore a variety of factors that may be important in valuing goods, providing a much more comprehensive understanding of why consumers may be making the decisions that they make. The tasks do still ask the subject to imagine the presence of peers, rather than placing them with someone in particular, which may be the next step in future research. However, the strength of these impulse-purchasing tasks is that it places the consumer right into the decision in an economically significant manner, making the entire experiment more valid. The choices made in these tasks matter for the consumer's welfare. There are also a variety of objects, and a variety of prices, rather than two different "characters" and a handful of clothing items, expanding the generalizability of the final results.

This experiment allows comparison of more traditional financial education methods with the social influence of responsible peers, building upon the legacy of researcher showing that social pressures do have an impact on decision-making, including impulse-purchasing. To the knowledge of this researcher, this specific phenomenon has not been studied in the past. Countless financial decisions, however, are made everyday in an increasingly globally connected world. These little interactions become incredibly important on a mass scale, and it is worth exploring all avenues to see whether it is possible to improve financial decisions.

III. Experiment

The data presented in this paper was collected from two experimental financial behavioral tasks. The subjects in the experiment were undergraduate and graduate university students, all between eighteen between twenty-six years old. A hundred subjects went through the experimental task, each completing fifty trials of each task. The experiment starts with an informational component in which the participant reads and is tested on his or her comprehension of a financial literacy brochure. He, or she, then takes part in a temporal discounting task (deciding between money now and money later), which is not examined in this paper. Then the participant takes part in an impulse-purchasing task involving common consumer purchases, and then a slider-valuation task involving the same goods. (The order of the temporal task and the latter two tasks is randomized, but not the order of the latter two tasks.)

The experiment was conducted to requisite economic standards, as opposed to traditional psychological standards. This means that no deception was used at any point in the trial. In addition, to line up incentives with actual behavior, for each task, one trial (out of both tasks) was selected to act as actual compensation. For example, if they indicated that they would buy the Panera gift card at $14, and the randomly generated price was less than $14, the participant would receive the gift card and whatever was left over in their budget (i.e. $20 minus the randomly generated price). The consumer was informed of this paradigm before engaging in the tasks, completely straightforwardly and honestly.

There were two conditions in this study. The participants are told to either

consider a responsible friend (social condition) or to consider their own financial plans (neutral condition). The informational brochures offered to participants at the beginning of the study are shown in Figure 1 and 2, the neutral and social conditions, respectively. Efforts were also made to remind the participants of their given strategy throughout. The "reminder" instructions for each condition are shown in Figure 3 and Figure 4, the neutral and social conditions, respectively.

Figure 1

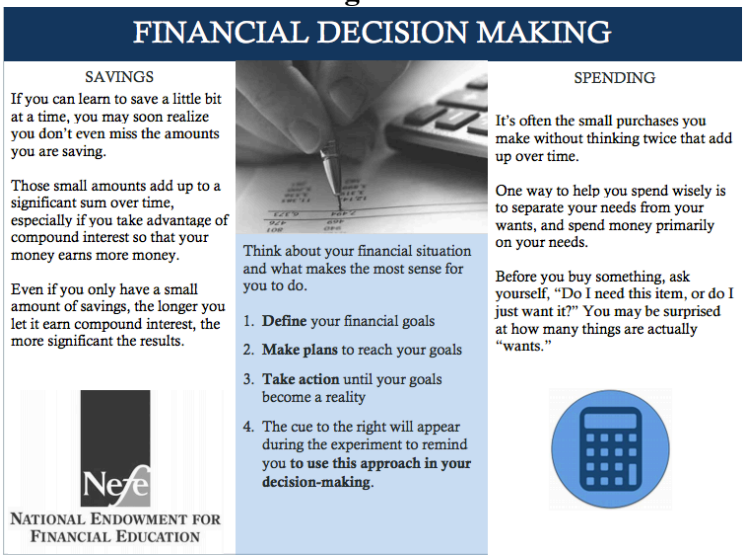


Figure 2

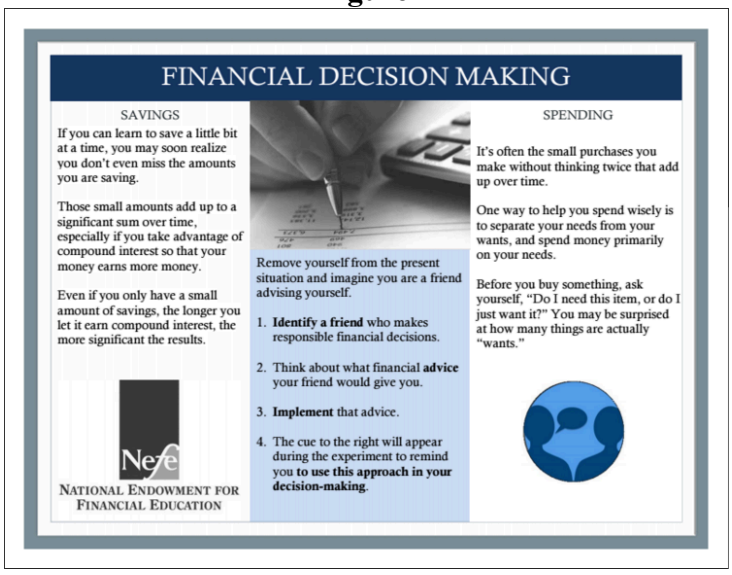


Figure 3

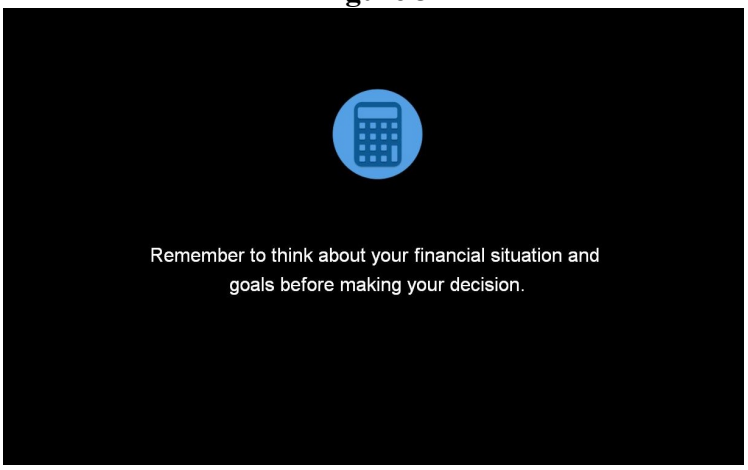
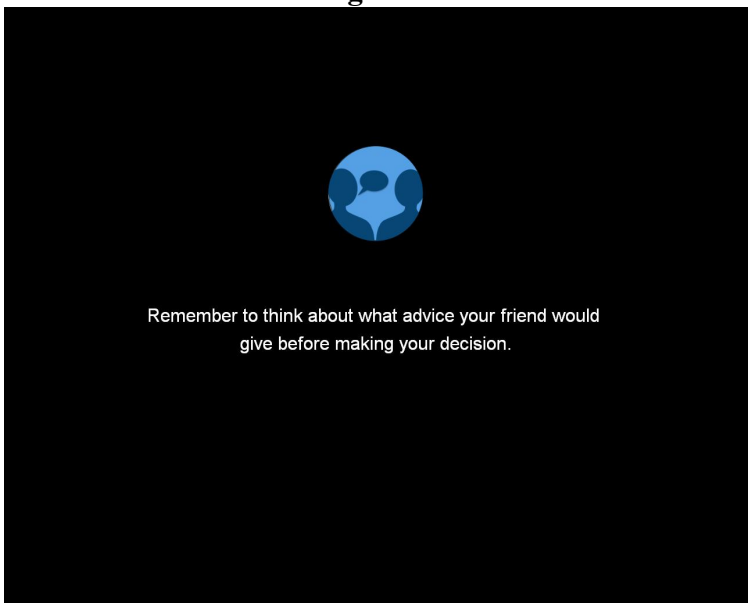


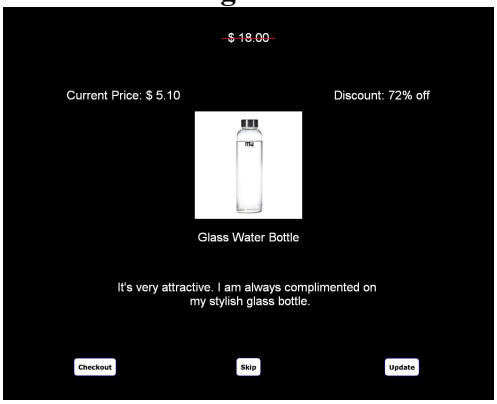
Figure 4



As a reminder, the first component was an impulse-purchasing task, which mimicked market conditions. The second component was a valuation task, in which the consumer valued the items in the impulse-purchasing task on a sliding scale. The two tasks are conceived of, as follows. In the first part, the subject makes a consumer decision in which they can "check out" items, skip items entirely, or update prices to bargain for a better rate. If they "check out" an item, that price is the indication of their 'bid' for the item in that trial.

These impulse purchases were tracked in an experiment in which all subjects were able to make the decision to "skip" over an item, "update" the price, or "checkout" the item. The subject is presented with an initial price and these three choices. If a subject chose to "skip" an item, he/she gave up the opportunity to purchase the item. If a subject chose to "update" the price, he/she received a new price, possibly higher or lower, for the item in question. The subject could then again, "skip", "update", or "checkout". After a randomly generated number of "updates", the item would be "lost" and be unavailable for purchase (to prevent unending "updates" on a quest for the lowest possible price.) Finally, if the subject chose to "checkout" the item, the subject has made the decision to purchase the item, which is the dependent variable discussed heavily in the "Results" section. The item also automatically updates after 5 seconds, also called a "wait" in this paper. The 'final price' is the last price seen before checkout, skip, or loss. The 'list price', an actual value for the item, is seen above the item itself. An example prompt is seen below in Figure 5.

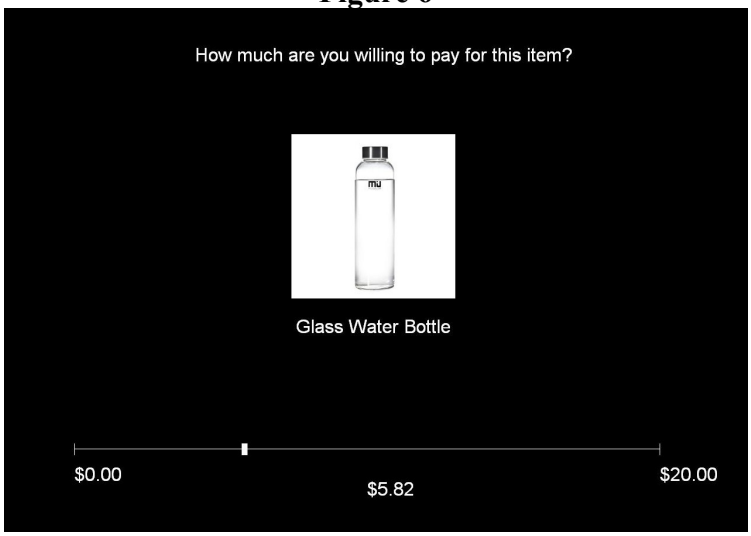
Figure 5



In the second part, the subject indicates their willingness to pay for items based on a Becker-Degroot-Markham auction. This is more straightforward, in that, whatever

indication of willingness to pay is made, that will be the subject's 'bid' for that item in that trial. This is where the "willingness-to-pay" valuation is determined. The subject is made aware that the reward is determined by randomly choosing one of the trials across both tasks. The slider task is shown in Figure 6. This task always follows the task shown in Figure 5, which has implications on the validity of the experiment and will be discussed later in this section and in regards to the results.

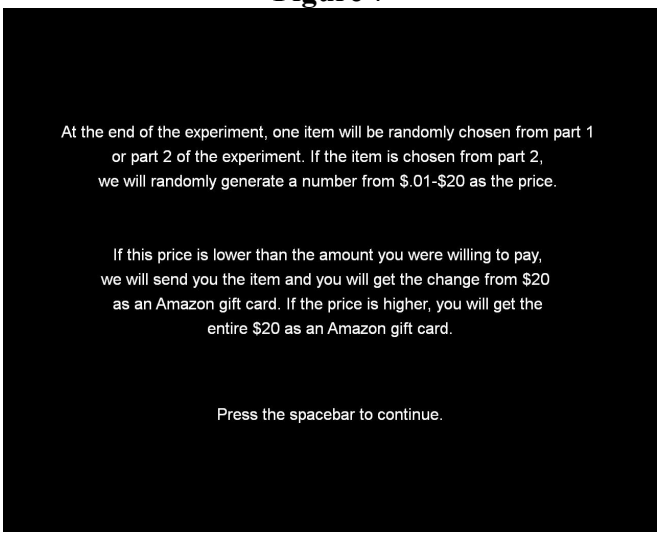
Figure 6



The consumer is informed (truthfully) that one of the trials in one of the parts will count towards the reward of an item at the end of the experiment. In order to elicit "true" behavior, the subject is told that for the chosen trial, a random price will be generated, and if the price submitted by the subject is higher than that generated price, then they will get the item plus the leftover budget. Otherwise they will receive the entire budget. The budget for each trial is $20, and most items are worth around $20. As operationalized in this study, an impulse purchase is a decision to use money on a gift card (worth $20), or common household item (worth around $20) in a short period of time. All purchases were made out of a $20 default budget, and consumers received the good if they then valued it

as much in the BDM auction. The subject received any item purchased, in addition to an Amazon gift card in the value of the leftover budget (e.g. if no item is purchased, the subject receives a $20 budget, if a $20 Panera gift card is purchased for $12, the subjects receives the $20 Panera gift card in addition to an $8 Amazon gift card.) The subject also received monetary compensation for the preceding time discounting trial, as well as a walk-in fee.) Finally, the instructions for the each part of the impulse decision-making task are shown below. Figure 7 shows the instructions detailing the reward schema.

Figure 7



The noteworthy fact about these two tasks is that the core of each task is essentially the same. Stripped bare, both tasks have the same reward function based off the price that was indicated in the trial. There is no traditional economic incentive to indicate a different price in either trial. The only difference between the two is the surrounding aesthetic i.e. whether it is presented in a market schema, or a slider schema. Even if there is a price to information acquisition in the market based task, it should cause a consumer to pass on a good not overpay, and would consequently not affect comparison in indicated "checkout" prices in the market task and indicated willingness-

to-pay prices in the slider task. The effect of these differences in aesthetics will be discussed later.

The difference in conditions is also worth discussion. In both the neutral and social condition, financial literacy is stressed, and all the other factors are identical. The only difference is whether the subject is told to carefully consider their own decision in terms of savings and needs and wants, or to consider what a responsible friend would do in that situation. The experiment accounts for some informational illiteracy through the brochure; the potential behavioral non-social differences should be eliminated by experimental randomness. Analysis of these data will help to answer the question of whether responsible social influences could encourage more responsible financial decisions.

These data are collected from an experimental source, which is rare in this field. This isolates the effect of the social condition and a full understanding of all the variables at play. The experiment used real consumer items and realistic price trajectories, creating as realistic a consumer environment as possible. The prices, and their updates, were driven from Amazon.com price trajectories for the same or similar items. The trajectories were adjusted to change by at least $1 for each time point and normalized to $20 (the budget). There was also always at least one price at a 50% or greater discount within the first 10 price changes. There was also a real payoff based on the decisions that were made within the tasks, so incentives matched the decision-making schema. A psychological measurement of impulsiveness, the Abbreviated Impulsiveness Scale or ABIS, was also administered. Eyes tracking data, and qualitative data were also collected, although not analyzed in this paper.

A weakness of experimental data is that it is somewhat artificial, compared with data collected in the field. It's possible that the subjects made different purchasing under the guise of a lab framework, or valued items differently online than in a real store. There is also no "real" friend in the experiment providing advice. The subject has to imagine what a responsible friend would tell them, and react based on that. It is possible that the subjects are unclear on what a responsible friend may tell them, or would react differently to that advice in real life. Implicit in the creation of the "responsible" friend is also the idea that the subject's own level of financial acumen will go into the results. It is also possible that the participants viewed the $20 as a bonus, rather than as a strict budget. That would impact the attitudes towards spending that money.

Another weakness of this experiment is that the subjects are forced to assume the advice that would be given by a particular friend. However, as Luo (2005) lays out, there is a great deal of research arguing that social pressure does not need to be physically present and that "imaginary" presences have a denoted effect on behavior that is similar to that of having an actual physical presence (and, in fact, their absence may even reduce social desirability biases). Let us imagine two different scenarios. In scenario one, an actual friend providing advice would be more responsible and would provide more responsible advice than the participant imagines. In this case, the participant is imagining a less responsible friend, and will make less responsible decisions. This scenario will understate the affect of a responsible friend, and so will work in a contradictory manner to the hypothesis, rather than result in false affirmation of the hypothesis In scenario two, if the actual friend would have been less responsible and would give less responsible advice than the participant imagines, than the participant will end up being more

responsible than if there was actually a friend there, and this would overstate the effect of the social condition. However, in this case, than that may be too optimistic in how financially responsible their friends, are it would still provide evidence for the general hypothesis that responsible peers, if they were truly responsible, would have a taming influence on impulse purchases. As far as this researcher can tell, any evidence in the data that there is a improvement in the social condition would point to proof of the hypothesis that thinking of a friend's advice, versus thinking of one's own goals, results in less impulsive consumer purchasing behavior. And because in both scenarios the participants are told to consider their choices carefully in both scenarios, the difference between the trigger of acting responsibility and making plans should be minimized.

IV. Theoretical Framework

This paper explores three key issues. First, it attempts to understand the variables that impact a valuation decision. Second, it examines whether a responsible friend can reduce impulsivity. Third, it examines whether valuations differ between a market-based task and a slider-based task.

There are various factors that may play a role in valuation decision of non-essential items. These include the initial price, the final price seen, the final price seen in the last and the list price. Beyond prices, other factors may include the number of prices seen, the condition, the ABIS test impulsivity score, and the trial number. The ABIS test is an Abbreviated Impulse Scale, based off of the behavioral inhibition system scale, a standard measure used in psychology to measure a subject's impulsiveness.

A rational actor would act in certain ways. A 'rational' subject would react to prices and the value of the good, ignoring any extraneous factors. A rational actor would buy more with lower prices, and buy less with greater prices. "Checkout" prices in the consumer-purchasing task should be similar to willingness to pay indications in the slider valuation task, as the only difference is in framing. There wouldn't be any behavioral non-social effects for a rational actor.

A real actor would act in different ways. Basic microeconomic theory still argues that as prices go lower, it is more likely to meet the consumer's inherent valuation and the consumer is more likely to make the purchase. This would be true for even if an actor were irrational in certain respects. All evidence points to the fact that in almost every situation, people react to prices in the standard economic fashion. In the same vein, as the price goes higher, it is less likely to meet the consumer's inherent valuation and the consumer is less likely to make the purchase.

This study does not use exactly use stochastic price determination, as the prices are determined based on a realistic price path. However, the consumer is operating under uncertainty. Under this model, we should expect consumer's to compare a valuation in their head with the price on the screen. If that meets their valuation, consumers will either bet on the price dropping and subsequently update in order to see another price, or they will make the decision to purchase the good at the given price. If the price does not meet their valuation, the consumer will skip the good if they have no interest at all, or see if they can get a lower price that will meet their valuation. Based on this theory, the consumers will incorporate the prices that they've seen in the past trials to adjust their target price of the good.

There should also be an anchoring effect on the initial prices. That means that drops from that initial price will affect purchasing decisions. In the consumer's mind, that initial price will affect evaluations of future prices. In general, significant drops should result in greater purchases, regardless of the initial price, due to this anchoring effect. Final prices, as standard economic theory predicts, should lead to less buying when higher, and more buying when lower, so its impact should also be negative.

Behavioral economics literature indicates that consumers will incorporate the past prices in a way that may not be 'rational'. As Furnham and Boo (2010) describe, the anchoring effect is particular robust in almost every setting. The initial price that one sees, or the reference price, has a particular pull on consumers that change valuations and judgments of offers. In fact, research has found that the initial price doesn't even necessarily have to be related to the actual good. Incidental prices will also have an effect on a consumer's willingness to pay, still acting as a reference price despite its lack of relationship (Nunes & Boatwright 2004). Therefore, the final price from the last trial may have an incidental anchoring effect. Based on these results, we should observe an anchoring effect based on the initial price in any sort of consumer purchasing experiment, and possibly on the price of the previous good as well, which is why that is included in the "regressions presented in this paper".

Other factors that may have an effect including willingness to pay indicated in the second trial are the prices seen, the trial number and the ABIS impulsivity score. Prices viewed should also be positively correlated, as you would only look at more prices if you already had some initial interest in the good. The ABIS score should have a positive impact on valuations, because a more impulsive person is more likely to exhibit

impulsivity in these tasks and 'buy' at higher prices. The trial number may be significant because it is a long study.

The question of whether a responsible friend can reduce impulse purchasing will be examined through comparisons of the results between conditions. There may be a difference across conditions, as a rational actor may still incorporate social feedback.

Experimental evidence indicates that the "responsible friend" should lead to significant results. Luo (2005) argues that family, by virtue being a more "responsible" influence, actually decreased frivolous purchases. In particular, Luo's argument that it was the fact that family sends a responsibility signal to an agent that affected the decision, rather than some other signal (e.g. lack of agency as a child). In this study, the consumer is using a 'responsible friend's' advice; so that signal and corresponding effect should be remain present.

The hypothesis of this paper is that the social condition will lead to lesser impulsivity, so the data for the two conditions should reveal different results. Past research shows that the peer pressure of responsible friends often results in better financial decisions than those made without that implicit peer pressure. The social condition creates an environment where the consumer is taking into account the valuable advice of a responsible friend. The hypothesis is that in the social condition, impulse purchasing will be lower than in the control condition.

This decrease in impulsivity could be indicated by fewer purchases, purchases at lower prices (which may be able to measured for the same good depending on the number of observations), and more patience with updating prices. This may be indicated in the regression through decreased purchasing or valuation behavior, which is the basic

economic interpretation using actual behavior. The price-searching behavior, i.e. the choices made in the impulse-purchasing task, may also indicate the levels of impulsivity exhibited. Someone searching through more prices may indicate that they're being less impulsive in selecting a price. Similarly, if someone is taking longer with their choices, they may be acting more deliberately and less impulsively. Although, these interpretations, as discussed later, come with caveats, and are reliant on indications in the actual valuation behavior.

It is important to note, that non-significant results are not necessarily a death knell for the hypothesis. It does show that being told to imagine a friend's advice is at least as powerful as being told to define a financial goal and making plans to reach that goal. The strategy presented in this paper, if not statistically different from the neutral condition, would therefore be just as effective and theoretically simpler to implement in the real world, where those who can't make there own plans because of lack of education could turn to a more responsible friend. An insignificant result would still be a relevant result.

The difference in valuation between market-based and slider based task will be indicated simply by looking at the different valuations provided by consumers. Again, this can be examined because the crux of each task is essentially the same. All that is different is the "window" dressing. In a rational actor, scenario there shouldn’t be a difference across valuation tasks. A real actor may be influenced by the differences across tasks, for a variety of reasons.

V. Results

Over the course of this results section, I will explore the basic purchasing data, some indicators of difference between the neutral and the social condition, the factors that influence good valuations, and what might cause one to pay more in the impulse purchasing task over the slider valuation task.

Part 1: Basic Purchasing Behavior

Before getting into the heart of the analysis, it is worth exploring the basic results of the study, and checking to see if they fit in with the expected economic hypotheses. We will examine the difference in final price and in willingness to pay, which are the two best indicators of how participants valued goods. One would expect that when a good was checked out, the final price seen was lower in the impulse-purchasing task. Similarly, the willingness to pay in the ensuing slider task should higher.

Table 1: Purchasing Behavior

Criteria	No Purchase	Purchase	P-Value
Number of Trials	4198	802	n/a
Mean Final Price	13.12	12.71	0.0042
Final Price Std Deviation	3.99	4.12	n/a
Mean WTP	3.16	3.96	0.00
WTP Std Deviation	4.18	4.3	n/a

Table 1 delineates the descriptive summary of the purchasing behavior. In total, 802 of the 5000 goods were bought, just over 16% of the goods. This would fall in line with the idea that these are non-essential items, as subjects passed over most of the goods. In accordance with expectations, when a good was checked out, the final price seen was lower in the impulse-purchasing task. This makes sense, as the one would expect subjects to buy things at lower prices (and search for lower prices if they're

interested in a good, as well). Similarly, the willingness to pay indicated in the ensuing slider task was higher. This is also expected, as the two valuation tasks do not test different things, so one should expect that purchases made in one task should be correlated with a higher willingness to pay in the other. The t-test p-values show that these results are extremely statistically significant.

In terms of general price-searching behavior, the subject updated past the first price in 67% of trials. This indicates that 33% of goods were dismissed out of hand. 20% of goods with more than one price seen were bought (329 out of 1626), while 14% of goods with only one price seen were bought (475 out of 3374). This shows that either people searched for better prices when they liked a good, or that updating prices inherently led to better prices, or both.

Other variables and their connection to the purchasing task will be further explored in part 3, which introduces a purchasing decision regression.

Part 2: Neutral/Social Condition Comparisons

Next, I will explore the indicators of differences in the social and neutral condition. The original motivation for this research was seeing whether responsible friends could make a positive impact on a person's financial decisions and this builds off the preliminary descriptive statistics to examine the purchasing behavior as the result of the social influence.

To reiterate, the experiment has set up two competing conditions. The first, the neutral condition, posits the subject to consider his or her own choices carefully. The second, the social condition, posits the subject to imagine a responsible "friend" who will give them advice. Comparing these indicators will provide evidence for or against the

theory that subjects may use more care and concern in making their choices in one condition or the other.

To this end, I will look at the differences in results of actual results in purchasing behavior, namely the number of checkouts, and the specified willingness to pay. Hypothetically, if the social condition engenders more responsibility, we would expect the number of checkouts and the indicated willingness to pay to decrease. Since these are non-essential goods, participants don't necessarily need to buy any of these items. A more responsible consumer will restrain himself or herself from making purchases unless the product meets their "true" valuation. That doesn't necessarily mean that any one purchase is because of impulsiveness and that any single price paid was above the consumer's "true" valuation. However, over the course of 50 trials, one would expect, as supported by the literature, that in these sorts of scenarios, consumers will be impulsive and 'overpay' to some extent for certain goods. When some level of impulsive thinking is triggered, participants will indicate higher valuations of goods, by checking out or through the slider valuation task.

There might be some indication as to whether this idea is true when exploring the price searching behavior as well. If that behavior is markedly similar or different, it can shed light as to whether consumers were searching for better deals and the constraints of the marketplace determined their behavior, or whether there were no differences in condition. I will look at behavior within the trials, namely the button choices made in the impulse trials, and the response time to the stimuli to click those buttons. It would also be expected that people might update and see more prices, contingent on their buying behavior. If people are buying less, they may also be skipping more quickly. Finally, one

would expect the response time to increase, as people would be considering their alternatives more carefully.

First, we can look at the actual purchasing behavior and the willingness to pay measure for both. This is the incentivized purchase made out of the $20 budget in both scenarios. These measurements encapsulate the economic behavior of the participant. The first table indicates the number of "check outs" made in the impulse purchasing task and the price at which those "check outs" were made.

The second measure of purchasing behavior comes from the slider task results, which were also incentive-compatible. Again, out of a $20 budget, the participants indicated their willingness to pay for each good. The criteria for receiving any rewards were analogous to the previous impulse-purchasing task and this was explained to the participants. The expectation is that a greater willingness to pay would indicate that the participants are less "responsible".

Table 2: Purchasing Behavior by Condition

Criteria	Neutral	Social	P-Value
No Purchase	2101	2097	n/a
Purchase	399	403	n/a
Mean Price of Purchased Goods	$12.85	$12.56	0.16
Std Dev for Purchased Good Price	$4.02	$4.22	n/a
Mean WTP	$2.97	$3.61	0.00
WTP Std Deviation	$4.20	$4.19	n/a

The purchasing behavior in the impulse-purchasing task was similar, and statistically indifferent. These results indicate that people in both conditions were equally as willing to purchase items. There was very limited evidence that the price of neutral goods may have been higher. Still, they checked out goods at a similar rate and price,

providing no evidence that one condition contributed particularly more to "responsibility" than the other.

Interestingly, the willingness to pay was greater for the social condition by about $0.64, which runs counter to the hypothesis. These results could indicate that in the social condition, subjects were actually more "impulsive", and less responsible, in the slider task. Interestingly, this is despite them valuing the goods at a similar value in the previous task. It's possible that in slider valuation, the neutral prompts are actually more effective in neutralizing purchasing of non-essential goods. It would have to act in a different manner than in the task that more closely resembles a true "marketplace". Perhaps with more information flying about in the "market" task, neither strategy is particularly effective at curbing impulsivity, or they're equally as effective. It's also possible that the neutral tactic is simply more effective than the social tactic in a simpler situation (or one that's unaffected by the variables present in the purchasing task as discussed in the theoretical framework and explored further later in this section).

It is important to note that despite the same criteria, the indicated prices for goods were much higher in the impulse-purchasing task than the slider task. This was true for both conditions consistently. We will return to this phenomenon in the last section of this data, when we look at "overvaluation".

Beyond the basic purchasing decisions, we can also look at the behavior that led to these decisions. The inconclusive results presented above, strive from the economic decision, but these following indicators can provide context for how these decisions were arrived at, and provide more insight into the way the subjects searched for prices, and may provide insight into other indicators of impulsivity.

First, I will look at button presses. This is an indicator of price-searching behavior across the trials. Comparing shopping behavior provides insight into the role that the different conditions are playing. If a shopper were being more 'responsible', they would likely show that by updating more and searching for better prices, or consistently skipping more often. Considering the previous results, it is evident that the shoppers or not choosing to buy less items, but it is possible that they are trying to find better prices even if they were not available.

Table 3: Button Presses by Condition (across 50 trials for each participant)

Outcome	Neutral Mean	Social Mean	P-Value
Total	113.42	133.94	0.0464
Checkouts	8.26	8.2	0.5173
Losses	1.96	2.4	0.1714
Skips	39.78	39.4	0.5951
Updates	59.72	76.74	0.0785
Waits	3.7	7.2	0.00

The difference in button presses was strongly significant between the two conditions, but that was almost completely driven by the increase in updates, waits, and losses. Functionally, updates and waits do the same thing, except one must wait the entire five seconds for a "wait" to occur. The increases in losses are driven by the greater updates, as losses are entirely dependent on a goods price being updated "too many" times and 'selling out' (the possibility of which subjects are informed of prior to the task).

These results suggest that in the social condition, participants tended to search longer for more goods. This could suggest a greater desire to purchase the goods, or a greater desire to search for a bargain. These results are in favor of the hypothesis that the social condition encourages more responsibility. It encourages the idea that thinking of a friend forces a more careful deliberation in searching for a better price on those goods.

However, this still leaves the question of why checkouts were not different, if consumers were searching through more prices. One hypothesis is that the prospective buyers were not finding the price that they were looking for, as evidenced by the minimal economic (if still statistically significant) difference in prices from Table 1. This would also work with the idea that this was in fact a reflection of their greater valuations (as noted by willingness to pay in the slider task) in the social condition, and that consumers were more eager to buy the goods, but simply didn't find an amenable price. In conjunction with the checkout results, this may in fact indicate that the social condition was a weaker "positive" influence on the participants.

The second measure that I will look at to explore price-searching behavior is the button press response time. Response time is an indicator of the way in which consumers were searching through prices and making decisions. The response time indicates how long it takes for a subject to choose a response, whether it is to skip, update, or check out across all trials. Presumably, longer response times indicate that a subject is thinking longer about their choice, or at least allowing the possibilities to process longer. This gives us insight into how carefully the subjects are weighing their choices.

Table 4: Response Time by Button Press (in seconds)

Decision	Neutral	Social	P-Value
Checkout	2.48	2.43	0.6157
Update	2.09	2.13	0.4722
Skip	2.59	2.87	0.0475

These results indicate that the only response time that is statistically different is the response time when a subject chose to skip an item. This difference was about .28 seconds. It's also worthy to note that waits, which were greater in the social condition, are triggered by holding off for 5 seconds, and is practically the same as updating manually,

would push the update response time up in the social condition. Incorporating that increases the response time for the social condition overall, as well. However, the response time differences between conditions for checkouts and updates were, for all intents and purposes, insignificant.

Results of this significance indicate, that, to some degree, in the social condition, there was some factor that caused subjects to take longer to skip than in the neutral condition. This could be, in accordance with the hypothesis, because the subjects in the social condition were considering their choices more carefully. It could also be that it simply takes longer to consider the impact of a "friend" versus considering one's own plans.

However, the question of why only subjects only take a longer time to skip arises again. It is also possible that the subjects are consternating longer over skipping a good that they want, rather than more carefully considering the prices that they have in front of them. This would be contrary to the hypothesis that the social condition would lead to more responsible behavior.

These significant results, taken in conjunction, do not necessarily paint a complete and whole story in any direction. There is some evidence in accordance with the hypothesis that a "responsible" friend is a better influence than one's own financial compass. Namely, this idea is supported by the fact that subjects spent longer looking for prices by updating and waiting more, and that they thought longer before skipping an item entirely.

However, there is just as strong, if not stronger evidence, which works in contrast to the hypothesis. The biggest piece of evidence is that the willingness to pay in the social

condition is actually greater than in the neutral condition by $0.64 an item. Over the course of the experiment, the subjects in the social condition would have spent an average of $32 greater than the subjects in the neutral condition. Also, the same statistics that support the initial hypothesis could also work against it. The greater number of updates may represent a greater desire to purchase the good, and the extended search for a non-essential impulse purchase. The longer time to skip may also be a symptom of the greater desire to check out the good, and the subjects holding off on skipping as quickly because of their greater interest in purchasing the good. Finally, the difference in checkouts and check out prices suggest, that in the end, there may be very little difference in actual behavior in a more realistic marketplace environment.

Part 3: Purchase Decision Regression

The second thing I will explore is how customers made their valuations, and what influences did or did not make a difference in their impulse purchasing decisions. These regressions are designed to elicit some of the factors that shoppers considered when making these impulse purchases. These regressions will hold other aspects constant and will allow examination of the influence of conditions on actual purchasing behavior, isolated from the other effects (and also other factors, isolated form the condition). It will allows us to more rigorously consider the impact of condition (and other factors) on the decision to purchase.

This first regression looks at some basic factors that may impact the decision to "check out". It is a logistic regression where the dependent variable is the decision to "check out". It is 1 when the participant makes an affirmative decision to purchase the good, and 0 when the participant does not purchase the good, or the good is lost (runs out

of updates). All choices were incentivized, so one would expect that they acted in accordance with their desires.

The factors being studied include a variety of prices, the initial price seen, the final price before the decision to skip or purchase, and the final price seen from the last trial (which might affect it through the anchoring effect). Other influences include the condition, an impulsivity score from a psychological ABIS test, the list price for the item, the trial number (1-50), the number of prices seen, and the willingness-to-pay indicated in the ensuing task. The willingness-to-pay is tied greatly into the purchasing decision (as one would expect), so it is not ideal, but it is also the most significant factor, as I will discuss. Also, as discussed in the theoretical framework section, one would expect prices to exhibit the traditional economic effect, as well as triggering the anchoring effect, while ABIS should be positively correlated with valuations.

Table 5: "Check out" Valuation Regression

Factor	Coefficient	Std. Error	P-Value	Odds Ratio
Sqrt(WTP)	0.362	0.095	0.000	1.436
Last Trial Final Price	-0.039	0.010	0.000	0.939
Sqrt(Prices Seen)	0.311	0.100	0.002	1.365
Final Price	-0.024	0.013	0.008	0.976
Prices Seen	-0.071	0.031	0.023	0.932
WTP	-0.063	0.028	0.025	0.947
Initial Price	0.016	0.014	0.261	1.016
Condition	-0.080	0.079	0.304	0.922
Constant	-1.22	0.235	0.000	0.265

The goodness-of-fit pseudo R^2 = .019, but R^2 values in logistic regression are hard to interpret. Another goodness-of-fit test, which is often used in logistic regressions, is the Hosmer-Lemeshow chi-squared, which in this case has a p-value of .457, which is significant. The individual results for various factors are also statistically significant but not strongly economically significant. The constant is -1.09, which indicates a strong

negative starting point from which every other factor has to react. It's also important to note that R^2 values are traditionally lower in human behavior trials, as predicting human behavior is difficult.

The ABIS score, the item's listed price, and the trial number were also tested, both individually, and for joint significant through an F-Test, and found to be entirely insignificant and removed from the regression presented in Table 5. The first is surprising because one would expect the subject's impulsivity to affect their actions in this experiment, which is designed to elicit impulsivity. The second is surprising because one might think it would anchor the subject, or that a subject might want an item of higher list price to a greater degree. Various interactions between variables were also tested, none apparently significant.

In order to test for nonlinearity of these factors, I applied the Box-Tidwell model, which provided evidence that additional prices and willingness to pay had a strongly nonlinear effect. As people were more extreme in their price-searching behavior, they were much more likely to purchase. Incorporating the square root of prices significantly affected the power of the initial price. Consumers who searched significantly more for better prices cut the coefficient of the initial anchoring price in half and took away its significance in predicting purchasing behavior (p-value went from .003 to 0.286).

Increases in willingness to pay also had a strongly nonlinear effect. This would indicate that there is an exponential affect in desire. As prices get higher, it is increasingly more likely that a subject will make a decision to purchase, rather than linearly more likely that a subject will make a decision to purchase.

The other significant results include the willingness-to-pay, the final price from the last trial, and the final price. As the square root of the number of prices seen increases by 1, the likelihood of buying the good increases by 34%. As the final price from last trial increases by $1, the likelihood of buying the good decreases by 4%. Based on the odds ratios, we can understand the relative change in likelihood of purchasing a good based on these factors. The odds ratio indicates that purchase was 92% as likely in the neutral condition as in the social condition.

These results suggest that the two valuation experiments elicited correlated valuations, and that the consumers reacted to the final price offer in economically sensible ways. The interesting effect was the final price from the previous trial. Theoretically, one would expect that anchoring effects would lead the final price from the last trial to act in the opposite way. This may be that reacting to the high price from the previous trial puts the consumer in a certain mindset for the next trial.

We move onto the second regression looks at the decision to "check out" only for goods in which the consumer valued them at greater 0 on the WTP scale. The factors here are similar to the one from the last regression, but accounts for the possible change in valuation from one test to task to the next (or the possible misunderstandings in instructions.) Presumably, if subjects realized a significant difference in valuation between the two tasks, so much so that they decided they had zero interest in a product, they either had a realization of their true interest in a product, or they didn't understand the task at hand. The results are shown in Table 6.

Table 6: Adjusted "Checkout" Valuation Regression (Remove obs. if wtp= 0)

Factor	Coefficient	Std. Error	P-Value	Odds Ratio
Sqrt(Prices Seen)	0.455	0.118	0.000	1.580
Last Price Seen	-0.043	0.012	0.000	0.957
Prices Seen	-0.112	0.037	0.002	0.894
Sqrt(WTP)	0.393	.210	0.062	1.481
Condition	-0.166	0.095	0.083	0.847
Final	-0.025	0.015	0.098	0.975
WTP	-0.690	.046	0.134	0.933
Initial	0.014	0.017	0.400	1.014
Constant	-1.167	0.353	0.001	0.311

In this regression, the goodness-of-fit measures are still mediocre. The pseudo R^2 = .0174, which again, is difficult to interpret, and not as poor of a measure as it looks. The Hosmer-Lemeshow chi-squared test provides a value of .4343, indicating that this is significant in predicting the decision to purchase within the given criteria.

A joint F-test was conducted for the insignificant variables of list price, trial number, additional prices seen, and the ABIS score, and they were found to be jointly insignificant (even including condition) and removed from the regression. The condition was left in, as that is the main factor of interest.

The most significant values are again the price searching behavior, willingness to pay and the price. The non-significant values are similar to the previous regression that did not remove the observations where the willingness-to-pay was indicated as 0. Again, including the square root of prices seen reduced the significance of the initial price, with similar implications as in the last regression. It also equalized the constants, as it appears the likelihood of purchase is strongly moderated by the number of updates a subject tried to go through.

Finally, this third regression looks at what factors impact the willingness to pay decision in the slider task (based on the Becker-DeGroot-Markam auction) that follows

the previous market-based task in the experiment. Since these two tasks don't differ in any significant economic way, we might expect that similar factors would effect the purchasing decision, or at least, that the condition (social vs. neutral) has a similar impact in each condition. On the other hand, there may be factors, as discussed later, that may lead to this task having different factors that are significant. The differences in the regressions in Table 5 and 6, and the one presented here in Table 7, will point to the factors in a market place setting that may have on a consumer's valuation (Similar to the difference between the regressions in Table 5 and Table 6, a regression leaving out all trials with a willingness-to-pay indication of 0 was conducted, but no significant differences were found, and it only reduced the power of the regression).

Table 7: Willingness-to-Pay Regression

Factor	Coefficient	Std. Error	P-Value
Sqrt(Prices Seen)	.697	.154	0.000
Purchase	0.694	0.161	0.000
Condition	0.693	0.120	0.000
List Price	0.028	0.016	0.09
Prices Seen	0.028	0.016	0.013
Initial	0.028	0.023	0.230
Final Price from Last Trial	-0.016	0.014	0.263
Final	-0.022	0.022	0.326
Trial #	-0.001	0.004	0.842
Constant	-0.148	0.611	0.809

The R^2 for this regression .022, which is small. This may be due to the fact that none of these factors map very well on to the inherent valuation given to a good (perhaps purchase, but not entirely, and prices seen, as discussed above). We can, however, still discuss the individual factors. The factors, again, were not economically significant. This time, however, they were not working against as larger of a negative constant. F-test for joint significance showed that the insignificant variables for list price, final price, and

trial was jointly significant (in any combination). Various interactions between variables were also tested, none apparently significant.

The three most powerful influences were the decision to purchase, which is not a surprise, square root of prices seen, also not a surprise, and the condition, which was somewhat surprising. As one made the decision to "check out" in the previous task, the slider valuation increased by $0.69. Similarly, if one was in the social condition, the slider valuation increased by $0.69. Also similarly, as the square root of the number of prices seen increased by 1, the slider valuation increases by $0.69. (This similarity in results appears to just be coincidence).

Tests for non-linear relationships show that as people were more extreme in their price-searching behavior, the willingness to pay went significantly up. Incorporating the square root of prices significantly affected the rest of the regression's coefficient, although not the overall explanatory power. This result indicates that the more interest a person seemed to have in the latter trial, the more prices the subject would search for in the preceding trial, with the number of additional prices seen increasing exponentially. This makes sense, as a good if a subject is particularly interested in a good, we would expect them to search more extensively for better prices. The effect of price-searching here also highlight the entanglement of how searching for better prices could both bean indication of interest in a good, as well as the power of finding a better price.

Returning quickly to the difference between conditions, the results in Tables 5-7 appear to indicate that the condition was not a significant factor in the market-based task, but was a significant factor in the willingness to pay task. Is the extra ornamentation a factor in one condition but not the other? Do people have friends who offer up different

advice depending on the situation? Different strategies may simply have different levels of effectiveness depending on the specific presentation of the scenario.

In this task, the prices (and list prices) seen in the previous task were much less significant, which makes complete sense, as those wouldn't be presented during the valuation in the auction task, and therefore probably wouldn't even subconsciously present in the subjects head. Incorporating the square root of prices seen also significantly reduced the influence of the initial and final price. This may be because initial price doesn't matter as much when you're seeing many prices, and lowering the price is the goal of additional price searching.

Together, these results argue that the biggest driving factors of impulse purchases in the marketplace are what most economists would expect, the prices at which the good are offered and the price-searching behavior. It also indicates that willingness to pay may be driven by other factors, however. The social condition was much less effective in reining in desire to spend money in the second task.

The contrast between these results and the previous results also highlight how much the effect of the given prices in a marketplace may affect our decision-making and valuation of goods. It is both interesting that they had any impact at all, indicating that this might have informed their valuation of the good in the slider task, but also that they had such an impact in the previous market task, considering that one could, by choice, pass up a good if it was presented a price beyond what they were willing to pay. What factors might lead to this difference in valuation?

Part 4: Valuation/Overvaluation

This leads to the third phenomenon that I will explore: the difference between willingness-to-pay and the price at which items were checked out. The previous regressions presented factors that affected purchases in each task and found that there was a difference in purchasing/valuation behavior between the tasks. This part will expand on that finding, and explore how much the participants "overpaid" in the initial impulse purchasing task, and why that might be the case.

Quickly, I will explain why I decided to call the value paid in the market-based task minus the value paid in the slider task, an "overvaluation". The first task, the scenario in which a price is presented to the participant and the participant must make a decision, is more like the situation people are presented with in real life, while the slider task, is a simplification of that setting. In most traditional economic literature, an auction (the slider task) is usually used to elicit a "true" valuation. It is the simplest form of the question, what is the maximum value you're going to pay? Any other ornamentation or aesthetic simply confounds the indicated willingness-to-pay. Based on that, I am calling the increased value indicated in the initial task an "overvaluation". This does not necessarily mean that the irrationality is being skewed in this direction, or that the good is being 'overvalued' irrationality at all, but I believe there is evidence that this is happening, as will be presented later in this paper. More importantly, if that simple change in mechanism is producing drastic differences in behavior, it could shed light on real world purchasing behavior. The simple 'moniker' is the catchall used to discuss the discrepancy in willingness to pay between the two tasks.

Again, the only differences between the two valuation tasks were between the set-ups of the task, not the conditions or the reward. Assuming complete understanding of the task, and that the effect of having the slider second every time does not have an effect, any effect would be derived from the differences in the stimuli of the task.

The difference between the final price seen in the purchasing task and the willingness to pay in the slider task was $9.96 in the non-check out condition, and $8.75 in the checkout condition. Table 8 is only for goods that were checked out, leaving 802 out of 5000 observations. It shows how much more on average, the price the goods were checked out at, were greater than the price at which goods were valued in the slider task.

The second half of Table 8 account for the possibility that upon second consideration, a person might decide they actually don't need the good and that these deviations explain the vast majority of the "overvaluation". I eliminated all the remaining observations with a willingness to pay slider valuation of 0, leaving 556 observations. As the data show, this does not account for the consistent "overvaluation" by the subjects.

Table 8: Overvaluation Between Conditions

Overvaluation	Total	Neutral	Social	P-Value
Mean	$8.75	$9.35	$8.15	0.003
Std. Dev	$6.08	$5.72	$6.36	n/a
Mean (wtp > 0)	$6.78	$7.30	$6.31	0.023
Std. Dev (wtp > 0)	$5.85	$5.50	$6.11	n/a

The overvaluation is practically normally distributed with skewness very close to 0. In general, the price indicated in checkout was $8.75 greater than the price indicated on the willingness to pay slider. For any purchases where the willingness to pay was then set at 0, the price indicated in checkout was still $6.78 greater. The larger standard deviations do mean that there's a large spread, and that subjects did not overpay for every good, just most of them, and by a decent amount, on balance. Subjects checked out 16 goods per

experiment on average, which, in sum, would result in subjects paying $140 more in one condition than the other!

This table also illustrates that the overvaluations were much greater, by almost $1 on average, in the neutral condition. This was, however, mostly driven by the differences indicated in willingness-to-pay. It's curious that the ensuing willingness-to-pay increases, but the purchase decisions remain similar between the conditions. It's possible that the conditions act differently upon each task, or simply that price-searching behavior was similar across conditions, even if internal valuations were not.

We can also go beyond descriptive statistics and look at what factors may be causing this valuation change beyond the condition. Many of the same factors that were in play in Part 3 may be important in this regression. What influences a person to spend more in when presented with a price and told to make a decision, compared to the option to value the item at any point along a slider?

Table 9: Overvaluation Regression

Overvaluation	Coefficient	Std. Error	P-Value
Sqrt(Prices Seen)	-2.56	.212	0.000
Initial	0.712	0.251	0.000
Prices Seen	0.576	0.064	0.000
Trial #	-0.026	0.006	0.000
ABIS	-0.219	0.076	0.004
List Price	-0.05	0.026	0.055
Condition	.157	0.192	0.413
Final Price of Last Trial	-0.014	0.023	0.550
Constant	1.368	.974	0.160

This regression has an R^2 of .24, which is moderate for this type of study. The constant started at 3.42, indicating that most of the factors were working against it.

In this trial the ABIS impulsivity score, the trial number, the list price and the final price of last trial individually were initially insignificant. However, these four

factors were extremely significant, as based off of a joint F-test, which provided a p-value of .0000. Even removing, ABIS, which is the most significant, and intuitively may influence the results, still leaves a joint p-value of .059, indicating that the combination of the trial number, price, and the final price of the last trial may have some combined impact. Obviously, the economic impact was still low. It seems, based on the results of these regressions, that the list price was largely non-influential throughout.

The most significant predictor of overvaluation was the negative effect of prices seen. This makes sense, as those seeing more prices have a better opportunity to buy the good at a cheaper price, and indicates that price searching was working as a tactic. Incorporating the square root of prices seen as also made the ABIS score and the trial number of individually significant.

The next most significant indicator of overvaluation is the initial price seen. As the initial price went up by $1, the overvaluation went up by $0.68, which is both statistically and economically significant. This would make sense, as that price would have an anchoring effect in the first task, but not the second task. The number of prices seen is also negatively correlated with overvaluation, which also makes sense. As a subject price-searches more, they would presumably buy the good at lower prices more often because they were searching for a better price. That should decrease the amount they "overpay" for the good in the second task. The condition is third most powerful predictor, as being in the social condition dropped the overpayment, on average, by about $1.13. This difference, again, is driven in part by the difference in valuation.

This investigation shows that there is a consistent overpayment, likely driven by the anchoring effects of price options in the tasks, or the price-driving effect of limited

choice, in the first task. There is no incentive to underbid in the BDM auction task, which indicates that there is some difference in the valuation process between the tasks, driven by non-significant conditions or stimuli. This was also more powerful in the neutral condition, lending some support to the theory that friends can provide a responsible influence (although that in turn is tempered by the difference in willingness to pay between the conditions).

One significant factor may be the consistent anchoring effect of the list price in the marketplace task, but not in the slider task. In the impulse purchase task (but not the BDM auction task) the list price of the good is listed above the good for the entire price-searching process. The subject seeing that value constantly above the good would certainly skew the perception of value of true, and exhibits all the hallmarks of a strong anchoring effect. The list prices are generally similar, and since their presence doesn't vary by trial, it may consistently pull the prices up, and not be significant in the individual purchase decision regressions. If this is the true cause, this is a significant result in support of the anchoring effect and may indicate that social influences are just as effective (or ineffective) at combating the anchoring effect compared with more traditional financial responsibility methods. It may also be the existence of prices at all that is causing this anchoring effect. It would indicate that the mere presence of a price would increase the consumer's willingness-to-pay.

There are also other explanations that would make these findings worth of economic discussion. One possibility is that the more information presented about and around the product, the more informed a consumer feels about the product and with more certainty comes a higher value placed on any good. Similarly, it is possible that more

information presented about a product may unconsciously lead the subject to believe that a good is higher quality and indicate a higher price, only to not be moved by the same factors in the second task. They may also simply be overwhelmed and were not as careful with their decisions.

Despite this very strong statistical data, the context in which the data was collected in must be taken into account, and any results must be couched with acceptance of these reservations. A significant issue is that the order of these tasks was not randomized. The market-based task was always ahead of the auction slider task and this may have affected the results. For one, data this strong may indicate a discrepancy between the intended understanding of these tasks and the actual understanding. It is possible that subjects were confused about the second round of the experiment and didn't complete read or comprehend the instructions provided in the experiment. They may have believed that the trials were only incentivized in the first task, or that once they were accounted for in the first task, the second trial didn't matter, or that there was some advantage to indicated lower prices in the second trial. Another possibility is that whenever a consumer sees a good a second time in an impulse purchase scenario, they exhibit more control, and re-evaluate their appraisal of the good at a lesser price.

Still, despite all of these possible explanations, the strength of the data suggests that the difference in tasks likely played some significant role in explaining the discrepancy in valuations, even if some of these other factors played a part.

VI. Conclusion

This paper explores the factors that go into a price valuation, the role of a responsible friend in making better financial decisions, and the differences between price searching in a marketplace valuation and an auction-based slider valuation. This research is experimental, and may be affected by the unnatural setting. The agent is also imagining the advice of a responsible friend, rather than actually receiving any advice. Future research should expand on this and explore whether a real friend has any implications.

The support for the hypothesis that social influence would be more effective than traditional intervention methods was limited, at best. There were no significant differences in the impulse-purchasing task, indicating that both were at least as effective in each other. The results pointed in the other direction in the slider valuation task, as the willingness to pay was significant higher in the social condition compared to the neutral condition. It is interesting to note that this led to a greater "overvaluation" in the neutral condition compared to the social condition. This likely indicates a difference in effectiveness of strategies across tasks, but the source and implication of that remains unclear. Analysis of the price-searching behavior was also mixed in support of the hypothesis. It was true that for certain choices, the decision took longer in the social condition, and that within trials, there were more updates in the social trial. However, the inconsistency across choices, combined with the actual purchasing behavior, may indicate a hesitancy to go past an item rather than a more responsible price search. In future trials, one helpful addition would have been the addition of a control condition where there was no mention of responsibility, the moderating effect on behavior of either

condition compared to a non-condition control. This could indicate when the strategies were having a significant effect.

Another of the major conclusions of this paper was that a market price-searching arena would lead to an "overpayment" on the part of the consumer (with the caveats described above). The two tasks, the market task and the slider task, were essentially driven by the same economic incentives, but still resulted in a large discrepancy in indicated willingness-to-pay. This is a significant result that points to the effects of behavioral non-social cues upon an individual's decision making. It may also point to the simple effect of a market-based setting on raising a consumer's willingness to pay for a good. The price-searching behavior did show a payoff for those who were willing to update and try to find better prices, and perhaps future research could look at the efficacy and factors that effect the way in which people explore and search for opportunities to make more responsible decisions.

If this study were to be re-created or expanded upon, there are a variety of conditions that should be changed to further test some of the conclusions arrived at in this paper. For one, the impulse purchasing valuation and the slider valuation should be randomly ordered, and clearly explained, to tease out the true effect of the impulse purchase and the slider valuation. Any list price should also be placed on both tasks, and even the price paid in the previous task, in order to assuage some of the behavioral non-social difference created by the anchoring effect. If the discrepancy between valuations exhibited in this paper remains, this is an indication that the conclusions drawn about the effects of a market place are actually more powerful than even the conclusions drawn about the anchoring effect. If the discrepancy between "check-out" prices and

willingness-to-pay disappears, it is an indication that the anchoring effect is robust in this experiment as well.

It is also worth amending this experiment to explore the long-term effects of education and introduction of the tactic of finding responsible social influences. As Fernandes, Lynch Jr., and Netemeyer (2013) note, traditional interventions are largely ineffective in improving financial decision-making, particularly in the long-term. If social influence is a factor over the course of weeks, months, or years, it has a leg-up on the traditional methods, in a way that was not tested in this experiment.

This study could also lead to different results with the authentic influence of family members or peers, replacing the individuals imagined peers. Perhaps the subjects did not fully follow the instructions, or confabulated with their own impulsivity with the imagination of their friend's advice, and the possible improvement was overshadowed by the lack of actual advice. This experiment may also have different results across education levels once this variable is introduced. Presumably, the nature of the subject informed their imagining of the "responsible friend" would tell them, and on that basis, affected their decisions. The subjects were almost entirely students from the same college, all aged 18-25, and it is completely reasonable to expect that there are groups of people whose financial acumen would be lower or higher than the group tested, and therefore, that those groups would create very different "friends". Any experiment, which places the subjects in a room where they received advice from a real person, rather than person that they created in their mind, could have conceivably different impact on behavior.

The results indicate that responsible friends do make some difference, at least in a price-searching market based task. Investment in educating consumers should invest some resources getting people to listen to responsible friends. Going forward, this field should be further explored. How can social circles positively or negatively impact people's financial decisions? Are there ways to use responsible friends to create more responsible consumers as a whole? Especially for the financially illiterate, and the poor who can't afford professional financial advice, this could be a more viable alternative than education, planning and goal-setting. It's worth exploring as organizations continue to pour more time and more money into the same interventions, with unclear results.

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