Individual Decision Making: Pain, Rules, and Effort

By

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ABSTRACT

Individuals are involved in daily decision making situations under varying levels of certainty and ease of gathering information, characterized by many factors such as the need to make payments, or the desire to fulfill goals. Essay 1 proposes that when individuals are faced with environments that offer an abundance of alternative choices and information (increased decision flexibility) consumers will have a harder time deciding and are more likely not to make purchases or to procrastinate. Environments such as the Internet are proposed to increase decision conflict and anticipated regret, as they increase the ease of generating counterfactuals. Limiting flexibility, by using exploding discounts, for example, reduces decision difficulty, and increases purchase likelihood. Essay 2 demonstrates that some of the documented discrepancies between expressed preferences and predicted happiness may be explained by individuals’ use of rules when making decisions. Rules are used whenever they are evoked, and exclude a deep factual analysis of the situation. For example, money is proposed to invoke a set of rules that are subsequently used. Specifically, driven by anticipation, consumers’ preference for a delayed concert is contradicted by their greater willingness to pay for an immediate one. The overarching nature of rules causes individuals to follow them even when it is not in their best interests. Essay 3 demonstrates that partitioning a task by providing progress information may influence motivation, effort, enjoyment, and performance in two opposing ways: when uncertainty about progress is high, partitioning increases motivation and liking of a task, but when progress uncertainty is low, partitioning decreases motivation, liking, and subsequent choice of the task.

Thesis Supervisor: Dan Ariely
Title: Associate Professor of Management Science
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The Pain of Deciding:
Indecision, Flexibility, and Consumer Choice Online

Abstract

Making decisions is not always fun. It is even less so when the decision maker is under the perception that deciding means committing to one out of a multitude of other possibilities and foregoing the rest. Furthermore, some shopping environments, such as the Internet, are more likely to instill decision makers with this perception. This work argues that the displeasure of making a decision depends in part on the environment in which it is made, and that both the general displeasure of deciding and the relative displeasure of deciding between the various alternatives can systematically influence choice. Two hypothetical choice studies, and four real choice studies demonstrate that when consumers make purchasing decisions in more restrictive environments, they are more likely to purchase and are as satisfied, because they experience less displeasure from deciding.

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"Cheshire Puss,' she began, ... 'Would you tell me, please, which way I ought to go from here?' 'That depends a good deal on where you want to get to,' said the Cat. 'I don't much care where--' said Alice. 'Then it doesn't matter which way you go,' said the Cat. '--so long as I get SOMEWHERE,' Alice added as an explanation. 'Oh, you're sure to do that,' said the Cat, 'if you only walk long enough.' "

/Lewis Carroll

Alice does not know which road to choose, and thus feels lost. Alice’s struggle to make up her mind would have probably left her standing in the woods if the sun was not about to set. She turns to the cat not because she expects to gain information but because any advice would make her decision easier. Alice’s situation is similar to the situation many consumers face when trying to buy products online, where there are many easily accessible alternative retailers and product offers. In both cases, the decision maker is under the impression that there exist many alternatives to be had, and thinking about the universe of outcomes makes choosing one much harder. The discomfort of making a decision in such situations and its adverse effects on decision making are at the center of this investigation.

Much is known about the difficulty of making decisions. Decisions could be emotionally difficult because the subject of the decision is emotionally laden, such as a decision between the level of safety of a car and whether it is environment-friendly (Luce, 1998; Luce, Payne, & Battman, 1999); the trade-offs required to solve the decision problem may even be considered inconceivable in a given society, if one needs to put a price on one’s siblings, for example (Fiske & Tetlock, 1997). One’s attitude towards making such emotionally laden decisions could also be influenced by the locus of the decision outcome (making a decision for one’s self vs. others), and the level of accountability required from the decision maker (Beattie et al. 1994). Another source of difficulty may be the amount of cognitive resources required in order to make the right choice. If this amount is too large, or the decision maker is unable to resolve the conflict which the different attributes of the various outcomes pose (Shugan, 1980; Tversky & Shafir, 1992) the decision maker may find the decision aversive. A third source of difficulty may be the appearance of too many alternatives in the choice-set. Having to choose from a set of twenty four possible jams as opposed to a set of six, may decrease intrinsic motivation to make the decision and go on vacation (Iyengar & Lepper, 2000).
An additional consideration that may make the decision more difficult is the realization that making the decision entails the possibility of generating regret in the future (Bell, 1982; Simonson, 1992; Gilovich & Medvec, 1995) and of being disappointed from the specific outcome one chose (Bell, 1985; Gul, 1991). Some situations and some decision outcomes may generate more regret than their counterparts, because they make it easier for the decision maker to generate counterfactuals. For example, one may feel more regret when missing a flight by five minutes than by fifty. Finally, making the decision may be emotionally or cognitively taxing and deplete the decision maker of valuable energies (Baumister et al, 1998). Therefore, the decision maker may often trade-off decision accuracy in favor of reduced decision effort (Payne, Battman, & Johnson, 1993). In doing so, the decision maker behaves in an adaptive way, responding to the specific situation at hand.

Most of these reasons for decision difficulty arise because of the specific characteristics of the possible decision outcomes (the choice set). A different source of decision difficulty, the one this investigation focuses on, is the negative affect of the decision process itself. This distinction between the pleasure derived from the outcome of the decision process and the displeasure involved in the decision process itself is at the core of this research. The central claim is that the amount of “pain” (negative happiness) the decision maker experiences when going through the motions of making a decision influences the outcome of the decision process in systematic ways, and that this pain is influenced by the decision environment. In particular, the more painful the process as a whole (absolute) the more the decision maker will try to avoid it, but also, the more painful a decision about a specific outcome is, the less likely is that outcome to be chosen (relative).

The paper continues with the development of the concept of the pain of deciding, and its effect on the decision process, followed by an analysis of its interaction with the decision environment. This interaction is tested in two hypothetical choice experiments, and in four real choice experiments. The paper concludes with implications for decision making, and in particular for online retailing and consumption.
Making decisions can be “painful” (negative affect)

The term pain of deciding is meant to capture the psychological difficulty of making a choice. Such difficulty could arise from high levels of conflict, when choosing between several similarly attractive outcomes (Shugan, 1980) or when adding an attractive choice to an already attractive set (Tversky & Shafir, 1992). The difficulty of making a decision could also arise from being aware of the possibility and implications of making a wrong decision. Greater awareness of the possibility of a wrong decision can come to be because of greater ease of generating counterfactuals (Kahneman & Tversky, 1982) and anticipating increased likelihood of feeling regret (Simonson, 1992; Gilovich & Medvec, 1995; Bell, 1985; Gul, 1991).

It is important to note that the pain of deciding is different from the cognitive effort exerted when facing a complex problem or the need to process vast amounts of information (Payne, Bettman, & Johnson, 1993). Rather, the pain of deciding is the difficulty of resolving the conflict imposed by the specific situation and environment, and could be differentially associated to the various decision outcomes. For example, one may find it more difficult to decide to work on a lingering research paper as opposed to going over E-mail when one has four reviews and two grant proposals to complete, than to make the same choice when there is only one review waiting on the desk. It has been shown that the multiplicity of alternative choices raises the level of conflict (Iyengar & Lepper, 2000), as well as increases the ease and likelihood of generating more counterfactuals. This increase in the pain of deciding may make it harder to decide to work on the paper relative to remaining at the state of the status quo (Kahneman, Knetsch, & Thaler, 1991; Dhar, 1996; Baron & Ritov, 1994; to name but a few). According to the suggested theory, the relative pain in deciding to work on the paper is larger when the decision environment introduces the existence of more possible outcomes to the decision process, causing the decision maker to be less likely to make that choice.

In sum, the amount of pleasure or displeasure associated with following a specific decision path is hypothesized to influence choice in two different ways. First, the more painful paths will tend to be avoided, while less painful paths will be chosen more often (relative pain of deciding). For example, in many consumption cases the decision not to buy is less painful as it does not translate directly to commitment. Second, if a path that avoids making the decision exists (Dhar, 1996; Dhar & Nowlis, 1999), than a more painful decision will tend to be avoided more often (overall pain of deciding). These
influences stem from characteristics of the decision process itself and not from the considered alternatives. Examples of such influences include the realms of judgment (Schwarz et al. 1991) and payment behavior (Prelec & Loewenstein, 1998), in which the process and not the explicit value of outcomes influences subsequent outcomes. Based on these principles, one can predict that when the pain of deciding is high, people will tend to avoid decisions if possible, or stick to the status quo if not.

**The decision making environment**

A claim central to the current work is that the decision environment can influence both the relative and the absolute pain of making a decision. For example, an environment may promise the possibility of many other alternative outcomes, which may increase the pain of choosing one of the outcomes under current consideration (greater anticipated regret). Alternatively, an environment may allow the ability to rethink and change a decision in the future which may decrease the pain of making a current choice (lesser anticipated regret). Another way to decrease the pain involved in making a decision is to avoid making a decision altogether or to defer the decision to a later time. Therefore, one would expect to observe more decision avoidance when the decision is more painful. Consequently, changes to the decision environment may directly influence not only the actual outcome of the decision process, but also its existence (whether one defers the decision or not) by changing the amount of pain involved in making the decision.

One way to characterize the difference between flexible environments (that offer either the ability to defer and rethink a decision or the promise of access to alternative outcomes) and non-flexible ones (that do not) is by analogy to decision graphs. If a node in the decision graph reflects a state (initial or outcome) and an arc represents a decision path, then both the existence of other possible outcomes and the ability to defer choice to a later time add [perceived] arcs to the graph. In the terminology of this work, a graph with more decision paths to either the same (deferral — make the same decision in the future) or to other outcomes (existence of other outcomes) represents a state with greater decision flexibility.
While the model proposes that decision flexibility has negative implications on the
decision making process, the reader is not alone in the feeling that, generally, flexibility in
decision making is a positive property. In order to ascertain whether people in general share this
belief, the following two experiments, were conducted in a public garden of a large
metropolitan. Each survey portrayed two consumers, one with high decision flexibility and one
with low decision flexibility: one survey described flexibility as having the ability to delay the
decision (consumer A enters the store and realizes that the discount will end a month from that
day while consumer B realizes the discount will end the same day); the second survey
described flexibility as the ability to have access to more alternatives (consumer A has seven
other stores in town that sell similar products, while consumer B has only one other such store).
Respondents were asked to indicate in which of the two consumers’ states they would rather be
(i.e. would they rather be in consumer A’s shoes or in consumer B’s). The results of both
experiments were similar and demonstrated that the majority of consumers prefer to be in a
state with greater decision flexibility (70% of participants in the first, and 72% in the second,
chose the state with greater flexibility, p < 0.001).

Consumers’ preference for a state with more decision flexibility does not imply that it
will be easier for them to decide in those conditions. Moreover, it is possible that a particular
action, such as buying or not buying might be more difficult to undertake in a state of high
flexibility. To verify this conjecture, the following two surveys were administered in the streets
of a large metropolitan. Each of the surveys portrayed a consumer facing one of the high
decision flexibility environments described in the previous two experiments. Both surveys
described a consumer intending to purchase a CD wallet under a state of decision flexibility,
and the task was to rate the decision difficulty and the amount of anticipated regret that would
be generated by each of the paths available to consumers: to buy, not to buy, and to delay the
decision. Both surveys displayed nearly identical results and so they were pooled together for
ease of presentation. The results, converted into z-scores, indicated that both the decision to buy
and the decision not to buy did not significantly differ on either the regret measure or the
difficulty measure. However, delaying the decision was significantly easier than making a
decision (means = -0.47 and 0.31 respectively, t[59] = 5.41, p < 0.001), and also generated
significantly less anticipated regret than making a decision (means = -0.52 and 0.19
respectively, t[59] = 6.40, p < 0.001). In accordance with this result, one may speculate that the
choice to delay the decision is regarded by decision makers, in this case, as the default or status quo alternative, which tends to generate the least amount of regret (Simonson, 1992).

These results shed light on the role of the relative pain of making a decision between the different choices available in a purchase decision. In particular they demonstrate that in a flexible situation the decision to buy or not to buy is the most painful to make and delaying the decision is the least painful. This asymmetry in the psychological costs of deciding adds to the understanding of the dynamics of decision deferral under high decision conflict (Tversky & Shafir, 1992; Dhar, 1996; Dhar & Nowlis, 1999).

The result of the relative pain of deciding inquiry (the latter two surveys) can be restated to claim that delaying the decision was perceived as much easier in a state of high decision flexibility. Conversely, making a decision, either to buy or not to buy, in an environment that allows high decision flexibility is more painful. Yet the earlier two surveys reported that consumers prefer a state with high flexibility. Combining these two findings implies that the preference for flexibility may inherently depend on the easiest solution to the decision problem, which may very well be to avoid it all together.

In sum, the pain of deciding, the difficulty of making a decision or of making a specific choice, is hypothesized to influence the process of making a decision, because decision makers feelings about the process have bearings on the outcome they choose. Furthermore, the decision environment, by allowing more or less decision flexibility, influences the pain of deciding. These two causal relations are summarized in the following model.

The analysis of the interaction between the pain of deciding and the decision making environment leads the following general model: decision flexibility influences the pain of deciding which influences choice – the greater the pain of deciding, the more likely is the least painful path to be chosen (Figure 1).

![Figure 1](image-url)

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The proposed model implies that when the environment generates greater decision flexibility, the pain of deciding may increase, reducing the chances of choosing an outcome different from the status quo. Unfortunately for retailers and sometimes for consumers, in the consumption world, the choice to purchase is hardly ever the status quo (acquiring the product requires an action and not purchasing - an inaction), and so in an environment with greater decision flexibility purchase rates will be lower. Conversely, restricting decision flexibility should reduce the pain of deciding and increase purchase rates.

In order to test the proposed model, two hypothetical choice experiments were administered, and four real choice experiments were run. The first two experiments focus on validating the logical links of the proposed model, the next two experiments provide realistic evidence and external validity, as well as demonstrate convergence of manipulations, to both the theory and the phenomenon. The final experiment provides more process measures of the phenomenon, as well as allows further distinctions from competing theories.

**Experiment 1 – The effect of flexibility on the pain of deciding and on choice**

The experiment was designed to validate the logical relations of the model by manipulating the level of flexibility and measuring its effects on the pain of deciding and on subsequent choices, as well as the mediating role played by the pain of deciding in the latter effect.

**Method**

*Participants:* Seventy seven pedestrians at a park in a major metropolitan agreed to answer a short decision making survey and were later given candy and thanked for their participation.

*Design & Stimuli:* The experiment was a hypothetical choice survey with a 2 (high vs. low flexibility) x 2 (flexibility type: the ability to delay choice vs. more perceived alternatives) mixed design (flexibility level was manipulated within and flexibility type between). The survey described two consumers, A and B, who were shopping for a CD wallet, and came upon a deal, in which a particular wallet (a color photo was included) was offered for $5 instead of $10.

Flexibility was manipulated through the descriptions of the different environments that the two consumers were in. Consumer B was always in the low flexibility environment, and
consumer A was always in the high flexibility environment. In the first type of flexibility manipulated (ability to delay), the high flexibility state was described as allowing consumer A to delay her choice: the discount that consumer A faced was going to remain for two more months, while in the low flexibility state, the discount consumer B faced was about to end that day. In the second type of flexibility (more possible alternatives), flexibility was manipulated by describing consumer A’s town as having seven other stores that sell CD wallets and consumer B’s town only one other store. The descriptions were followed by a series of choices and rating scales.

Dependent Measures: Participants were asked for their prediction of whether each consumer (A and B) would decide to buy the CD wallet, and then to estimate the level of difficulty each consumer would feel while making the decision. Participants were also asked to indicate which consumer would take longer to make the decision. In addition, participants were asked to rate the extent to which each consumer will anticipate feeling regret when making the decision, and also to rate how easy it would be for each consumer to generate alternative scenarios in which her decision was wrong. Finally, as a manipulation check, participants were asked to rate the amount of flexibility each consumer would have perceived to have while making her decision. All the choice questions required circling the chosen alternative, and all the rating questions had scales of zero to one hundred, in which higher ratings signified more of each measure.

Results

The different descriptions of the states the two consumers were in generated different decision flexibility. Participants’ mean ratings of the amount of flexibility felt by the consumer under high vs. low flexibility (A vs. B) were 79.19 and 21.49 in the flexibility to decide in the future (t[37] = 8.31, p < 0.001), and 68.10 and 29.13 under the flexibility of having more stores that sell similar products (t[39] = 6.71, p < 0.001). The results suggest that participants’ perception of the amount of decision flexibility were indeed influenced by the manipulations in the desired direction. Since both forms of flexibility had similar effects in the subsequent measures as well, in the analysis that follows flexibility is treated as one manipulation.

The main dependent measure was participants’ predicted choices for the two consumers. The proportion of participants predicting the decision to buy for consumer A (15.02%) and those predicting the decision to buy for consumer B (80.26%) was significantly
different (t[72] = 12.62, p < 0.001). These results support the prediction that increasing flexibility decreases the propensity to purchase. Flexibility also influenced the pain of deciding, measured as the difficulty of making a decision and as the amount of time participants predicted the two consumers would spend thinking about the decision. The two measures were aggregated to generate the pain of deciding construct, normalized to mean zero and scaled between -1 and 1, where -1 means that consumer A’s decision was more painful and 1 that consumer B’s decision was more painful. The predicted mean difficulty was -0.56 which was significantly different than zero (t[74] = 8.26, p <0.001). This result means that participants predicted consumer A’s decision to be significantly more painful.

When examining the mediating role of the pain of deciding in the effect of flexibility on the decision to buy, an interesting picture emerges. The role of the pain of deciding as a predictor of choices was estimated using a probit model, in which choices were used as a dependent measure and the pain of deciding as an independent measure. The results indicate that greater decision difficulty decreases the propensity to buy (t[137] = 3.51, p < 0.001). It is thus important to test whether it is the flexibility that influences decision difficulty that in turn, influences the likelihood of purchases and not some other latent variable. Therefore, decision difficulty was regressed on flexibility to generate the set of predicted values as well as the set of residuals. These two estimates were then added to a probit model as independent measures, to test their predictive power. The results suggest that the effect of flexibility on decision difficulty (predicted set) has a large and significant effect on choices (t[136] = 7.56, p < 0.001), but that the other unobserved factors influencing decision difficulty also have a significant effect on choice (t[136] = 2.40, t = 0.016). Furthermore, the total variance explained by the model increase significantly when adding decision difficulty to the model that includes flexibility as predictor of choice. These results suggest that both decision flexibility and decision difficulty decrease the propensity to buy, and that only a part of the effect of decision flexibility is caused by an increase to decision difficulty (partial mediation).

Discussion

The logical links proposed by the model: 1) decision flexibility increases the pain of deciding, and 2) the pain of deciding reduces the likelihood of deciding to buy, were verified by the results. The results suggest that greater decision flexibility increases the pain of deciding
and lowers purchase rates, and that part of this effect is caused by the direct effect of the pain of deciding on the propensity to buy. Using the result that in a state of decision flexibility, making a decision is much more painful than delaying it, this result could further imply that the overall pain of deciding depends on the particular choice one considers, such that the effect of flexibility on the pain of deciding depends not only on the environment but also on the preference towards a specific alternative (default). In accordance with this distinction, Experiment 2 tested whether there are systematic differences between the levels of pain of deciding associated with the option to buy.

**Experiment 2 – The effect of flexibility on the pain of the choice to buy**

**Method**

*Participants:* Sixty three participants were pedestrians in a popular square of an eastern college town, who agreed to participate in a decision making study. Participants were thanked and given candy for their participation.

*Design & Stimuli:* The study was a hypothetical choice survey with a two cells (Flexibility type) between participants design. The survey differed from the one used in Experiment 1 in the dependent measures used. Participants were told that both consumers have decided to purchase the CD wallet for $5, and were asked to rate, on a scale of zero to one hundred, for each of the two consumers the difficulty involved in making this particular decision, and also to choose which would have taken longer to decide on this specific choice. The dependent measures were a continuous measure of the predicted difficulty of making the decision to buy, and a binary selection of which consumer made her decision after a shorter period of deliberation.

**Results**

The results for the two depended measures were not significantly different and were pooled to create a three level scale indicating that either flexibility is more painful, the converse is true, or that they are equally painful. The proportion of participants who predicted that making the choice to buy is more painful under high flexibility conditions was significantly larger (63%) than those who predicted that there would be no difference (19%) or that the converse is true (17%) \( t(30) = 4.54, p < 0.001 \) for the more alternatives flexibility, and \( t(29) = \)
2.07, p = 0.047 for the flexibility to decide at a later time]. Figure 2 displays the average share of each choice of both types of flexibilities.

![Proportion Chart]

**Figure 2**

**Discussion**

The results demonstrate that the decisions to buy are perceived to be significantly harder to make under conditions that increase decision flexibility. Together with the previous results, these results indicate that when there is greater decision flexibility, the decision to buy and the decision not to buy become more painful while postponing the decision becomes less painful and easier to make. This analysis implies that restricting consumers’ decision flexibility can increase purchase rates, as it will make the purchasing decision relatively easier. Experiment 3 was designed to test this prediction.

**Experiment 3 – Eliminating flexibility**

Experiments 1 and 2 used predicted hypothetical choice and ratings as the main dependent measures. Such measures are only as good as peoples’ theories about others are correct, and may be influenced by considerations such as demand effects and incentives to influence the outcome of the experiments. To increase the reliability and accuracy of the findings by aligning the incentives, as well as the external validity of the results, the rest of the experiments used real choice as a dependent measure.
Method

Participants & Design: Participants were general university population recruited through an electronic mail announcement. The announcement advised people to participate, as they would be able to buy “cool” products for bargain prices. Interested students were given the address of the experiment’s website.

The study was a real choice experiment conducted in an online shopping environment. An electronic commerce website was constructed, using a JAVA applet and a MySQL database (each mouse click was recorded in the database in real time), running on a Windows system through an Apache web server. The experiment consisted of two conditions: a control condition and a flexibility condition. In the control condition products were offered for sale at a discount of 50% from their original price, and participants were instructed that once they made a decision it was unchangeable and that they had to make a choice. The flexibility condition was identical except participants had the options to decide at a later time and to return and change their decisions. The experiment was designed to mimic a real shopping experience (be incentive compatible), and so, participants were not paid for participations, and made their purchases with their own money. Their only incentive to participate was the opportunity to buy products at low prices.

Stimuli: The experiment website was constructed so that users needed to login with their name and E-mail address, went through several instruction pages, and then reached the main screen. The main screen consisted of nine product category buttons, a “checkout” button, and a “done for now, continue later” button. In addition, next to each product category button there was a marker signifying whether that category had already been visited by the participant or not. After selecting a product category, participants were shown a purchasing screen that displayed photos of two products, descriptions of the two products, a retail price and a discounted price for each product, and three buttons. Next to each of the two products there was a “buy” button that, when pressed, signaled the user’s choice to purchase that product. In addition, on the bottom of the screen there was a “don’t buy” button that meant that the user didn’t want to purchase any of the products, and in the flexibility condition, a “maybe later” button by which the user signaled that she wishes to delay deciding to a later time. Every button press would return the user back to the main screen, and the corresponding product category would be marked as visited (see Illustration 1 for an abstract view of the interface).
The products were chosen to be nine pairs of substitute products that were thought to be of interest to the participant population. The product categories were: books ("The double Helix", "Surely You're Joking, Mr. Feyman"), CDs (Grammy 2000, Rap Grammy 2000), pens (Cross navy blue, Cross chrome), chocolates (Godiva truffles, Godiva collection), DVDs ("The 6th sense", "Boys don't Cry"), gift certificates (Amazon.com, Buy.com), tools (Leatherman Mini, Mini Maglite), ice-cream coupons ($5, $10), and cookies (Pepperidge Farm chocolate-chunk, double-fudge Oreos).

Illustration 1

Main screen with six product categories, two of them already visited.

Product category screen, Flexibility condition

The manipulation of flexibility was achieved by varying the instructions between the two conditions, as well as adding the "maybe later" choice in the Flexibility condition. In the control condition participants were told that any decision they were making (any button clicked in a product category screen) would be treated as final. In the flexibility condition, however, participants were told that they could change their decision as many times as they want before they actually checked out (this included leaving and returning another day). On screen one-line reminders of the condition were added into the interface. In the control condition the one-liner was "Remember, once you make a decision it is final, and cannot be changed," while in the flexibility condition the one-liner was "Remember, you may revisit this screen and your decision as many times as you want."
Procedure: Participants entering the website were shown a login screen in which they had to enter their name and E-mail address, and were randomly assigned to one of the two conditions. Once assigned to a condition, participants would always remain within that condition, including any future return visit to the website. Participants' E-mail address served as identification for future visits, and also as a means to contact the participants in order to arrange for payment and for product delivery. Once logged in, participants read instructions that corresponded to their assigned condition, and when ready, continued to the shopping website. From that point participants behaved freely as consumers in the environment described above.

By enabling participants to make decisions in more than one product category, and thus multiplying the amount of data generated by each consumer, the design introduced the possibility of between decision dependencies such as budget considerations. In order to prevent such dependencies participants were told that once they finish their shopping and checkout, the computer was going to randomly choose one product category, and that only their decision in that product category was going to be the outcome of the shopping process. Participants were instructed that this procedure meant they had to treat each decision they made in a product category as if it were the only one they were making. This was compatible with their incentives because participants could not know in advance which category will be chosen, and each category had exactly the same probability to be chosen.

Once participants checked-out, they were asked to rate (using a sliding bar) their satisfaction from the shopping process and their satisfaction from their choices, and were then informed of the product category that was chosen for them and the resulting outcome. If the product category randomly chosen by the computer happened to be one in which participants chose not to buy, their participation ended, and if the product category was one in which participants decided to purchase, they were contacted to arrange the transaction.

In order to diminish attempts to infer something about the value, uniqueness, or scarcity of the product offer (Cialdini, 2000), participants were told that the website will remain active and available for as long as they needed. In this way, the discount was always there for them, since participants were themselves the ones who decided when to enter a product category. In actuality, no visits to the website were made past the eighth day.
Dependant measures: Participants choices were recorded, as well as the elapsed time from the point they initially entered a product category screen until a decision was made. The timing data included date and time of day, which enabled the analysis of return behavior. In addition, participants' satisfaction ratings from the shopping process and from their choices were recorded.

Results

The data collected are many choices by each individual, in a certain order, in a specific condition. This panel data structure may raise suspicion that the real effects of the treatments are confounded with individual heterogeneity, state dependence (a lingering effect of previous choices), or a possible interaction of these with product heterogeneity (Heckman 1991; Honore & Kyriazidou 2000; and Arellano & Honore, 2000; see Arellano 2000 for a review). The experiment had been designed to minimize such effects by the random choice of the one product category that was selected as the outcome of the experiment. This meant that participants' decisions in different product categories should not have been related. However, there may have been lingering effects of a recent purchase on the next decision, or there may have been specific product categories that consumers perceived as related, or there may have been too much heterogeneity among consumers (as driven by different wealth levels) which may have prevented inter-category decision independence. These issues were examined econometrically, using a random-effects Logit model with lagged choices, as well as lagged interactions. Although there was some heterogeneity in purchasing behavior and some effects of state-dependence, these potential biases had little effect on the dependent measures, and did not change any of the results. Because the qualitative results are robust to all specifications tested, the results will be presented using the most parsimonious model.

As there were no systematic differences between the choice to buy the upper product and the choice to buy the lower product, both these decision were pooled and will be presented

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1 The probabilities used to test the difference between conditions were estimated using the following model, which includes first-order lagged interactions of choices with past product categories (this outperforms a model with first-order laged choices), as well as an individual specific random effect:

\[
\Pr(y_{it} = 1) = \frac{e^{\alpha_i + \beta x_{it} + \gamma y_{i,t-1}, x_{it-1}}}{1 + e^{\alpha_i + \beta x_{it} + \gamma y_{i,t-1}, x_{it-1}}}, \quad \text{where} \ y_{it} \ \text{is the binary choice of individual} \ i \ \text{at the relative position} \ t \ \text{in the sequence of choices,} \ \alpha_i \ \sim Gaussian \ \text{is an individual specific random-effect,} \ x_{it} \ \text{includes a condition dummy and a product category dummy.}
as a purchase. Table 1 summarizes the proportion of final decisions to purchase, across product categories, for the two conditions.

<table>
<thead>
<tr>
<th></th>
<th>Books</th>
<th>CDs</th>
<th>Godiva Chocolates</th>
<th>Cookies</th>
<th>DVDs</th>
<th>Gift Certificates</th>
<th>Ice cream Coupons</th>
<th>Cross Pens</th>
<th>Tools</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.13</td>
<td>0.10</td>
<td>0.56</td>
<td>0.33</td>
<td>0.40</td>
<td>0.22</td>
<td>0.63</td>
<td>0.25</td>
<td>0.13</td>
<td>0.31</td>
</tr>
<tr>
<td>Flexibility</td>
<td>0.05</td>
<td>0.10</td>
<td>0.25</td>
<td>0.15</td>
<td>0.16</td>
<td>0.30</td>
<td>0.25</td>
<td>0.00</td>
<td>0.06</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Participants' purchase choices in the two conditions were significantly different. While the average propensity to purchase in the control condition was 0.31, the average propensity to purchase in the flexibility condition was 0.18 [t(288) = 2.372, p < 0.02]. Furthermore, the decreased purchasing is mostly driven by participants choosing to delay choice in the Flexibility condition, instead of choosing to buy, that is, moving to the flexibility conditions caused a switch from a choice to buy to a delay of the decision. The increase in the average propensity to delay choice (0.16) cannibalizes the share of the choice to buy (-0.13) significantly more than the share of the option not to buy (-0.03) [χ²(1) = 4.51, p < 0.04]. This means that participants who delayed choice in the flexibility condition did so because of conversational norms, or because they treated the delay as a comfortable option to not buy, but rather when push comes to shove – in the control condition – most of them actually chose to buy.

A measure that may shed light on the actual decision process is the time participants spent making the decision. If participants' decision process differed fundamentally between conditions, one would expect the timing measures to reflect this difference. However, participants' decision times did not differ significantly across conditions. The mean decision times were 11.54 seconds in the control condition, and 14.05 seconds in the flexibility condition [t(288) = 1.295, p = 0.196, ns.]. Even when considering the sum of all the times a specific participant spent on a specific decision (including the duration of revisits, which naturally increases the duration in the Flexibility condition), the means are 12.43 seconds in the control condition, and 16.28 seconds in the flexibility condition, and are only marginally significant [t(254) = 1.673, p 0.096].

Finally, the design of the study allows a peek at customer return and decision reconsideration behavior. Out of the 290 decisions, 34 (11.72%) were revisits, of them only 8
(2.75%) were changed, 6 of them were changed to purchase from not purchase, and 2 from not purchase to “maybe later”, and the rest retained their initial choice. This result, together with the fact that the products offered were in fact offered at amazingly good deals, suggests that participants that chose the maybe later option probably did not do so because of a resolution to go out and search for more information and return more educated and ready to make a better choice, but rather did so to avoid making the decision. Those that did return mostly procrastinated again.

Participants were slightly more satisfied from the process when they had less flexibility, but slightly more satisfied with their choices when they had more flexibility. These differences were not significant either in their satisfaction from the process [$t(18) = 1.23, p = 0.23$], or in their satisfaction from the consumers’ own choices [$t(18) = 1.24, p = 0.23$].

Discussion

Consumers made purchasing decisions about real products, with their own money, in an online website. Restricting consumers’ ability to defer their decision and to change their mind seems like a manipulation that consumers would not appreciate. Indeed, the pilot survey found that people prefer a state of decision flexibility over the control condition (see also Gilbert & Ebert, 2002). However, consistent with the central framework proposed, restricting flexibility in an online environment, can increase purchase rates significantly. Consumers who felt a decreased cost to indecision were less likely to purchase, despite the fact that there was also a decreased cost to making a decision (because of the ability to change a decision at a later time). Most of this shift in behavior can be explained by a shift from decision to indecision, and not by a shift from a preference to buy to a preference not to buy. This shift from a preference to buy a product to a choice to delay the decision and eventually not buy the product supports the idea that the indecision driven by decision flexibility is not necessarily in the consumers’ best interests.  

Experiment 4 – Limiting flexibility

Although the results of Experiment 3 suggest that restricting flexibility may be in both the consumers’ and the retailers’ interests, the survey results suggest that consumers will tend to shy away from such states that lack flexibility. The applicability of the theory, thus, depends on

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2 The product offers were evaluated as very attractive by ten independent judges from the same population.
the ability to limit flexibility in a manner that does not discourage consumers. One such mechanism sometimes used by sales people is limiting the lifetime of a discount on a good deal. (Too) Often we hear sales people uttering the words “I can give you this deal today, but tomorrow [raising hands in the air] – I don’t know.” Using a different manipulation of flexibility that leads to similar results may further strengthen and support the theory. Experiment 4 attempted to provide more support for the theory by utilizing such a mechanism in which the discount was time limited.

Prior to applying time pressure to the purchase process, one must ascertain its implications for the decision process. For the current purpose, one should determine the correct amount of pressure that would achieve the desired effect of creating an explicit potential for loss and regret in the case of indecision and delay of decisions, without changing the decision process. Too much time pressure could amount to time stress and have negative effects on the decision making process (Svensson & Maule, 1993, for example). In brief, the general effects of time stress on decision making include reductions in information search and processing, changes to the types of information considered, and finally, making wrong judgments and evaluations. Payne et al. (1993) argued that there might be a hierarchy of responses to time pressure that helps decision makers overcome some of these potential pitfalls. They observed that people appear to select a decision strategy that saves considerable effort at the expense of only a small decline in accuracy. The adaptive perspective (Payne et al., 1993) suggests that decision makers adapt to time pressure in ways that appear to be sensitive to the accuracy of the decision process. First, people may try to respond simply by working faster. If this is insufficient, under moderate time pressure, decision makers appear to adapt by being more selective in the information they consider, but under severe time pressure, they shift to strategies that are qualitatively, and not just quantitatively different (people may change processing strategies for example, from alternative-based processing to attribute-based processing). These analyses imply that decision optimality should be lower under high-time-pressure conditions.

Thus, because time pressure could change the decision process, the time sensitive manipulation that is needed to test the current hypothesis is one that is not constraining the decision process, and allows more time to make the decision than is actually needed. Such time limit is proposed to decrease indecision. Based on a pre-test, the actual time pressure in the
experiment was chosen so that it will be salient to the decision maker, but will not constrain the
decision process.

Participants & Design: Participants were a sample of the population at an East Coast
university, mostly students, recruited through messages to various electronic mail lists. The
messages advised people to participate, as they would be able to buy "cool" products for
bargain prices. Interested parties were given the address of the experiment's website.

Similar to Experiment 3, this was a real choice experiment conducted in an online
environment. The experiment consisted of a control condition and three time limit conditions.
In all four conditions products were offered for sale at a discount of 50% from their original
price, but unlike the control condition (which was similar to the flexibility condition in
Experiment 3) the three time limit conditions made the discount available for a limited time
only (the conditions varied on the length of the discount lifetime). The experiment was
designed to be incentive compatible, and so, participants were not paid for participation, and
made purchases using their own money.

Stimuli: An electronic commerce website similar to the one used in Experiment 3 was
constructed. The product category screen in the control condition was similar in nature to that
of Experiment 3, though the particular design (location of photos, text messages, and buttons)
was different. In all three time limit conditions, a vertical progress bar was added at the left side
of the screen. The bar was always initialized to full (100%) when participants first entered a
product category screen and descended to empty (0%) at a rate which corresponded to the
available discount lifetime. When the bar reached zero, the discounted price offer disappeared
and only the retail price remained. Participants could still purchase the products, but at the
regular retail price. A pretest of choices in the control condition revealed that the average
decision time was 8 seconds, with a standard deviation of 4 seconds, and so, the three discount
lifetimes used were 16, 32, and 64 seconds. These durations were meant to ensure that the
manipulation did not actually constrain the decision process, in an attempt to not affect its
quality.

Another slight difference from Experiment 3 was the product selection. Due to
availability, the "tools" product category was eliminated and two product categories were
added, reaching a total of ten product categories, and twenty products. The two additional
categories were T-shirts with the university logo (two types) and coffee mugs with a university logo (two types).

Procedure and dependant measures: The procedure was identical to that of Experiment 3, except participants were now randomly assigned to one of four conditions. The dependent measures were again choices, decision times, and two satisfaction measures surveyed at the end, as well as a gender indication question. Gender of participants had no significant effect, and will not be discussed any further. The study lasted for one month, but no visits to the website were made past the first three days.

Results

Participants could have made one of four choices in each product category. They could have bought the first product, bought the second product, decided not to buy any product, or postponed their decision to a later time. Since there was no systematic difference between the first or second product, both the decision to buy the first and the decision to buy the second were pooled, and will be presented as a purchase. At some point, participants eventually pressed the “checkout – finalize my choices” button, which converted all the decisions that were left as “maybe later” to non-purchases. This was thoroughly explained, and was not a surprise for participants. Table 2 displays the proportion of purchases in each product category across the four conditions.

<table>
<thead>
<tr>
<th></th>
<th>Book</th>
<th>Mug</th>
<th>CD</th>
<th>Godiva</th>
<th>T-shirt</th>
<th>Ice cream</th>
<th>Cross</th>
<th>DVD</th>
<th>Cookie</th>
<th>Gift Certificate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.23</td>
<td>0.22</td>
<td>0.04</td>
<td>0.26</td>
<td>0.36</td>
<td>0.13</td>
<td>0.04</td>
<td>0.16</td>
<td>0.17</td>
<td>0.31</td>
<td>0.20</td>
</tr>
<tr>
<td>16 seconds</td>
<td>0.10</td>
<td>0.24</td>
<td>0.10</td>
<td>0.25</td>
<td>0.33</td>
<td>0.15</td>
<td>0.14</td>
<td>0.25</td>
<td>0.05</td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>32 seconds</td>
<td>0.41</td>
<td>0.43</td>
<td>0.09</td>
<td>0.70</td>
<td>0.43</td>
<td>0.30</td>
<td>0.13</td>
<td>0.23</td>
<td>0.30</td>
<td>0.43</td>
<td>0.35</td>
</tr>
<tr>
<td>64 seconds</td>
<td>0.30</td>
<td>0.26</td>
<td>0.08</td>
<td>0.46</td>
<td>0.33</td>
<td>0.35</td>
<td>0.12</td>
<td>0.15</td>
<td>0.23</td>
<td>0.46</td>
<td>0.27</td>
</tr>
</tbody>
</table>

In order to determine the significance of the differences between conditions t-tests were conducted on the binary choice data. As can be seen in Table 2 and in Figure 3, participants who had 32 seconds to decide were significantly more likely to purchase than those in the control condition [t(448) = 3.937, p < 0.0001]; those who had 64 seconds to decide were also

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3 Similar to Experiment 3, the data collected are several choices by each individual, in a certain order, in a specific condition. This panel data structure was handled in the same fashion as in Experiment 3, and the results presented were found to be robust to heterogeneity and state dependence biases.
more likely to purchase than those in the control condition \( t(478) = 2.169, p < 0.04 \); and participants who had 16 seconds did not act any different than those under the control condition \( t(428) = 0.148, p = 0.88 \), in which the discount was infinitely long (never expired). The 32 and 64 seconds conditions differed marginally \( t(468) = 1.841, p < 0.07 \).

In order to characterize the purchasing behavior in the study, the binary choice data was transformed to probability of purchase in each condition, using a Logit transformation that included controls for heterogeneity and state-dependence. The results of this estimation are given in appendix A. Figure 2 depicts the average propensity to purchase, according to the above model.

![Average Probabilities to Purchase](image)

**Figure 3**

As in Experiment 3, one could use the duration of participants’ decision process as an indication of the process itself. Specifically, these decision times may be used as a measure of the obtrusiveness of the manipulation. If the manipulation had a strong effect on the decision process, these would translate into significant differences in its length. The average decision times are listed in Table 3. No decisions were made after the discount expired. Interestingly, even when the decision was not to buy, participants made their choice when the discount was still available.
<table>
<thead>
<tr>
<th></th>
<th>Average Decision Time</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Seconds</td>
<td>8.195*</td>
<td>0.42</td>
</tr>
<tr>
<td>32 Seconds</td>
<td>10.252</td>
<td>0.45</td>
</tr>
<tr>
<td>64 Seconds</td>
<td>12.387</td>
<td>0.73</td>
</tr>
<tr>
<td>Control</td>
<td>10.993</td>
<td>0.78</td>
</tr>
</tbody>
</table>

* Difference from control condition significant at the p < 0.01 level.

These relatively short decision times are an important indication of the non-binding character of the time limit manipulation. If the discount durations were binding, one would expect to see clustering around or very close to the time limit.

In this study, participants could have returned at a later time to modify any decision they have previously made. While in the time limited conditions, later changes would mean not having the discount, there would be no financial costs of doing so in the control condition. Participants could also go back and cancel a decision to buy. Changing a decision to buy into a decision not to buy was always available in all conditions. Out of a total of 976 decisions made by 98 participants, 89 (9.12%) were revisits to decisions already made. Out of those who returned to reconsider their decision, 45 (53%) did not change their mind, and only 10 (1%) changed their decision to a purchase decision. This means that if a participant previously decided to buy the first product, in most cases they made the same decision upon return. This consistency is remarkable given the fact that there was no indication on the website about their previous choice. In total, 95.59% of decisions were never changed once they were made.

Finally, two measures of satisfaction were collected at the end of the shopping process, after participants chose to checkout and finalize their choices. The first measure was participants’ satisfaction from the shopping process itself, and the second was participants’ satisfaction with the choices they have made. None of the measures differed significantly across conditions. However, as might be expected, participants in general do not like time pressure when making up their mind, and so, although participants’ satisfaction displays only a slight non-significant decreasing trend as the time pressure increases, participants were less satisfied with the process than with their choices [t(184) = 2.346, p < 0.021]. Participants’ mean reported satisfaction scores for both measures are reported in Table 4. These satisfaction measures serve as a dual manipulation check. Finally, although time pressure had some effect,
participants were not less satisfied with their choices which means that the time pressure was not so strong as to generate increased uncertainty.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Process Satisfaction</th>
<th>Choices Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Seconds</td>
<td>37.143</td>
<td>52.762</td>
</tr>
<tr>
<td>32 Seconds</td>
<td>46.783</td>
<td>49.913</td>
</tr>
<tr>
<td>64 Seconds</td>
<td>46.231</td>
<td>57.815</td>
</tr>
<tr>
<td>Control</td>
<td>50.739</td>
<td>57.727</td>
</tr>
</tbody>
</table>

**Discussion**

As predicted, limiting flexibility by associating a cost with delaying decisions increases the propensity to decide and consequently to purchase. Participants in both the 32 seconds and the 64 seconds conditions purchased significantly more than those in the control condition, who had ample decision flexibility. Also as predicted by previous research on time pressure, putting too much pressure on decision makers (16 seconds) has the property of potentially reducing confidence, and thus deterring decisions. Note that the 16 seconds time limit was not a binding limitation for most of the participants, but it turned out that it was psychologically sufficient to affect the decision process. This is also reflected in the satisfaction levels reported by participants in this condition. The specific difference between the 32 and 64 conditions is interesting, but is beyond the scope of this work.

Increasing purchase rates from 19% to 36% is obviously in the best interests of the retailer. A fair question at this point is whether restricting flexibility is doing a disservice to consumers or is it the case that restricting flexibility is in their best interests as well. To answer this question, a demand estimation survey was administered to 44 participants from the same population as those who participated in experiments 3 and 4. The survey included a description, photo, and retail price of the products used in those experiments. Participants were asked to mark all the price levels that they would be willing to pay for each product, on a scale that contained prices from $0 to 1.5x the retail price of the product. The results were translated to implied market share for each product at the price offered in the experiments, and then averaged to yield the predicted average market share for the product-price bundles. The predicted average purchase rate was 61%! This share of purchasing is much higher than any in
the experiments, suggesting that increasing the propensity to buy was not only in the retailer’s interests, but also corresponded to the consumers’ interests as well.

Experiments 3 and 4 manipulated decision flexibility and by restricting it in two different ways, increased the propensity to buy. These manipulations to decision flexibility corresponded to the abovementioned definition thus supporting the proposed model, but the limitations of the real choice online studies prevented a complete test of the model as well as such manipulations checks as perceived flexibility, or a specific measure of the effect of flexibility on the pain of committing to alternative decision paths. In order to obtain these measures, the following lab experiment was administered.

Experiment 5 – In the Lab

The findings of the first two experiments provide theoretical support for the proposed model. Experiments 3 and 4 establish that the pain of deciding, as influenced by the decision environment and the amount of flexibility it allows, has a significant and systematic effect on real choice. The real choice experiments provide accuracy and validity because they demonstrated real behavior. For this reason, they are limited in their ability to provide potentially intruding measures that may shed light on the actual process participants are going through when making their purchasing decision.

In order to provide further evidence for the absolute and the relative effects of the environment on the pain of deciding, and on the final outcome, as well as another test of whether the manipulations influenced choice at the process or at the product level, participants in Experiment 5 were brought into the lab. Experiment 5 replicated the two manipulations, must decide and limited time that were used in the online real choice experiments allowing for additional process measures.

Method

Participants & Design: Participants were mostly students recruited from an east coast urban area using ads and posters. The ads promised $12 for one hour of decision making studies. Subjects were asked to participate in a shopping experience for real products, and while they were doing that, to also answer a paper and pencil questionnaire.
Similar to the previous experiments, the study was a real choice experiment conducted in an online environment, only this time participants were in the lab when they logged in to the website. This experiment was the first out of a series of several unrelated tasks participants undertook in the lab session, and participants were paid for the entire session. The experiment consisted of three conditions: a control condition (flexibility, as in Experiment 3), a condition in which participants had to make a decision and could not change their choice at a future time (must decide, as in Experiment 3), and a time limit condition (time-limit, as in Experiment 4, in which the sale lasted only for twenty seconds). In all four conditions products were offered for sale at a discount of 50% from their original price. Participants made purchases using their own money. The fact that participants were in the lab introduced some limitations, one of which was that the option to delay the decision to a later time had less meaning than in previous experiments. This means that the difference between the flexibility and the rest of the conditions is expected to be smaller, because the strength of the flexibility manipulation is lower than in previous experiments.

Stimuli and dependant measures: An electronic commerce website similar to the previous experiments was constructed. The product category screen in each condition was identical to its corresponding source experiment. That is, the flexibility condition was identical to the same condition in Experiment 3, the must decide condition was identical to the control condition of that experiment, and the time-limit was identical to the time limit conditions in Experiment 4. The products offered were identical to those of experiment 3. The dependent measures for the online task were again choices, decision times, and two satisfaction measures surveyed at the end.

In addition, a pencil and paper questionnaire was prepared. The questionnaire had nine identical pages, one for each product category, which included the following measures: a graphic scale of the extent the participant found the decision difficult, a rating of the difficulty of each specific choice option (buy top product, buy bottom product, not buy any product, decide at a later time), a maximum willingness to pay for each of the products, a choice of the decision that may generate the most regret (buy / not buy / delay), and a similar choice of the least regrettable decision, a rating of the amount of decision flexibility encountered, and a measure of the tension / relaxation felt while making the decision (on a cartoon-like scale, similar to the SAM (Bradley & Lang, 1994)).
Procedure: Participants arrived at a pre-assigned time to the computer lab, and were seated at a computer terminal connected to the Internet. As the current experiment was the first task they performed out of a series of five unrelated studies, they were handed the paper and pencil questionnaire mentioned above, that also contained instructions about how to log into the online experiment. The main addition of Experiment 5 was that after making a decision in each product category, participants were asked to fill out a two-page questionnaire. They were also instructed to go through all the product categories, even those that they were not interested in. Participants were told that their decisions were real, and that they would be contacted later by Email to set up payment for and delivery of the items.

Results

774 decisions were made by 86 participants, who also answered a full page questionnaire for each decision made. The means of each dependent measure in each condition, rescaled to a 0 (low) to 10 (high) scale, are summarized in Table 5.

<table>
<thead>
<tr>
<th></th>
<th>Difficulty of choice to buy</th>
<th>Difficulty of choice not to buy</th>
<th>Difficulty of delay decision</th>
<th>Difficulty of deciding</th>
<th>Perception of Flexibility</th>
<th>Tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility</td>
<td>4.85</td>
<td>3.76</td>
<td>3.43</td>
<td>3.10</td>
<td>6.15</td>
<td>3.32</td>
</tr>
<tr>
<td>Must decide</td>
<td>5.29*</td>
<td>4.44*</td>
<td>-</td>
<td>3.14</td>
<td>5.10*</td>
<td>3.32</td>
</tr>
<tr>
<td>Both Expiring</td>
<td>5.38*</td>
<td>3.9</td>
<td>4.52*</td>
<td>3.65*</td>
<td>4.76*</td>
<td>3.82*</td>
</tr>
</tbody>
</table>

* Difference from Flexibility condition significant at least at the p < 0.05 level.

There were no significant differences in the measure of maximum willingness to pay across the four conditions (means: $6.2, $6.1, and $6.4), and in addition there were no significant differences in the average differences between the WTP for the two products in each category across conditions (the mean differences ranged from $1.88 to $2.15). It is thus useful to use this measure as a proxy for individual heterogeneity in preferences in the analyses that follow.
To determine whether participants experienced a different state of decision flexibility, the flexibility rating measure was regressed on condition dummies, product category dummies, and the maximum WTP measure. The results suggest that the must-decide and the two-expiring conditions differed from the flexibility condition significantly $[F(1,737) = 10.25, p = 0.0014$; and $F(1,737) = 25.92, p < 0.001]$. Participants rating of the difficulty of delaying the decision to a later time was regressed on condition dummies, product category dummies, and the maximum WTP. The results indicate that participants found it significantly more difficult to delay the decision in the must-decide, and two-expiring conditions than in the flexibility condition $[F(1,699) = 16.99, p < 0.001$; and $F(1,699) = 15.49, p < 0.001$ respectively]. Participants also rated their most regretful choice and their least regretful choice on two different scales. While the modal most regretful act in all conditions was the act of buying, the modal least regretful act was not buying in all but the flexibility condition. In the latter condition, the modal least regretful choice was delaying the decision to a future time.

The binary choice data was analyzed using a probit model, controlling for conditions, product categories, and preference heterogeneity (using the WTP measure), and including independent variables for difficulty of buying, difficulty of not buying, difficulty of delaying the decision, and for flexibility. The results indicate that, as predicted, the difficulty of both not buying and delaying the decision increases the propensity to purchase $[\beta = 0.121, t(694) = 5.10, p < 0.001$ and $\beta = 0.05, t(694) = 2.11, p = 0.035$ respectively], and that difficulty to buy and greater flexibility decrease the propensity to purchase $[\beta = -0.069, t(694) = 2.5, p = 0.012$ and $\beta = -0.04, t(694) = 1.69, p = 0.091$ respectively]. The results further indicate that the effect of the difficulty of not buying is the most influential out of the four measures.

Perhaps more important according to the proposed model is to test the difficulty participants found in moving away from the status-quo, and deciding on another outcome. This measure can be calculated by subtracting the difficulty of choosing to buy from the difficulty of choosing to delay the decision, when possible, or from the difficulty of choosing not to buy when delaying is not an option. Similarly, one can calculate the difficulty of choosing not to buy when delaying the decision is a viable alternative. Doing so yields two measures of the pain of deciding. One would expect that the greater the distance of an outcome from the status-quo, the lesser the probability that outcome will be chosen. This is indeed the pattern of the
results: the coefficient on the difference between the difficulty of the option to buy and the status-quo is negative and significant \( [\beta = -0.111, t(713) = 7.14, p < 0.001] \). Moreover, these measures can also allow the analysis of the mediating role of the pain of deciding in the influence of flexibility on the propensity to purchase. Using the above probit model specification, the role of flexibility (as captured by the manipulations) was found to be significant and negatively related to the probability to purchase \( [\beta = -0.257, t(714) = 2.15, p = 0.032] \). Adding the measures to the same specification renders the flexibility manipulation non-significant \( [\beta = -0.129, t(712) = 0.98, p = 0.326] \), while the pain of deciding coefficient remains significant \( [\beta = -0.109, t(712) = 7.01, p < 0.001] \), resulting in full mediation. Furthermore, pseudo R² increases significantly when adding the pain of deciding variable [likelihood-ratio test: \( \chi^2 (1) = 138.07, p < 0.001 \)] but then does not drop significantly when removing the flexibility manipulation dummy [likelihood-ratio test: \( \chi^2 (1) = 0.974, p = 0.325 \)].

**Discussion**

This experiment adds additional pieces of knowledge to the decision flexibility – pain of deciding paradigm. In particular, the measure of flexibility provided a manipulation check for the previous two experiments; the measurement of maximum willingness to pay, apart from serving as a control of preference heterogeneity, provides evidence that the increase in purchasing behavior had not been generated by an increase in product valuation, but rather that the manipulation influenced choice at the process level. Finally, the relative ease or difficulty of committing to a specific decision path other than the status-quo influence the outcome of the decision process, as well as mediates the effect of decision flexibility.

**General Discussion**

The framework proposed postulates that the environment in which decisions are made influences the outcome of the decision process, not only by influencing the way the decision maker views the different alternatives, but also by influencing the attraction of the decision process itself. In turn, the amount of displeasure the decision maker experiences while considering various decision paths influences the likelihood that they will be undertaken. The *pain of deciding* is therefore a vessel by which the decision environment systematically influences choice. Specifically, the amount of decision conflict and anticipated regret
associated with the decision at large and with the various specific outcomes, is a function of the decision environment.

In most consumption occasions, the decision to buy is not the status-quo. Consequently, the suggested theory, decision flexibility influences choice through the pain of deciding, implies that when decision flexibility increases, consumers experience greater pain in moving away from the status quo (making the decision to buy). Thus, consumers are more likely not to buy and to defer the decision. Experiment 1 demonstrated that decision flexibility reduces the propensity to buy a given product, and that this decrease could be explained by increased pain of deciding. Building on the result that making a decision is more painful than delaying it, Experiment 2 demonstrated that consumers indeed find the decision to buy more painful in a state of high decision flexibility than in a state on low decision flexibility. Applying the theory to real purchase behavior, Experiment 3 validated the theory by demonstrating that adding decision flexibility significantly decreases purchase rates. This result was driven, at large, by a switch consumers made between choosing to buy and choosing to avoid the pain of decision.

It is interesting that consumers chose to delay the decision at all, as they had the opportunity to return to the product screen and modify any choice they have previously made. In such settings, even a minute preference for one of the options should dictate choosing that option, over the delay alternative. Interestingly, most consumers who decided to delay choice ended up not purchasing at all, as discussed below. However, the pilot experiment demonstrated earlier that people in general like decision flexibility, and in accordance, consumers were not very pleased with the manipulation that limited their flexibility. Experiment 4 was an attempt to apply the theory using a different more subtle manipulation, and provided further support for the suggested model, as well as demonstrated convergence of manipulations. Participants in Experiment 4 purchased significantly more products when their decision flexibility was limited by the short lifetime of a discount. Experiment 5 took the same manipulations of the previous online experiments into the lab to provide better measures of participants’ decision processes, providing measurements of the absolute and the relative pain of deciding, as well as a manipulation check for the amount of decision flexibility inherent in each condition. Experiment 5 also provided support for the notion that the flexibility
manipulation influenced the decision at the process level, rather than at the product valuation level, by demonstrating that while the manipulation had an impact on choice it did not change the willingness to pay for the products. This result provides even further proof that participants did not treat the flexibility manipulation as a signal for increased product value. Finally, the results also provided support for the mediating role of the pain of deciding in the influence of decision flexibility on the propensity to change the status-quo, and make a purchase. The analysis suggested that most of the increase in purchase probability in the less flexible conditions was caused by a decrease in the difficulty of making a choice different than the status-quo (which was either deferring the decision in the limited time discount manipulation or not buying in the must decide manipulation).

In many consumption situations the retailer has some control over the consumption environment and thus on the amount of decision flexibility experienced by consumers. This research verifies the intuition that allowing too little flexibility is not appreciated by consumers, but more importantly, demonstrates that allowing consumers too much decision flexibility may increase the difficulty of making decisions, and in particular, the difficulty of making the decision to buy. Moreover, decision flexibility significantly decreases the relative pain of indecision, and consumers are therefore far more likely to resort to decision deferral when allowed greater decision flexibility. This means that sales mechanisms should promote making decisions, and that this may be achieved by rewarding decisions and penalizing flexibility and indecision. A direct implication of this principle is that technological advancements that simplify the shopping process and increase decision flexibility may have adverse effects on purchasing behavior because they offset the psychological balance that people are used to when making such decisions. Such adverse effects can be reduced by employing specific flexibility limiting strategies, some of which have been investigated in this work.

Marketers should be particularly attuned to such environmental effects. The aspects of the decision environment that influence the pain of deciding, and thus the final choice, are often under the control of the marketer. This research suggests that the pain of deciding is a hurdle on the way to attain closure, and that manipulating the decision environment, by changing the level of decision flexibility, may help overcome that hurdle.
Alternative Theories

Experiments 3 and 4 manipulated decision flexibility by restricting it in two different ways, and consequently increased the propensity to buy. These manipulations to decision flexibility may also be interpreted as presenting a situation in which the decision maker's future access to the same consumption bundle is limited. When a certain item is scarce, people tend to be more attracted to it (Cialdini, 2000), and may also infer that the scarcity is a signal for its high quality (Spence, 1974). According to these inference processes, a consumer will perceive a product offer of limited availability as more attractive and as having greater value. Under this interpretation, in Experiment 4 for example, participants entering a product category screen and seeing two products that have an expiring discount may have inferred that these products are worth more than if the discount was not about to expire. Some evidence against this argument was obtained by measuring participants' willingness to pay in experiment 5, and showing that the particular manipulation of flexibility did not influence this measure.

Moreover, the experiments were designed in a way that would minimize considerations of scarcity or inferences based on signaling principles. In the experiments, participants had control over the exact time that they enter the limited situation. For example, in Experiment 4 the time limit only started when participants chose to enter a specific product category. This design was an attempt to prevent participants from making inferences about increased product value because of scarcity (Cialdini, 2000) or signals about market value (Spence, 1974). Furthermore, by always allowing participants the option not to buy, participants freedom was not perceived to have been taken away and little psychological reactance should arise (Brehm, 1966). To provide an empirical test of whether the increase in purchasing in the two experiments is the result of increased valuations for the products because of scarcity, signaling, or any other reason, the following experiment was run.

Scarcity Experiment

This experiment manipulated the discount expiration similar to Experiment 4, but only for one of the products. The second product had a discount that was infinitely lived. Once participants made choices in these conditions, one needs to directly compare the demand for the same product when it has an expiring discount and when it does not. Consequently, if the scarcity or signaling principals are at work in the settings of the previous experiments, if participants enter a product category screen and encounter two products offered at a discount,
but only one of the product had a discount with an expiring fuse, the relative share of that product should increase, as it would be perceived to be more attractive. The situation described is exactly what participants in this experiment experienced: only one of the products, chosen at random by the computer, had an expiring discount. If, however, scarcity and signaling were not responsible for the increased propensity to purchase in the previous experiments, no difference should be observed between the share of the expiring discount product and the non expiring discount one.

The scarcity experiment was done in exactly the same way as Experiment 3 (same products, real choices – real money, online, 50% discount), and participants were graduate students of an east-coast university. The particular product that had an expiring discount was randomly chosen by the computer at each product category for each participant. Next to that product only, at each screen, a time limit progress bar appeared. When the bar reached zero, the discounted price offer for the product next to it disappeared. Participants could still purchase the products at their current price (only one of which was still discounted).

162 participants made 1030 decisions over the course of the experiment. Participants could have made one of four choices in each product category. They could have bought the first or the second product (one of which had an expiring discount), decided not to buy any product, or postponed their decision to a later time. At some point, participants eventually pressed the “checkout – finalize my choices” button, any decision that was left as “maybe later” at that point was treated as a non-purchase (as specified in the instructions).

In order to answer the question central to the investigation, one needs to compare the share of the limited product offer with that of the unlimited product offer. When one product had a limited time discount, participants made 732 decisions, 117 of them were decisions to purchase. In those decisions, participants chose the limited product 52 times (44%), and the unlimited product 65 times (56%), indicating a directional effect opposite in direction from a signaling / scarcity reaction.

An analysis of the point in time in which participants made decisions in these settings may shed light on the process participants went through when making their decisions. In particular, one rational algorithm to solve the decision problem may be to first consider the expiring discount product, and if the verdict is not to buy it, than consider the second, non-expiring, offer. This would depend on participants’ ability to separate the purchase
consideration from the purchase environment. The central model in this work relies on the consumers' inability to do so, and indeed, 81% of the participants who purchased the unlimited product did so before the discount of the limited product expired. Moreover, 90% of decisions not to buy any of the products were also made before the discount for the randomly chosen product expired, as well as 75% of the decisions to defer choice. It thus seems that participants treated the decision problem for both the purchase outcomes, and the delay outcome as a single stage problem. This behavior further strengthens the view that a general characteristic of the decision problem, such as the pain of deciding proposed here, was influenced by the manipulation, and not an attribute or the value of a specific product.

This design enabled the testing of the hypothesis that the increase in purchase rates in experiments 3 and 4 was not caused by an increased valuation of the products in the limited conditions. results show that participants were not more likely to buy the product that had an expiring discount than the one that had an unlimited one when both were present on the same screen. The fact that participants seemed to treat the whole situation as if it were slightly limited, as indicated by the timing of the choice to not buy and the choice to delay the decision, provides further support for the idea that the effect of the environment, captured by these types of manipulations, happens at the process rather than the product level.

Procrastination

The concept of decision deferral relates to procrastination in the following way: making the decision is potentially beneficial, because one can choose the alternative that generates the most happiness. However, if the situation is not compelling enough to actually force making a decision, then people who entertain a myopic expectation that in the future they could make an even better decision will tend not to decide; and in the future, unless the situation changes, the same thing will happen again, and again.

The basic experimental design that allowed participants to defer decisions and return at a later time (minutes, hours, days, or even weeks later) enabled the investigation of procrastination. In particular, procrastination in these settings means that participants choose to decide at a later time, and when they do return, again choose to decide at a later time, and so on. Indeed this was the most common action upon revisiting a decision. A weaker form of procrastination may be to choose to decide later, and never return to make a decision.
Procrastination may be disproved if participants return at a later time and change their decision, either buy one of the products or choose not to buy. An important characteristic that differentiates procrastination from simple delay is the actual intention. In the case of procrastination, the decision maker intends to make a decision, only not just now, whereas in the normal delay situation, one may already realize that not deciding may very well be the preferred path and outcome. Various conditions in the studies presented provide natural observations of the unfolding of the purchase behavior over time and as summarized above displayed just this type of behavior. Alarmingly, the conditions that allowed participants to procrastinate are those that most resemble the flexible online environment.

In Experiment 4, it is interesting to investigate the subsequent behavior of participants who chose the “maybe later” option. Out of a total of 65 such decisions, only 13 (20%) were returned to, and 6 were ultimately changed, but only 2 of those to a purchase decision. This means that over 90% of these decisions were left open and never acted upon.

But perhaps the strongest procrastination like behavior was demonstrated in Experiment 3, where in the Flexibility condition participants could delay the decision, but also return and change any decision they had previously made. Out of the 37.24% (108) of decisions that were “maybe later”, only 8.3% (9) were revisited, and no decision was changed! This means that even those participants who chose to decide later, and actually revisited that decision, ended up choosing to decide later, again. Furthermore, two decisions not to purchase were subsequently changed to “maybe later”, and also never acted upon.

The evidence portrays a situation in which consumers who choose to decide at a later time rarely do so, and those who try, end up making the same act of postponing the decision (Tykocinski & Pittman, 1998). This behavior is mostly apparent in conditions that allow decision flexibility. A qualitative attempt to learn about the antecedents of this behavior, by sending an electronic mail to procrastinators inquiring about their motives and subsequent behavior, revealed that most procrastinators “intended to come back at a later time, but kinda’ forgot all about it”.

**Future research**

This research raises several interesting questions about the micro domain of the process of making a purchasing decision, as well as in the macro domain of selling and controlling the
flexibility of the shopping environment. Several manipulations in the current research influenced the actual outcomes of decision process, without investigating the actual changes in the internal mechanisms that are responsible for the change in the process (the difference between the 32 and 64 seconds conditions in Experiment 4, for example). And finally, this research only slightly addressed the emotional (satisfaction, happiness, and confidence) implications of decision deferral and procrastination. These may be related to the study of self control, procrastination, and cognitive dissonance.

**Final words**

The results presented above suggest that decision flexibility influences the decision process systematically, in part through its effect on the pain decision makers feel when considering different decision paths. The concept of decision flexibility as introduced presents a new perspective by which to view the effects of the environment on decision making. The results suggest that the pain of deciding is not cognitive load, but rather the dislike of the inherent conflict involved in deciding about particular outcomes. The mediating role of the pain of deciding suggests that decision makers’ final choice may be related to the ease of deciding on its corresponding path.
References


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Decisions by Rules:
Disassociation between Preferences and Willingness to Act

with Dan Ariely

Abstract

Individual decision making has been largely viewed from an outcome maximizing perspective. Building on previous theoretical works, this paper suggests that individuals consider not only their preferences for different alternatives, but also behavioral rules as guiding principals for their choices. Invoked by the situation at hand, rules are used whenever they are cognitively available, and therefore may also be used when they lead people to choose alternatives that fit their rules but not their preferences, and thus to not maximize their happiness. A series of experiments demonstrates that people follow such rules; that the rules people follow can be disassociated from their preferences, consequently leading to loss of utility; that the use of the rules does not arise because of cognitive limitations; that once the rules are invoked they are used; that rules are used as a first response to the decision problem; and that the invocation of the rules can be the result of external cues from the environment. These findings may explain some of the systematic inconsistencies in the ways consumers behave.
A great deal of the decisions individuals make entail payment or receipt of money. This is not surprising for the true role of money is to allow smooth exchange and market trades. Such exchanges have been argued to reflect individuals' internal attitudes, utilities or preferences, such that decisions made maximize (under a set of constraints) these internal values (Simon, 1957, among many). For example, if a person schedules a vacation on a date two months into the future instead of a week into the future, all else being equal, it is assumed that this person has an internal state under which the expected pleasure of the later vacation is higher, and therefore, that person should be willing to pay more for the preferred vacation.

However, several streams of research have demonstrated that the above conclusion does not always hold, and that in fact there are many reasons for actions, and paying in particular, to be discrepant from preferences. Moreover, even predicted actions and willingness to pay may be inconsistent with expressed preferences. Such inconsistencies may arise because of the specific context the decision maker encounters (Tversky & Simonson, 1993), the affective characteristics of the decision problem at hand (Fredrick, 2002; Slovic et al, 2002), or the specific elicitation procedure used (Fischoff, 1991).

This paper builds on theoretical views in psychology, philosophy, and decision making (Prelec 1991; Prelec & Hernstein, 1991; Ainslie, 1992; March, 1994; as well as moral and legal philosophers such as Habermas, 1999) to suggest an additional reason for the inconsistency between preferences and actions – the use of decision rules\(^4\) – and elaborates on the mechanism underlying the use of rules in making decisions. While rule following may be an adaptive decision making mechanism, the overarching and unconditional nature of rules sometimes leads to actions that are not in the best interests of the decision maker. In particular, this work focuses on one such rule that involves

\(^4\) A great deal of discourse in moral and legal philosophy is devoted to the overlap, hierarchy, and boundaries of a myriad of terms describing behavioral guidelines, such as rules, principles, norms, rationales, morals, and so forth. The locus of distinctions between such terms lies in the [superhuman] ability to identify the source, relevance, and distinct implications of each one, contrast, compare, and finally choose the correct manner of thought and action that follow from that choice (See for example, Dworkin's "Judge Heracles" in Habermas 1996). In this work, the use of the term "rules" refers to a general underlying mechanism whereby people choose according to what they think they ought to do, and these "ought"s arise when a situational cue invokes them. Specifically, in the central demonstration of the paper, the need to decide about money is said to invoke a set of rules as guidelines for choices that "ought" to be made.
payment decisions and demonstrates the underlying mechanism, in part, by showing where it fails to leave the decision maker with the best outcome.

The rest of the paper continues with a theoretical background related to the use of rules in decision making, followed by a deeper investigation of one particular rule relating to intertemporal choice — "Don't pay to delay good experiences." Specifically, this rule concerns the assumed advantage of having positive experiences sooner rather than later. This rule implies that delay should not be paid for\(^5\). Armed with this rule, evidence for a case which should be an exception (attending a concert) where there can be a positive utility for delay will be provided. Once the positive utility for delaying concerts is established, the aforementioned inconsistency will be demonstrated (even when decision makers prefer to delay positive experiences they are not willing to pay the delay). The actual mechanism of the use of the rule will be investigated through manipulation of the saliency of invoking cues and of the depth of consideration of the outcome. Finally, the question of the activation-invocation source of the rule will be addressed. The paper concludes with a general discussion of the specific rule opposing delay of positive experiences as well as the use of decision rules in everyday life.

**Why "Rules"?**

Following a substantial treatment in philosophy, Prelec (1991; Prelec & Hernstein, 1991; see also Ainslie, 1992; March, 1994) suggested a decision making style that is independent from tastes or preferences but is akin to the use of legal rules in matters of self-control and identity maintenance. Unlike preferences these rules are assumed to be general over-arching guidelines for behavior and as such are applied broadly in a legal-like manner — "do or do not do"\(^6\) (hence the term "rules"). Moreover, Raz (1975) defines a test of whether a behavioral guideline is a rule by identifying its overarching nature and seldom questioned validity:

"[By following a rule] What I am not doing is assessing the merits of the case taking all the relevant facts into consideration. I am not doing

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\(^5\) As an example of this rule, consider whether you would be willing to pay to change a 2\(^{nd}\) day delivery to a 5\(^{th}\) day delivery in cases when anticipation has a positive value.

\(^6\) More generally: x should [not] do y in situation S (Raz, 1975).
this for I have decided on a rule, that is, I have accepted an exclusionary reason to guide my behavior in such cases. I may occasionally, of course, examine the justification of the rule itself. If I re-examine the rule on every occasion to which it applies, however, then it is not a rule which I have adopted. I may on the other hand examine the rule occasionally even when not confronted with a case to which it applies. This is the test by which to determine whether a person follows a rule.”

One consequence of their broad application is that there are circumstances for which the rules are not suited and yet they are applied (as with many legal systems), resulting in actions that can at times be disassociated from preferences. According to some, it is by the very definition of rules that the exclude a set of considerations that may, at times, prove the right set to apply (Raz, 1975). For example, suppose one immensely enjoys smelling the fresh air in the park on her way to work, and even mentions this to her secretary every day. And suppose that a young entrepreneur realizes this, and convinces city hall to start charging one cent for passage through the park, when the flowers are in bloom. It is very likely that the protagonist will refuse to pay merely because she does not believe one should pay for a breath of fresh air, even though it is worth much more than one cent to her. In this example, the protagonist’s belief in the invalidity of the payment request functions as a rule when she makes her decision. Nevertheless, using the rule robs her of valuable happiness.

More recently, researchers have begun uncovering the mechanisms underlying some of these documented inconsistencies. Hsee et al. (in press) describe a set of ‘expressed preferences – anticipated action’ inconsistencies and categorizes them into three subgroups, based on the underlying logic that generates them: lay economism, lay scientism, and lay functionalism. The common thread proposed is that people follow “rationales” – meta-rules or principles that guide behavior, and are sometimes applied even when doing so leads to the aforementioned inconsistencies and consequently to less preferred outcomes. The current work follows a similar line of thought but instead focuses on one such rule, and attempts to provide more detailed evidence for the decision making mechanism itself.

**Rules in daily decisions**

Decision-rules could be based on social, cultural, or moral conventions. Growing up in different cultures, or subcultures, is likely to teach individuals different “causal
schemata” of the stimulus-response relations in their environment (Kelly, 1972; Nisbet & Wilson, 1977). In his theory of human sociability, Fiske (1992) suggests four meta-schemas of social order that translate to specific courses of action through the adoption of various corresponding rules of conduct by different cultures. The four forms of sociality (communal sharing, authority ranking, equality matching, and market pricing relations) thus define four distinct sets of admissible behaviors. For example, can you imagine yourself after a fabulous meal at your mother-in-law taking out your checkbook and asking how much you owe her for this dinner (for the ingredients and for her time)? Such normative behavioral rules could be taught, but could also be learned from experiences (Schwartz, 1977; Gilbert, 1995; see also Raz, 1975). For example, Schwartz (1977) discusses personal norms – internalized rules of conduct that are learned from social interactions; yet vary between individuals within the same society and function to direct behavior in particular situations (what should one bring as a present for the host of a dinner party). Backed by views of 18th century thinkers and focusing on issues of self-control, Ainslie (1992) argues that as a child develops, she consciously or unconsciously learns a general precept, such as “maintain health” or “be good”, effectively uniting actions under a common rule towards a desired end. Such grouping of choices serves as the building blocks of one’s willpower. This aspect of rules, that they have to be learned, differentiates rules from preference-based mechanisms (preferences can be either learned or endowed), and deserves further emphasis. Some of the rules are learned from personal experience (don’t tell one’s spouse dinner is not good; set a personal deadline one day before the actual deadline; hide an extra key in the garden), while others are based on social, cultural, and moral conventions one does not need to experience in order to learn (one should not steal; paying for sex is not a decent relationship; some offers are unfair; time is money, etc.). Because these rules are learned and may be socially constructed they are also not universal and the specific rules that are applied in different circumstances depend on individual, social, and cultural factors. Moreover, individuals may “drift” into following rules gradually over a period of time without ever consciously deciding to do so (Raz, 1975):
"A Person may, however, come to follow a rule without having decided to do so. He may have been brought up from early childhood to believe in the validity of the rule and to respect it. He may have drifted into following the rule as an adult gradually over a period of time without ever really making up his mind to do so."

Several theorists have also argued that personal rules are the predominant mechanism for pre-commitment against follies of self-control (Prelec, 1991; Prelec & Herenstein, 1991; Ainslie, 1992; Raz, 1975). In these cases, rules may be self generated in order to dictate future behavior and avoid future conflicts. For example, an ex-smoker may create a rule that prevents her from even an occasional seemingly harmless taste of a friend’s cigarette for fear of increasing her own urge to smoke.

**Rule Activation**

The activation of such rules is likely not only to be defined by social and cultural context, but also by the local context of the task (March, 1994). For example, Fiske and Tetlock (1997) suggest that one can overcome one type of such rules, emerging from taboo-tradeoffs, by obfuscating the tradeoff, and reframing the decision task in more comparable terms. When tasks are reframed, binding norms or decision rules and not invoked, making their violation easier (see also Ratner & Miller, 2001, Experiment 4). For example, although it is not considered appropriate to pay with cash for a dinner one is invited to, it is acceptable (and even recommended) to “pay” back the hosts with a gift such as wine or flowers. The key here is attention to the appropriateness and applicability of the rules (Ainslie, 1992). When attention is directed at a rule, it will be followed. On the other hand, in cases where attention is not directed at a rule, it will not be invoked and therefore not followed. Indeed, it has been suggested that the problematic effect of framing on the activation of social norms may lie in focus of attention (Cialdini, Kallgren, and Reno, 1991). When attention is focused on a particular norm as a standard for behavior, rules are likely to influence behavior, whereas when attention is not directed at a rule, following one’s preference is likely to take precedence over following rules. The framing and attentional aspects of the activation of rules also implies that their activation is in many cases implicit, which renders their invocation exogenous. The exogenous activation means that different manipulations, such as different framing of the same situations will determine whether the rule is invoked or not and consequently
determine the reliance on the rule as a guiding principal for behavior. The invocation process that starts at the recognition of the exogenous situation (attention) may also be influenced by the decision maker's internal goals such as preserving a current identity or strive towards a desired one (March, 1994). For example, a consumer might ask what other consumers might do in similar situations or what might someone they admire do if they were in their shoes.

In summary, the rules of current interest are analogues to legal or moral rules - they do not form a binding constraint on behavior, but instead form guiding principals that are not always explicitly considered. Because these rules only form virtual constraints on decisions, they will be followed most frequently when they are strongly invoked, when decisions are made mindlessly (Langer, 1989), when there is little experience in the domain, or when the roles are acquired via non-personal (social) experience (Reagan & Fazio, 1977). Moreover, because rules are general in nature, behaviors that are guided by them will not always match optimizations according to preferences, and following rules could come at the expense of personal utility.

**Overview**

While there is no question that internal states are commonly used as inputs for consumers' decisions, the main two general claims of the current work are that 1) if a rule is invoked when consumers make decisions, instead of following their preferences they follow the rule in a "moral-like" fashion⁷; and that 2) these rules can sometimes be invoked in situations that undermine preference maximization. Specifically, this paper claims that dealing with monetary decisions brings a set of rules into consciousness that are then followed, and unlike the judge in the legal metaphor, consumers do not actively consider whether the rule should be overridden in a specific case. For example, if the person in the above example, who had to choose between two vacations, one in the near future and one in the more distant future, would forgo the future vacation and choose an immediate getaway because the latter was offered at the same price, the decision maker would exhibit a preference-willingness-to-pay inconsistency, which would yield a lower happiness level. If the only reason the less preferred vacation would have been chosen

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⁷ Complemented by the feeling of a distinct "right" thing to do.
was a general impatience that was applied to this specific case as part of an overarching strategy (unwillingness to pay the same or more for a delayed positive experience), and this principle was used as a rule, the first claim would hold, and the use of such norm-rule in a situation that leads to lesser happiness would verify the second claim. In fact, there are few aids to prevent consumers from applying the rules they have learned or picked along the way in the wrong situations. Like a developing child who learns not to touch a scaring oven, either from a painful experience or through the help of her parents, and sometime later in life she realizes the exception to that rule and learns when it is safe to touch the oven, consumers learn behavioral rules that guide their behavior, but unlike the child, the situations consumers apply these rules are hardly ever as obvious as a cold vs. hot oven, and thus there is little opportunity to learn when the rule should not be applied.

The strategy used to shed light on the mechanism underlying the use of decision rules included several steps. First, one specific rule of consumption was selected. In order to select one consumption rule for in-depth investigation, thirty MBA students were presented with perceptual maps that represented attribute trade-offs for an upcoming website. The attributes included price, product selection, delivery speed, and reaction time. Participants were asked to mark the point that best represented their own preferences, as well as to mark quadrants that represented unbearable or unacceptable tradeoffs, if any existed. They were then asked to write one sentence per such quadrant explaining their decision to mark such areas in the graphs. The goal was to find the most prevalent rule-like explanation for an unacceptable tradeoff. The results suggested that the third quadrant in most graphs (high price and low level of a positive attribute) was marked as unacceptable in over 90% of the cases. However, the most consistent rule-like explanation given (nearly 60% of the cases) was for unwillingness to pay more in order to delay delivery of a product. Note that when one follows a rule or principle, that rule provides a clear and available reason for behavior. It thus made sense to look for such rules in the explanations given for the unacceptable tradeoffs. In order to support the proposed mechanism, one needs to show that behavior follows a systematic pattern that coincides with this selected “rule” (observe behavior), but does not match people’s preferences (measure preferences), and that this happens upon specific rule activation (invocation cue). In fact, it will be argued that money or the act of paying is the cue that
invokes this rule, by showing that it is not medium invariant ("paying" with effort does not invoke this rule). Moreover, one must ascertain that the actual mechanism is rule-following-like in nature. This last property can be investigated through the manipulation of the salience cue, as well as through testing whether careful consideration of the facts in the situation will negate the exclusionary nature of rule based decision making.

The focus of the current work is thus on a rule that asserts that delay of a positive experience should not be paid for. The spirit of this rule is that in most cases delaying positive outcomes is undesirable. Yet, if consumers were to apply this general preference across the board (using it as a rule), they might react negatively to delays even when delays have a positive value for them. Two pilot experiments will demonstrate that, in contrast to most cases, there are instances in which consumers prefer to delay positive experiences. Experiments 1 and 2 will demonstrate a disassociation between predicted preferences and predicted actions (willingness to pay), showing that there are cases in which consumers apply the rule rather than maximize their happiness. Examining the mechanism in more details, Experiment 2 will show that the disassociation between preferences and actions becomes stronger as the rule becomes more salient. Experiment 3 will then demonstrate that it is in fact the thought of monetary payment that invokes the rule, by comparing to alternative modes of payment – willingness to exert effort. Finally, Experiment 4 will demonstrate that the disassociation caused by the need to decide about monetary expenditures occurs because the rule is followed mindlessly, perhaps automatically, and when one carefully considers the situation, the likelihood of choosing the better path increases.

The chosen exemplary rule has two other important characteristics that help to eliminate some of the possible alternative explanations: It provides only a virtual constraint (because its violation does not entail any real cost); it can be applied in simple situations where the cost of thinking is of no concern or importance (thus eliminating mental effort as an alternative explanation).

Pilot Experiment 1

In order to demonstrate that decision makers are not willing to pay for delays, despite the fact they prefer them, one needs to first show that in some instances decision
makers have positive preferences toward delays – in particular, in the case of anticipation. It is assumed that products that generate high levels of anticipation relative to the level of enjoyment from prolonged usage will be valued more when delayed rather than when not. This type of product may be a long awaited one-time positive experience such as a concert, for which the enjoyment from anticipation may be higher than the happiness from recollection. This hypothesized pattern of anticipated happiness should be significantly different from a product that one is impatient to own and delivers high utility levels over time once owned – such as an electronic gizmo. To support this claim, Pilot experiment 1 elicited expected daily happiness for these two products (concert vs. electronic gizmo). The hypothesis was that the temporal patterns of predicted happiness would be different, and in particular that the concert, but not the gizmo will have a large anticipatory component.

Method

Fifty students from a west coast university participated in the experiment as part of a course requirement. Participants were asked to imagine that they have just purchased an item (a ticket to a concert or the latest PDA – a gizmo) and were shown a calendar depicting the next sixty days, with one of three dates marked in bold, one in each condition. The marked dates were tomorrow, two weeks, or one month from today, and represented the actual delivery / consumption time for the given product. This resulted in a six conditions: 2 products (concert vs. gizmo) x 3 delivery / consumption dates (tomorrow, two weeks, or one month) within-respondent design, in which each participant completed six versions of the questionnaire. As the choice was given, participants were asked to report their expected daily happiness (for every day in the calendar, which spanned 2 months) from the experience described to them. Ratings of daily happiness were given on a scale from -10 (unhappy from the experience) to 10 (very happy from the experience).

Results

Figure 1 displays participants’ average expected daily happiness. As can be seen from Figure 1, and consistent with the predictions of the positive value of anticipation for the concert, the expected happiness prior to the experience was higher for the concert than for the gizmo, while the expected happiness after the experience was higher for the
gizmo than for the concert – the interaction between type of experience and happiness period (before / after) was significant \[ F(1,37) = 10.99, p < 0.002 \]. In other words, Figure 1 demonstrates that it was better to have the gizmo earlier, but the same is not true for the concert.

**Figure 1:** Average expected daily ratings of happiness with the experience in Pilot Experiment 1.

Figure 2 depicts a composite measure of the overall expected happiness derived from the reported stream of daily happiness (Figure 1). One may assume that people care about near events more than about far events when they make decisions (time discounting). This means that happiness the next day should be weighed more heavily than happiness one week away, when making choices. The total happiness measure is
thus a summation of exponentially discounted states, as shown in Figure 2, where $V_t$ is the reported expected daily happiness at day $t$, and $\delta = 0.96$ is the discount factor. Such discounting functions give an advantage to near events over far ones. In other words, if people are indeed discounting future events, Figure 2 suggests that participants thought it would have been better to have the gizmo as early as possible, but that the same is not true for the concert.

![Chart](attach://chart.png)

**Figure 2:** Total discounted expected happiness calculated as the total expected happiness, given date of event (sum of discounted averages of normalized daily happiness), with $\delta = 0.96$ discount factor.

**Discussion**

The different configurations of expected happiness validate our hypothesis about the role of anticipation – people would prefer a later date for the concert but not for the gizmo presumably because such a decision raises their (discounted) expected happiness. A more direct analysis (average daily expected happiness and composition measures before and after the event) reveals that for concerts, people expected to be happier before than after it, while the opposite was true for the gizmo. Thus, there exists a class of products (experiences), of which the concert is one example, for which the general rule of
not delaying positive outcomes is unsuitable. In fact, if consumers were to use such
decision rule when making decisions about concert tickets, their actions will not
correspond to their anticipated pleasure and result in sub-optimal choices.

**Pilot Experiment 2**

Pilot experiment 1 was designed to demonstrate that decision makers should
theoretically have preferences for delay in some product categories. Specifically, the
results predicted that people should choose to delay experiencing a concert but not an
electronic gizmo, because enjoyment with anticipation was expected to be higher for a
concert than for an electronic gizmo. Pilot experiment 2 tested this prediction.

**Method**

One-hundred students from a west coast university were approached and asked to
fill a short questionnaire. Participants were asked to imagine that they have just
purchased an item (a ticket to a concert or a gizmo manipulated between respondents)
and were asked about their preferences for delivery / consumption time out of four
possible dates (tonight, tomorrow, two weeks, or one month ahead). This resulted in a
two condition (concert vs. gizmo) between-respondent design. The options for timing
(tonight, tomorrow, two weeks, or one month ahead) were displayed on a two month
calendar, similar to the one used in Pilot experiment 1, and respondents were asked to
indicate the date they desired by circling it on the calendar. In their answers, participants
were asked to ignore their schedule constraints. This request is crucial because
presumably decision makers are more likely to have plans for the near future than to for
the far future. Thus, asking respondents to ignore their schedule constraints was
important in order to get a clearer measure of participants’ preferences for timing.

**Results & Discussion**

As seen in Figure 3, the modal choice for the gizmo was “tonight”, while the
modal choice for the concert was “two-weeks from tonight.” Furthermore, the mean
desired delay for the gizmo was 1.06 days while the mean desired delay for the concert
was 7.25 days \(t(98) = 6.07, p < 0.0001\]. It is interesting to note that for the concert there
were two respondents who preferred to delay the experience by a whole month. Finally,
it is reassuring to note the similarity between Figure 2, the prediction based on
anticipation, and Figure 3, actual choice proportions. The results of the comparison of this calculated predicted total happiness, was similar to the choice pattern of Pilot experiment 1 (r = 0.99 and 0.89 for the concert and gizmo, respectively). Furthermore, this high correlation held for any time discounting level below 0.98 for the gizmo (low discount factors correspond to high time discounting, signifying impatience), and for any discount factors greater than 0.94 for the concert (signifying patience). This comparison supports the existence of a class of experiences, of which the concert is one example, which are preferred to be delayed.

While it seems that generally good experiences are better consumed earlier rather than later, the results of Pilot experiment 2 suggest that consumers sometimes prefer to delay a positive experience in order to experience anticipation (Loewenstein, 1987). In this specific case this preference was caused by the nature of the experience (product). It seems that the concert, but not the gizmo, shifts the balance between immediate gratification and enjoyment of anticipation in favor of anticipation and away from impatience.

![Figure 3: Frequency of desire delay for the two product categories (concert and gizmo) in Pilot Experiment 2.](image.png)
Experiment 1

Pilot experiments 1 and 2 demonstrate that people would rather attend a concert at a later date (as long as it is not too late) and that this preference corresponds to the happiness they expect to derive from anticipating such experiences (Loewenstein, 1987). The next question to ask is whether the contradiction between preference for delay in this specific case (the concert) and the more general rule against paying for delay will cause decision makers to behave in a way that is not consistent with their preferences. This work proposes that when actions such as willingness to pay are concerned, this rule will tilt the scale and decision makers will act (pay) according to the rule and not according to their preferences.

Method

Two hundred eighty-nine students from a west coast university were approached and asked to fill a short questionnaire. Participants were presented with the same calendar as in the pilot experiments, as well as the same concert descriptions (but not the gizmo). The first factor of the experimental design was the timing of the concert: half of the calendars had the concert marked as taking place tonight, and half in two weeks. The second factor was the type of dependent measure respondents were asked to provide: half of the participants were asked for their willingness to pay (WTP), and half were asked for their predicted total expected satisfaction from the concert on a visual analog marked at one extreme as “extremely unhappy, “at the other extreme as “extremely happy,” and at the middle as “indifferent.”” The visual scale was later translated to 21 point scale ranging from −10 to +10. Note there were no negative responses on this scale, and thus the meaningful scale is bounded between 0 and 10. The third factor was whether respondents were asked to provide expected daily happiness (as in Pilot experiment 1) or not (as in Pilot experiment 2). The manipulation of eliciting expected daily happiness was termed “explicit” because it is likely that reporting this measurement would have made the advantages of delaying the concert more salient to participants. This resulted in a 2 (tonight vs. two weeks) x 2 (WTP vs. satisfaction) x 2 (explicit vs. implicit expected daily happiness) between-respondent design.
Results & Discussion

The satisfaction results generally replicated the pilot experiments. Overall, expected satisfaction was higher for the delayed date (mean = 7.05) than for the near one (mean = 5.43), and this difference was statistically significant [t(135) = 3.77, p < 0.001]. The WTP results were in the opposite direction, where overall, WTP was lower for the delayed date (mean = 25.17) than for the near one (mean = 30.42), and this difference was statistically significant [F(1,71) = 5.79, p < 0.02].

Aside from these two main effects, it is interesting to note how the request to provide expected daily happiness measures influenced respondents’ estimates. As can be seen in Figure 4, the total expected satisfaction was clearly influenced by the request to provide daily-expected happiness ratings. In this case, total happiness increased when respondents became more aware that in this special case, there is a benefit for delay [F(1,136) = 4.69, p = 0.032]. On the other hand, the WTP measures were not influenced by the request to provide daily-expected happiness ratings. The results are consistent with the idea that when asked to provide a payment (or a WTP response) the rule against payment for delay may be so strong that even making the benefits from delay more apparent did not change the pattern of the results. Together, the lack of influence of providing expected daily happiness on WTP and its influence on total happiness, create an increased disassociation between preferences and WTP as the awareness of the benefits of delay increase.
In sum, the results of Experiment 1 show that decision makers are not always able to correctly relate their actions (WTP) to their preferences (happiness). Moreover, when reminded of their preferences, individuals display an even greater discrepancy between expected satisfaction with delay and willingness to pay for it – suggesting that increasing individuals’ understanding of their preferences does not free them to act in their best interests. This increased discrepancy because of the performance of a simple prediction task indicates that the preference - WTP discrepancy is not due of a heuristic aiming to minimize cognitive effort, but instead it may be based on a strong behavioral rule — not to pay for delay. If such a heuristic existed and was the cause of the discrepancy, the prediction task should have decreased the discrepancy.

**Experiment 2**

The WTP measure used in Experiment 1 has some drawbacks associated with it. First, WTP responses are bounded from below and unbounded from above. Second, there are concerns about participants’ ability to provide meaningful responses to this type of WTP question (Fischhoff, 1991). To address these concerns, an attempt was made to replicate the results and validate the disassociation results with a choice measure, which
does not have these scale problems. More important, Experiment 2 also tested more directly the idea of rule-based choice by manipulating the saliency of the rule – hypothesizing that as the rule becomes more salient, it will be followed more frequently, leading to a larger disassociation between choices and preferences.

**Method**

The questionnaire used had the same basic concert scenario as in the previous experiments. Two hundred and forty-six students from a west coast university were approached and asked to fill a short questionnaire. The respondents were randomly assigned to one of four conditions: pleasure, WTP, preference, and switching. In all four conditions participants were asked to choose their preferred timing for a concert among three options: ‘tonight’, ‘two weeks from tonight’ or ‘indifferent.’ In each of the conditions respondents were asked to indicate their preference for the timing of the concert via a different dependent measure. One fourth of the respondents were asked which would give them the greatest anticipated overall pleasure, one fourth were asked which they would be willing to pay more for, one fourth were asked which they prefer, and the last fourth were asked for switching choices (changing their ticket from tonight to two weeks or changing their ticket from two weeks to tonight). It was hypothesized that the rule prohibiting payment for delay was least salient in the pleasure condition, more salient in the preference condition, even more salient in the WTP condition, and most salient in the most explicit case – switching. Based on the expected saliency, preference for delay was predicted to be strongest in the pleasure condition, followed by the preference condition, followed by the WTP, with the lowest preference for delay in the most explicit violation of the rule (switching).

**Results and Discussion**

The proportion of participants who chose the concert in two weeks as being more pleasurable (58%) was larger than the proportion of participants who were willing to pay more for that concert (19%) or to pay explicitly for switching to that concert (21%). It was also larger than the proportion of participants who chose that concert as their preferred date (48%), the latter being a nearly even split (Figure 5). The three-level
choice data was analyzed using an ordered probit model, in which each condition was represented by a dummy variable. In this analysis, a negative coefficient represents preference for immediacy (impatience), a coefficient not different from zero represents indifference, and a positive coefficient represents a preference for the delayed concert (patience). The ordered probit analysis confirms that relative to the preference condition, participants were more likely to choose the delayed concert in the pleasure condition ($\beta = 0.355$, $t[382] = 1.86$, $p = 0.063$), but more importantly, participants in the payment condition and in the switching condition were all much more likely to choose the immediate concert ($\beta = -0.446$, $t[382] = 2.38$, $p = 0.017$, and $\beta = -0.531$, $t[382] = 2.08$, $p = 0.038$, respectively). In order to further understand the underlying time preference, for each of the conditions the number of participants who chose to see the concert in two weeks divided by the number of participants who chose to see the concert the same night was calculated. Using this measure, a ratio that is greater than 1 indicates preference for delay, smaller than 1 indicates preference for immediacy, and 1 indicates indifference. The results confirmed our expectations. When respondents were thinking about their pleasure, there was a strong preference for delay (2.07), which was reversed when asked about paying more (0.36) or paying explicitly for switching (0.27). It is also interesting to note that the pleasure dependent measure and the WTP dependent measures were mirror image of each other, while the simple preference question showed an even preference between the two options (1.04). All ratios but the one for the preference question were statistically different from 1 ($p < 0.001$). The preference results could suggest that when asked about their preferences in a generic framing, some decision makers use WTP type of reasoning and others use pleasure type of reasoning when answering. Overall, these results support the “decisions by rules” framework in two ways: First, the results replicate the disassociation between pleasure and payment, and second they show that as the rule becomes more explicit, such as in the switching condition, the disassociation between preferences and action becomes even larger.

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8 In all following analyses, reducing the data to a binary measure by either splitting indifference into the two polar choices or by ignoring it, yields qualitatively similar results, but is statistically incorrect.
**Figure 5**: Proportion of choices for the two timing options and the four dependent measures.

**Experiment 3**

The disassociation between stated preferences and stated WTP observed in the preceding experiments stems from the [mis]use of rules, and in particular, the when it comes to payment, people follow a rule that at times leads them towards an inferior outcome. This discrepancy between participants’ behavior and their best interests may be specific to money (as is currently hypothesized) or may be an artifact of the process of predicting happiness or future actions. One way to answer this question is to elicit preferences without alluding to money. Another proxy for preferences is people’s willingness to exert effort. If people would be willing to exert more effort in order to see the delayed concert, the claim that the disassociation is caused by the need to make a payment would be supported. Conversely, if people would not, then the error lies in their expressed preferences. Understanding the cause of the discrepancy between expressed preferences and WTP in this way may further help in understanding the process by which the current rule is invoked. Experiment 3 was designed to answer these questions.
Method

Experiment 3 replicated the basic question of the concert timing choice (tonight, two weeks from tonight, or indifference), but used three different dependent measures (WTP, happiness, and effort) in a between-participants design. The main dependent measure, as in previous experiments, was a choice of the concert date. In the WTP condition participants were asked which timing option they would be willing to pay more for; in the happiness condition participants were asked which timing option would give them greater overall happiness; and in the effort condition participants were asked for which timing option they would be willing to drive farther in order to purchase the tickets today (driving to buy tickets today was important in order to control for the temporal effect on the perceived effort involved). As in experiment 2, the three possible choices were preference for tonight, for two weeks from tonight, and indifference. One hundred and eighty-four students agreed to answer a short questionnaire.

Results

The proportion of participants choosing each one of the three options (tonight, indifferent, or two weeks) is displayed in Table 1. The main dependent measure was participants' choice from three ordered options, of which choosing to see the concert tonight is one extreme, choosing to see the concert in two weeks is the other, and choosing indifference is somewhere in between, participants' choices were thus subjected to an ordered-Probit analysis, which included dummies for the effect of the different dependent measures levels. The main effect of asking about WTP as opposed to happiness replicated previous findings, and was negative and significant ($\beta = -0.495$, $t[181] = 2.38$, $p = 0.017$). This means that when asked for the concert date for which participants would be willing to pay more, as opposed to the date in which they would enjoy the concert more, participants were much more likely to choose the earlier date than the later one. However, when asking people for the concert date for which they will be willing to drive farther to buy the tickets for, participants exhibited the same amount of patience as when asked about happiness ($\chi^2 (1) = 0.45$, ns.), and when compared to the WTP driven question, participants were, again, significantly more patient and preferred the delayed experience ($\beta = 0.633$, $t[181] = 2.98$, $p = 0.003$).
Table 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tonight</th>
<th>Indifferent</th>
<th>Two Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure</td>
<td>35%</td>
<td>23%</td>
<td>40%</td>
</tr>
<tr>
<td>Willingness To Drive</td>
<td>32%</td>
<td>23%</td>
<td>45%</td>
</tr>
<tr>
<td>Willingness To Pay</td>
<td>52%</td>
<td>29%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Discussion

The results of Experiment 3 suggest that when people choose the amount of effort they are willing to exert in order to gain a future pleasure, they are consistent with their valuation of that pleasure. This consistency, however, does not hold when people think about making payments. The results thus indicate that there is something inherently different about the manner in which people think about money. When participants in the experiment made their choices with respect to their willingness to pay, they followed the rule against paying for delay and made choices that were inconsistent with the expected future benefits, but when they thought about exerting effort, this rule was not invoked, and participants were consistent with their expectations of happiness.

Experiment 4

The results of the previous experiments support the proposed mechanisms by demonstrating that when people make a decision involving monitory payment they follow rules that are invoked by the monitory nature of the decision and are followed in a moral-like manner (i.e. do the right thing as opposed to generate the most “good”). Moreover, people behave in this pattern even when it is not in their best interests to do so – there is no immediate imposing penalty for choosing the outcome that would increase future happiness. Indeed, participants’ reaction seems almost automatic or mindless, as was implied by the theoretical analysis of rule following at the onset of the paper. If this is indeed the case, then asking people to consider the decision more carefully should alleviate the inconsistency between predicted happiness and choices.

Method

Three hundred and thirty seven participants agreed to answer a short online questionnaire. Experiment 4 replicated the basic question of the concert timing choice
(tonight, two weeks from tonight, or indifference), with the two different dependent measures (WTP and happiness). However, in this experiment half of the participants were asked to answer the “first thing that comes to mind” while the other half was asked to answer “after considering the question very carefully”. This resulted in a 2 dependent measures (WTP vs. Pleasure) x 2 thoughtfulness (first vs. careful) between-participants design. The main dependent measure, as in previous experiments, was a choice of the concert date. As in experiments 2 and 3, the three possible choices were preference for tonight, for two weeks from tonight, and indifference. In addition to choices, participants’ decision times were measured as a manipulation check.

Results

The proportion of participants choosing each one of the three options (tonight, indifferent, or two weeks) is displayed in Table 2, along with the average time it took participants to read the question, make their decision, and indicate that decision in each condition. As can be seen from the difference in average time to answer between the conditions, the manipulation of asking participants to think carefully about the decision increased the amount of time they spent thinking about their answer dramatically [F(1,336) = 6.26, p = 0.0128]. This result provides a strong manipulation check because this measure also includes the amount of time participants spent on reading the question, which should not differ across conditions.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tonight</th>
<th>Indifferent</th>
<th>Two Weeks</th>
<th>Decision Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>36%</td>
<td>46%</td>
<td>18%</td>
<td>44.47</td>
</tr>
<tr>
<td>Careful</td>
<td>36%</td>
<td>43%</td>
<td>21%</td>
<td>60.65</td>
</tr>
<tr>
<td>WTP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>41%</td>
<td>24%</td>
<td>34%</td>
<td>48.44</td>
</tr>
<tr>
<td>Careful</td>
<td>26.5%</td>
<td>26.5%</td>
<td>47%</td>
<td>72.42</td>
</tr>
</tbody>
</table>

Similar to previous experiments, participants’ choices were subjected to an ordered-Probit analysis, which included dummies for the effect of the different dependent measures levels. The main effect of asking about WTP as opposed to happiness replicated previous findings, and was negative and significant (β = -0.224, t[336] = 1.82, p = 0.069). This means that when asked for the concert date for which participants would
be willing to pay more, as opposed to the date in which they would enjoy the concert more, participants were much more likely to choose the earlier date than the later one. To test whether the thoughtfulness manipulation influenced the propensity to use the rule, one must estimate the interaction between consideration level, payment, and choice. If this interaction is negative and significant, then people are more likely to follow the rule when they are indicating their immediate, mindless reaction and not when they are considering their choice carefully. Using the same ordered-probit model, the coefficient on this interaction was estimated, and found to indeed be negative and significant ($\beta = -0.333, t[335] = 2.21, p = 0.027$). Participants were more likely to follow the rule when asked about money if they spend less time considering their decision. Moreover, including this interaction rendered the WTP coefficient not different than zero, indicating that the impatience was only observed in the WTP-First condition.

**Discussion**

Experiment 4 merely asked some of the participants to consider their decision carefully within the same paradigm used in the previous experiments. If as suggested earlier, once a rule is invoked consumers follow it without engaging in deep considerations of its appropriateness, one should observe a decline in rule application as decision makers pay more thought to the decision problem at hand. Consistent with this prediction, the results of Experiment 4 demonstrate that the observed reversal in intertemporal choices was not present when participants invested more in their decision process. The coherence displayed is driven by a change in participants’ reaction to the increased consideration of their willingness to pay for the delayed concert, and not because there was any change when they gave more thought to the happiness derived from the delayed concert. In fact, replicating the results of Experiment 1, participants who thought more about the pleasure involved in delaying the concert, were as likely, if not more, to prefer the delayed concert date. The current result further strengthens the support for the implied mechanism, whereby consumers follow a rule when it is invoked, instead of engaging in a deep consideration of the consequences of each choice. Engaging in such consideration enable consumers to realize that following the rule within the current paradigm is neither required nor beneficial. Finally, the fact that participants’ happiness prediction does not differ when they spend but a little time pondering about
their choice is evidence for the simplicity of the task. The ease by which participants arrive at the conclusion that the delayed concert would generate greater overall happiness weakens the support for a heuristic explanation to the pattern of their willingness to pay.

**General Discussion**

The motivation of this work was to demonstrate that individuals sometimes make decisions according to preset rules and not their preferences, and that such a decision-making mechanism may lead them to make decisions that are not in their best interests. Rules are overarching guidelines for behavior that are learned either from experience or from social exchange. Once learned, rules will be followed when they are invoked, and as apparent from the results, may be invoked by cues from the external environment. In particular, the specific rule under investigation is invoked because of the need to make a payment – that is, money invokes a set of rules that guide relevant choices. A set of experiments demonstrated the decision by rules mechanism by showing that there are cases in which people choose outcomes, that are not the outcomes that they prefer, and that this discrepancy is caused by following a rule.

The demonstrations provided were in the context of a rule that prevents paying more for delayed positive experiences. Pilot experiment 1 demonstrated that there are at least some desirable experiences (concerts being one of them) that should be preferred to be experienced later rather than sooner because of the positive value in anticipation. Pilot experiment 2 verified this prediction. This preference for delay was established using both choices and discounted expected future happiness as proxies of preferences. The postulate that this rule against payment for delay implies that people will not be willing to pay more for an experience they prefer delayed was validated in experiments 1 and 2. Experiment 2 provided further support for the proposed mechanism by demonstrating that the magnitude of disassociation was related to the salience level of cues for the specific rule. Experiment 3 demonstrated that when using a different method of expressing preferences, exerting effort, participants did not exhibit the predicted action – preference inconsistency, but in fact, were very consistent in their preference of the
delayed concert. This result supports the contention that money is the invoking cue for the rule prohibiting payment for delay; and that, absent that cue, participants were consistent with their preferences. Moreover, this invocation procedure provides further evidence for the suggested rule-based mechanism of decision making. Finally, Experiment 4 demonstrated that people apply the rule mindlessly instead of engaging in through consideration of the consequences of their decision. When they do think more carefully about the decision problem at hand, they are more likely to realize that the immediate concert is not worth more, and override the rule.

The mechanism of following decision rules when making choices has several characteristics that are different from other mechanisms. It is perhaps important to note the specific aspects of the results that are consistent with rule following as a decision making mechanism and may differentiate the current pattern of results from alternative mechanisms: The main effect, the reversal of intertemporal choices when deciding about money, disappears when the cost is non-monetary (effort), consistent with money being the invoking cue for the rule under investigation. Moreover, the effect is amplified by making the fact one is paying for delay more salient. Finally, deep consideration of the decision problem lessens the effect of the rule, suggesting that the rule is applied automatically or at least mindlessly, as predicted above.

Other decision making mechanisms, such as heuristics or optimization generally do not depend on a cue for activation and are not overruled by simply asking for careful consideration. Furthermore, rules are applied almost mindlessly when invoked rather than as a carefully considered best response to the situation. Once more thought has been put into solving the problem, consumers are able to override the rule, and are less likely to follow it, if, as in the current paradigm, it is indeed not their best response. However, thinking less about the decision does not change the choice of the delayed concert in the happiness condition, pointing to the simplicity of the task and undermining the view that because of an accuracy-effort tradeoff a heuristic was used to determine willingness to pay. It does not seem to be effortful for participants to realize the advantages offered by the delayed concert.

Decisions mechanisms such as “decisions by rules,” provide a refreshing perspective on the ways in which individuals carry out their decision policies. Decision
theorists have largely assumed that people make decisions according to a set of preferences. Such views imply a search for at least a local optimum, or for a close enough estimate when exact algorithms are too costly (use of heuristics). The current work suggests that this is not always the case – decision makers sometimes do not try to consider the best alternative according to their preferences, but rather act upon pre-imposed decision-rules that are based on moral or social norms and on behavioral guidelines (see also Prelec, 1991; Prelec & Hernstein, 1991; Ainslie, 1992; March, 1994; Hsee et al, 2003).

A related perspective on the analysis of decision making has been coined reason-based choice (Shafir et al. 1993). According to this view, people rely on reasons to justify choices, especially in the face of conflict, and sometimes even search for them when the reasons are not obvious – “people search for a compelling rationale for choosing one alternative over another”. While reasons and rules can be considered close relatives, there are some important differences. Perhaps the most prominent is the hierarchical asymmetry: rules can provide and function as reasons, but reasons seldom become rules (but see Raz, 1975 for an in depth discussion on a hierarchy of reasons, some of which may be used as the rules defined in the current context). Moreover, while the study of choice from the perspective of reasons sheds light on similar issues, the source of the reasons is not always clear ex-ante. Another difference lies in the hypothesized process. The current investigation demonstrates that rules are used on the fly at a low level of thoughtfulness. The analysis of reason-based choice envisions an elaborate process of weighting and comparing reasons pro and con for each available choice alternative. Finally, the situations investigated in the current work do not lend themselves as naturally to a reason-based process, but nevertheless the use of rules would certainly provide easy ex-post reasons to explain the choices participants made.

Other Decision Rules

The decision by rules perspective that making decisions according to pre-existing rules is a general mechanism used to guide decisions in day-to-day life. A few examples of such rule-based behavior might be found in domains such as: 1) moral - taking home company office supplies is ok, while taking money from the petty cash box is prohibited;
2) volunteering - people are more likely to volunteer outside their professional domain than within it; 3) purchasing - coupons are acceptable price discrimination but online price discrimination is not (such as in the Amazon case Rosencrance, 2000); 4) negotiations - people offer and expect more than the equilibrium divisions in ultimatum games (see Roth, 1995 for a review; Frederick, 2002); 5) etiquette - holding the fork in one's left hand is correct even if it is not comfortable; 6) valuation - making choices according to perceived monetary value as opposed to true preferences (Hsee, 1999; Hsee et al., 2003); 7) interpersonal relations - people find it objectionable to pay others to smile or be nice to them, and also prefer paying a babysitter not in front of their children.

This latter rule can be generalized into the idea that it is considered immoral to pay directly for relationships. The most obvious example of this rule is the moral reprehensibility in paying for romantic relationships. Other examples suggest that it is inappropriate to buy friends, or hire people to give one compliments. To demonstrate this rule within the decisions by rules framework, one additional experiment was carried out. One hundred and forty-six students from a west coast university were presented with a store choice, in which stores differed on the level of service they provide and on the extent to which the framing of the premium for service in each store was likely to invoke the PFR rule. The central question is whether willingness to pay the service premium will depend on the salience of paying for service (relationship). The prediction was that although individuals would be willing to pay implicitly for service (prefer a store that is more expensive only because it offers better service), their willingness to pick that store would diminish as the payment is framed more explicitly as payment for service. The argument is that paying directly for service violates a rule much like paying people for a smile or for greeting you.

The respondents were asked to assume they were going to purchase a TV, for $500 and were asked to choose their preferred store out of two possibilities. Participants where randomly assigned to one of three conditions in which the saliency of the PFR rule-invoking cues were manipulated. In the bundled condition (low-salience) respondents were given a choice between store A that had average price and average service, and store B that had better service but prices that were 10% higher. In the mid-salience condition respondents were given a choice between the same store A, and store
B' that had better service but charged 10% commission for their service. In the high-
salience condition respondents were given a choice between the same store A, and store
B'' that had better service but with a service charge of $50 paid at checkout directly to the
salesperson. Note that in all three conditions, the store with the high quality service (B,
B', and B'') entailed an identical premium but different framing of the payment for
service.

As hypothesized, the proportion of participants who chose the expensive-high
quality-of-service store was 57% in the low-salience (bundle) condition, and 28% in the
high-salience condition [t(93) = 3.03, p < 0.004]. The proportion of participants who
choose the expensive store in the mid-salience condition was between the other two
conditions (41%). These results demonstrate that decision makers have a rule of not
paying for relationships even when the relationship is as simple as service at a store.
These results provide additional support to the idea that the more salient the rule is (as the
payment gets more implicit), the more likely are decision makers to follow it. Finally,
this experiment illustrates that masking the conflict caused by the decision rule (by
bundling for instance) yields choices that are more aligned with preference and are thus
normatively better. It is important to note that when respondents were asked about their
preference, they had no difficulty in providing an answer – suggesting that in the cases of
WTP when the rule was involved, respondents did not ask themselves what they prefer
and instead just followed the rule.

**Rules & Heuristics**

The mechanism of using rules has some resemblance to the use of heuristics, but
also some important differences. Expressing the similarities and dissimilarities between
rules and heuristics will help us better define these rules. The first point of comparison
concerns the goal of the heuristics / rules. Heuristics are procedures used by decision
makers to limit the amount of information processed or the complexity of the ways in
which it is combined (Frederick, 2002). As such, heuristics are useful for simplifying
computations under uncertainty, when cognitive resources are scarce, or when full
computation is infeasible. Heuristics such as elimination by aspects (Tversky, 1972), and
representativeness (Kahneman & Tversky, 1982) are examples of such mechanisms. The
rules investigated here are different because they do not describe a computational approach. Instead, these rules provide “do and don’t do” action plans – that are not meant to simplify decisions but rather to enforce certain conventions.

The second point of comparison between heuristics and rules concerns the “rationality” or ecological validity of using heuristics / rules. When examining various mechanisms that underlie behavior, there seem to be two types of preference-behavior inconsistencies, referred to here as “rational” and “irrational” violations. “Rational” violations of preferences occur when the benefits of following the rule or heuristic outweigh the possible cost of utility loss, and thus form an acceptable tradeoff. For example, when the cost of thinking about a problem is high, using a simplifying heuristic that saves the decision maker a lot of time might be rationally desirable and useful as a general approach (most heuristic-related violations are of this type). There are multiple examples of such violations in the literature; perhaps the most notable is the accuracy-effort tradeoff framework (Payne, Bettman, & Johnson, 1993). In contrast we hypothesize that rules are related to “irrational” violations, in which the sacrifice of utility cannot be explained by effort-benefits considerations. If such cases exist, they will be ones in which it is easy to realize the best choice, yet decision makers do not engage in such realization, and instead follow their decision-rules. For example, Prelec (1991) argues that when it is very tempting to make a suboptimal decision, because of temporal, saliency, or scale mismatches, decision makers are more likely to resort to using rules in order to make the globally correct choice. According to this view, rules do not necessarily simplify the decision because the decision maker must contrast the long-term benefits of the rule with the short-term benefits of not following the rule, in the case of a temporal mismatch, for example. However, this view requires that the consumer understand and be aware of the two competing strategies of following rules and of following local preferences. The current research suggests that at least in some instances consumers do not exhibit this distinction and instead follow a rule if and only when it is invoked, and thus differs on the particular definition of a rule. Similarly, consider a choice between an option that is a “better deal” (e.g. two products cost the same, but one had a higher original price) and one that provides higher personal utility (e.g. the product that is liked more). The decision maker should naturally choose the option that generates greater
overall pleasure, hence the “worse deal” option. However, the mere framing of one option as a better deal changes consumers’ likelihood of choice in favor of that option (Hsee, 1999). In this case, a choice of the better deal option implies decision makers follow the “value seeking” rule rather than their own preferences (for a detailed treatment of this rule, see Hsee, 1999; also Hsee et al., 2003). Thus, the two different mechanisms - heuristics and decision-rules - have different goals and are called into action in different types of situations. Unlike heuristics, rules will be used for guiding decision making even when the complexity of the task is trivial, and when there is no need to do so. In other words, people follow decision rules even though there are no repercussions from not doing so. Moreover, the current argument proposes that such rules will be followed even when they directly conflict with the preferences of the consumer. As is apparent from the literature, using personal rules or decision rules as a general mechanism yields many advantages on a personal level as well as on a social level. Nevertheless, using rules also carries disadvantages. Investigating the drawbacks and pitfalls of using rules, similar to heuristics, enables one to learn about the properties of the underlying mechanism.

Limitations

All of the experimental evidence represented aggregate results of individual decision making. It is not unlikely that the propensity to follow rules and the rules themselves differ across individuals. The current investigation did not deal with these issues.

The specific choice of the decision rule at the center of this investigation does not naturally lend itself to a moral metaphor as the rule used in the above example (not to pay for service in a store). However, the current view is based on the analogy to the moral decision process as one which is determined by the knowledge of what ought to be done, and as a rule commands a generality which leads to the demonstrated disassociation from the consequentialist view. It is therefore the broadness of the rule analogy that empowers the demonstrated findings.

In sum, while it is generally considered that decision policies reflect preferences,
the type of decision mechanism proposed here — rules — is more akin to personal
guidelines people follow as a consequence of basic norms or beliefs (Prelec, 1991; Prelec &

Future Research

Investigating the underlying mechanism by manipulating the salience of the rule
invoking cues, as in Experiment 2 and 3, is one type of evidence for the idea that
decisions are sometimes an outcome of a set of rules rather than a direct reflection of
preferences. A different type of evidence for the use of rules in making decisions could
be based on pre-situational factors, factors that manipulate the overall tendency of
individuals to follow rules instead of overriding them and following their preferences.
Such manipulations may be attained by priming participants with hedonics, such that they
realize the rule should not be followed in the specific case. The following experiment
was designed to be an initial test of this presumption.

One hundred and forty-five undergraduates at an east-coast university participated
in the experiment in return for candy. The design was a 2 (hedonic priming vs. no
priming) x 2 (WTP vs. happiness) in a between-participants design. The main dependent
measure, as in experiments 2 to 4, was a choice of the concert date. In the WTP
condition participants were asked which timing option they would be willing to pay more
for. In the happiness condition participants were asked which timing option would give
them greater overall happiness. As in previous experiments, the three possible choices
were preference for tonight, for two weeks from tonight, or indifference. The central
manipulation took place just before completing the choice task. In line with the three
priming conditions, one half of the participants were asked to write about their
experiences when eating their favorite foods or when having a full-body massage, while
the others proceeded directly to the choice task.

The main dependent measure was participants’ choice from three ordered options,
of which choosing to see the concert tonight is one extreme, choosing to see the concert
in two weeks is the other, and choosing indifference is somewhere in between (choice
proportions are displayed in Table 3). Similar to experiments 2 to 4, participants’ choices
were subjected to an ordered-Probit analysis, which included dummies for the effect of the WTP measure and for the priming manipulation. Recall that in this analysis, a negative coefficient represents preference for immediacy (impatience), a coefficient not different from zero represents indifference, and a positive coefficient represents a preference for the delayed concert (patience). The main effect of the dependent measure replicated previous findings, and was negative and significant ($\beta = -0.706$, $t[141] = 4.21$, $p < 0.001$). This means that when asked for the concert date for which participants would be willing to pay more, as opposed to the date in which they would enjoy the concert more, participants were much more likely to choose the earlier date than the later one.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Tonight</th>
<th>Indifferent</th>
<th>Two Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition – Priming</td>
<td>Pleasure</td>
<td>WTP</td>
<td>Pleasure</td>
</tr>
<tr>
<td>Hedonic</td>
<td>26%</td>
<td>20%</td>
<td>9%</td>
</tr>
<tr>
<td>None</td>
<td>27%</td>
<td>53%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Examining the effects of the priming manipulation showed that hedonic priming had a significant positive effect on participants’ choice of dates, relative to the control where there was no priming manipulation ($\chi^2 (1) = 6.70$, $p = 0.009$).

The decisions by rules mechanism proposed in this work suggests that in some cases decision makers do not consider their preferences but instead make their decisions according to decision rules that are invoked by the decision situation, unless the invoked rule is overridden. This experiment was designed to test whether pre-situational factors, such as an increased awareness to the hedonic needs, can influence whether individuals will make choices that are rule-compatible rather than preference compatible. The experiment adds to the results of experiment 2 and 3 by demonstrating that following such rules is not only a function of their invocation saliency or cue but also their likelihood to be overridden by hedonics, for example. The results showed that participants primed with hedonics were less likely to apply the rule and prefer the delayed concert. The topic
of rules override is one that deserves further investigation and is beyond the scope of this research.

The current research leaves some open questions for future study: What other rules are there? What is the process by which these rules emerge? What are the individual and cultural determinants of such rules (see also Fiske, 1992; Fiske and Tetlock, 1997)? Are these rules specific to exchanges with money or do they extend to non-monetary exchanges? What characterizes the set of rules that are invoked by money? It is also interesting to ask what is the origin of rules such as the one against paying for delay. It is possible that this rule stems from the need for immediate gratification. From a developmental perspective the human ability to anticipate develops at a later stage than the need for immediate gratification. It is interesting to note that an extensive literature on delay of gratification finds that the ability to delay gratification is positively related both to developmental level and to surrounding social habits (Mischel, et al, 1989). When considering this, it is especially interesting to uncover the point at which money steps in and dominates action considerations. Finally, it is interesting to ask whether there are ways in which individuals can overcome the rules and behave according to their preferences. Regarding this last question, it is possible that being mindful (see Langer, 1989) of the different rules might allow consumers to ignore them at the time of action or to pre-commit to ignoring them ex-ante. Some theorists believe that violating a rule can be a slippery-slope to their demise (see Ainslie, 1992, for a review) while others believe that such violations can be highly informative to the decision maker about her own persona (Prelec, 2003). It may be the case that some types of rules present the former case and others the latter. Resolving this dilemma is at the heart of understanding the use of rules in guiding behavior.
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Task Partitioning:
The Effect of Progress Information on Effort and Motivation

Abstract
A large part of human behavior is directed toward achieving end-goals. This work investigates the influence of partitioning progress toward end-goals into stages on motivation, effort, and preferences. In particular, we suggested that certainty about progress towards an end-goal would increase motivation, and that partitioning would have a positive effect under progress uncertainty, but negative under certainty. The latter claim follows from the relative constancy of the total motivating power of an end-goal. Two experiments with human participants validated these claims, by demonstrating that partitioning a high uncertainty environment by providing discrete progress information improved performance and liking of a task, whereas the reverse was true under certainty. The results held when partitioning was implicit as well as when explicit information was provided. These effects contradict the view that adding more feedback, positive reinforcement, or information can only improve performance and liking of a task, as shown by individuals' inability to predict these effects (Experiment 3).
A large part of human behavior is directed toward achieving end-goals. A few examples of such end-goals are climbing mountains, developing relationships, saving money, running a marathon, and getting a promotion at work. In such cases, the path to achievement is not always rewarding by itself (that is, individuals will not engage in the path if it would have not lead to the end-goal), and the reward value is derived from reaching the end-goal. In mountain climbing for example, many mountaineers report that the daily experience is miserable, yet reaching the peak provides meaning, satisfaction (see Loewenstein 1999).

When examining such end-goal tasks, some seem to be composed of a single prolonged event (running a marathon, saving money), while others seem to be composed of multiple components (climbing a mountain, becoming a professor). It is this distinction between single-continuous paths and multiple-partitioned paths toward end-goals that is the center of the current work. In particular, we investigate the effects of partitioning on preference, motivation, and effort.

Recent work on hedonic retrospective evaluations (Ariely & Zauberman 2000) and on experimental games (Andreoni 1988; Croson 1996), suggest that partitioning strongly influences the ways in which individuals perceive and react to partitioned experiences. In term of hedonic evaluations, it was demonstrated that experiences such as annoying sounds or stock markets performance are perceived in a manner that depends on their trend (Loewenstein & Prelec, 1993) when the experiences are cohesive, and are less so when the experiences are partitioned (see also Ariely & Zauberman forthcoming). When people play games in experiments that seems as a long string of games against an opponent, their strategies evolve over time as a reaction to that opponent. However, if arbitrary break points are introduced, individuals “reset” their strategies at those points (Andreoni 1988; Croson 1996). These results provide analogies to the pursuit of end-goals – we propose that running a marathon when it is perceived as a single even might be very different from running a marathon that is divided into ten components.

Humans are not alone in their pursuit of end-goals, and in fact most of the research on animals involves action toward an end-goal such as food or water. In general, partitioning a task by providing information about progress made, was found to decrease both effort and choice likelihood. For example, Duncan & Fantino (1972)
provided pigeons with signals in the form of light indicators as they were getting closer to their goal. Conditions differed on the number of lights on the way to reward, while keeping the overall length of the task constant. The results showed that the pigeons demonstrated robust preference for the less partitioned task.

Would (and in what way) partitioning influence human motivation and effort when partitioning provides only information about the relative distance to an end-goal? Based on the research outlined above, we expect the general answer to be yes. Our proposition is that partitioning can create sub-goals, which can have reward value in and of themselves – as they provide a sense of goal completion. However, we expect that the effect of such sub-goals on behavior is going to depend on additional information presented in the task. Specifically we propose that when information about progress is limited, information about sub-goals and their completion would increase motivation and effort. On the other hand, when there is ample information about progress, information about sub-goals and their completion would decrease motivation and effort.

The intuition for this prediction is based on two propositions: The first is that expected reward generates more motivation when the certainty about progress is higher. The second is that the total amount of motivation given a certain reward and required effort is relatively stable (Rescola & Wegner, 1972; Miller, et al. 1995), which means that adding sub-goals can decrease the motivating influence of the end-goal (as was evident in the pigeons work mentioned above). Together these propositions provide the following hypotheses (Figure 1):

H1 – As certainty about progress relative to an end-goal increases so will motivation.
H2 – When there is uncertainty about the progress relative to an end-goal, partitioning will increase motivation.
H3 – When there is certainty about the progress relative to an end-goal, partitioning will decrease motivation\(^9\).

\(^9\) Note that this hypothesis suggests a violation of rational thinking whereby more relevant information can decrease performance.
The first experiment investigates this paradigm using people as participants, money as the primary goal, and task partitioning as progress information. The second experiment extends the examination to a more complex task involving accuracy as well as effort, with explicit rather than implicit environmental cues (progress information and partitioning). The third experiment tests people’s ability to predict the abovementioned effects. The paper concludes with a discussion of the results as well as practical implications.

**Experiment 1: Gold mining**

**Participants**: 95 Participants, mostly students from the Boston area, were recruited through ads and public announcements. Participants came to a computer lab, seated at individual terminals, and randomly assigned to one of the four conditions. They were given instructions by the computer, and when indicated, started playing the game. Participates were paid a sum between $0.11 and $36 depending on their performance.

**The task**: A computer program called “Gold Miner” was created for this experiment. The program introduced participants to their character: a gold miner (a small red circle initiated at the leftmost of the screen), and informed them that the miner has to get to the gold mine (a blue rectangle on the rightmost side of the screen) so that participants could earn money from the gold mined. Participants were informed that the
faster they get to the gold mine the greater their reward would be. In order to move their miner participants had to click the keys “z” and “m” in sequence repeatedly, each sequence would move the miner one step (the entire length of the task was 243 such steps). Once they reached the goldmine, respondents were informed about their reward for the trial and were presented with a choice of whether to participate in another round or whether to terminate, get their total payoffs and leave. The different conditions in the experiment were manipulated by changing the terrain (bridges and tunnels) that the gold miner had to travel (see Figure 2).

![Diagram of different conditions](image)

Figure 2

**Design:** The experiment consisted of four conditions in a between participants design. The conditions varied on two dimensions: whether they had stages (partitioned) and on the amount of information participant had about their location relative to the goldmine. In the no information condition, participants had no information about how far along they were until the goldmine was reached. In the stages condition, the task was divided into quarters, and participants were informed when they completed each quarter of the path. In the full information condition, participants knew exactly how much progress they have made at any point in time. Finally, in the full information with stages
condition, participants knew exactly how much progress they have made at any point in time and in addition they were informed on completion of each quarter of the path.

**Dependent measures:** The main dependent measure was performance (effort), measured by the amount of time each participant needed to complete a trial. An additional measure was the attractiveness of the task, as indicated by the number of trials each participant chose to play. Finally, the momentary effort was be measured by the rate at which participants clicked the two keys.

**Results:** Participants completed a total of 548 trials across the four conditions. The main dependent measure was the amount of time participants spent on each trial. This measure corresponded to the size of the reward participants received for each trial, such that a shorter time was linearly related to higher payoff. The average time for each trial, in the four conditions (Table 1) was regressed on dummies for stages, information, trial number and their interactions\(^\text{10}\). The analysis revealed a main effect of information as improving performance \([t(542) = 3.59, p < 0.001]\). However, as predicted adding stages to the no information condition improved performance dramatically \([t(225) = 2.577, p = 0.0106]\), but the reverse is true for the full information condition, where adding stages hindered performance \([t(319) = 4.196, p < 0.001]\). This was evident by a significant interaction between stages and information state \([t(542) = 3.68, p < 0.001]\).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Time (seconds)</th>
<th>Number of Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full information</td>
<td>50.8</td>
<td>9.32</td>
</tr>
<tr>
<td>Full with stages</td>
<td>58.3</td>
<td>4.37</td>
</tr>
<tr>
<td>Stages</td>
<td>54.7</td>
<td>7.07</td>
</tr>
<tr>
<td>No information</td>
<td>59.2</td>
<td>3.31</td>
</tr>
</tbody>
</table>

Then number of trials played by participants in each condition (Table 1) was regressed on condition dummies as well as on participants’ previous payoff (controlling for the individual performance in the previous trial), in order to get a proxy for how enjoyable participants found the experience. The analysis reveals that participants found

\(^{10}\) There was no difference between the effect of trial number on performance between conditions (interactions between trial number and conditions were rejected by specification tests), thus observations within each condition are treated as independent in analysis of mean times.
the full information condition most enjoyable, followed by the stages condition, followed by the full information and stages condition and the no information condition. All of the differences between conditions but the one between the last two (full information and stages and no information) were significant at the p < 0.03 level or higher. The effect of performance in the previous trial was negative and significant as expected [β = -0.029, t(349) = 2.57, p = 0.011].

The results also allow an analysis of the momentary effort and clicking rate. One obvious pattern is that participants began with an initial vigor, and then remained in a lower pace. However most important to the current predictions, participants in the two conditions with stages reacted to the stages in two opposing ways (Figure 3). While participants in the Stages condition regained some vigor at each stage transition, their counterparts in the Full information and stages condition dismay and slow down at each stage transition. Participants in the no information condition were the least stable in their effort, and those in the full information were the most unvarying.

![Click Delay - Standardized](image)

**Figure 3**
A regression analysis of the momentary click delay data on the period of transition between stages and the short period thereafter reveals a significant difference between the effects of moving from one stage to another in the different conditions. While there is no significant effect in the other conditions, the effect in the Stages condition is negative (faster click rate) and significant [β = -0.029, t(∞) = 1.81, p = 0.071], while in the full information with stages condition it was negative but not significant [β = -0.023, t(∞) = 1.37, p = 0.17]. This result demonstrates that advancing from one stage to another motivates participants to increase effort more when there was less information. Figure 4 depicts the difference in click delay times between the two conditions with stages. As can be seen, consistent with the previous analysis, the effect of transitioning from one stage to the next gave a greater spunk to participants in the stages condition then to those in the full information with stages condition.

![Figure 4](image)

**Figure 4**

**Discussion:**

The results of Experiment 1 showed that in line with hypothesis 1, providing more information increased performance and liking of the task. Furthermore, inline with hypothesis 2, providing participants with progress information in the form of task
partitioning improved performance and liking of the task, however, inline with hypothesis 3, providing the same information when there is little uncertainty about progress decreased both performance and liking for the task. This interaction between partitioning and information state was predicted on the basis of the notion that the task stages will be reacted to as sub-goals and will subtract from its reward value. The analysis of momentary effort verifies this effect: while the effort levels increased in the transition to the next stage in the stages condition, they decreased in the full information with stages condition, relative to the full information condition. Participants appear to have relaxed or perhaps taken a breath whenever they finished a stage when in a state of little uncertainty and sub-goals.

**Experiment 2: Target practice**

Experiment 1 demonstrated that human participants reacted to task partitioning not unlike pigeons. Two questions emerge from these results: do these results generalize to tasks that involve more than just sheer physical effort? Will this pattern of results remain even when cues are stated explicitly? Experiment 2 was designed to address these questions as well as to replicate the findings of Experiment 1.

**Participants:** 170 Participants, mostly students from the Boston area, were recruited through ads and public announcements agreed to participate in an eye-hand coordination study.

**The Task:** A computer program called “Target practice” was created. The main game consisted of a blue dot, controlled by the participants using the keyboard arrows, and a large red circle moving slowly in random directions on the screen. The goal was to bring the blue dot to the center of the red circle, and maintain it there as long as possible, while the red circle continues its movement. Every second that the dot spent at the center counted as a hit (a red signal at the upper right corner of the screen flashes), and participants were one step closer to the end of the game. Participants were informed that the faster they get to the end of the game the greater their reward would be. Unknown to participants, the game consisted of 100 such steps. At the end of each trial, participants were shown the running sum of earnings, and asked whether they wished to play again, up to a maximum of ten trials.
Design: The experiment consisted of six conditions in a 2 partitioning (stages or no stages) x 3 information state (probabilistic, deterministic, or full information) between participants design. The deterministic conditions provided no progress information, and the probabilistic conditions were similar but the length of each stage was a function of performance with an expected value of twenty hits. In the full information conditions, a label displayed the hit counter in the form of percentage completed (from 0% to 100%). When partitioned, all conditions displayed a label at the lower right corner of the screen stating the current stage number, and participants were told in advance that the game had five stages.

Dependent measures: The main dependent measure was overall performance\(^{11}\) (length of trial in seconds), which corresponded linearly to payoffs. An additional measure was the attractiveness of the task, as indicated by the number of trials each participant chose to play.

Results: Participants completed a total of 873 trials across the six conditions. The main dependent measure was the amount of time participants spent on each trial. The average time for each trial is presented in Table 2.

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Similar to Experiment 1 the effect of adding stages to the task depended on their relative information value (Table 2). In the probabilistic condition without stages – the least informative condition, the average trial time was longer than the one with stages \([F(1,238) = 3.6, p = 0.059]\), that is, stages helped, whereas in the full information conditions, adding stages decreased performance \([f(1,314) = 9.986, p = 0.0017]\). In the deterministic conditions the effect of adding stages was positive, yet not significant.

\(^{11}\) Note that in this game, the momentary effort cannot be measured by the rate at which participants clicked the keys because a more accurate response requires fewer key strokes.
[F(1,315) = 1.627, p = 0.203]. This pattern of results leads to a significant interaction between stages and the information state [F(2,867) = 5.619, p = 0.0038], that is, stages improve performance when there is little information, but degrade performance when information is abundant.

**Discussion:** The results of this experiment replicated the main findings of experiment 1. In particular, partitioning a task using progress information may either improve overall performance (if progress information is scarce) or degrade it (if progress information is plentiful). The results further generalize the findings of Experiment 1 to a more complex task, one that involves accuracy in addition to sheer effort. Moreover, while the progress cues and the full information feedback in Experiment 1 were all implicit (background colors and seeing vs. not seeing exact position), the current manipulations were all explicit (displaying stage numbers and exact percentages of progress), suggesting that the results are not limited to non-conscious cues, and may be more relevant.

**Experiment 3: Antique dealers**

The results of experiments 1 and 2 suggest that unlike the common perception, adding positive reinforcements in the form of task progress information may decrease overall performance, even when the cues are explicit and salient. An interesting question is whether people understand the conditions under which partitioning hinders performance. Experiment 3 attempted to answer this question.

**Participants:** 60 MBA students at a major east coast university participated as part of a class requirement.

**The task:** The assignment was a hypothetical replication of Experiment 1, but in a different context. Pencil and paper surveys described a situation in which four antique dealers needed to walk to an auction house, because their cars broke down. The auction house received daily fresh stock and sold it, such that the earlier the antique dealers would get to it the higher the likelihood of getting more items and a larger profit.

**Design:** A pencil and paper survey consisting of four conditions in a within participants design was conducted. The conditions were equivalent in nature to those in Experiment 1, and participants’ task was to predict the effort levels exerted by people in
such conditions. The four conditions differed in the road the dealer had to traverse. Similar to Experiment 1 (Figure 2), in one condition (*No information*) the road was not marked and had no intersections; in the second condition (*Stages*) the road was not marked but consisted of three intersections, at the quarter, middle, and three-quarters of the distance (similar to the stages of Experiment 1); in the third condition (*Full information*), the road was marked every ten yards (because of an annual Marathon run a week before) but had no intersections; and in the fourth condition (*Full information and stages*) the road was likewise marked, but also consisted of the abovementioned intersections. In all conditions the dealer was not familiar with the road, but had a rough estimate of the overall distance.

**Dependant measures:** Participants were asked to estimate the speed in which the dealers would traverse the road at each sixteenth part of the road. Participants rated the walking speed sixteen times for each of the four dealers, after being told that the average walking speed of a typical antique dealer is 4mph.

**Results:** The estimated walking speed data was subjected to a 2 (information state) by 2 (stages state) ANOVA analysis. The results indicated that while participants do not perceive an overall effect of information \( [F(1,56) = 1.638, p = 0.206, \text{ ns.}] \), nor an interaction between stages and information \( [F(1,56) = 0.03, p = 0.864, \text{ ns.}] \), they do predict a strong positive effect of stages on speed (and overall payoff accordingly) in both states of information \( [F(1,56) = 28.357, p < 0.001] \).

An analysis of the individual cells reveals two predicted effects in addition to that of stages. Participants predicted that the dealers would get tired and slow down as the task progressed, but also that at the last quarter, towards the end, all four dealers would have regained their vigor, and would increase their effort and walking speed (Figure 5).
Similar to Experiment 1, one can ascertain the predicted impact of advancing from one stage to another in the four conditions by regressing the momentary speeds on the transition point between two stages and the step after it. Doing so reveals that participants predicted only transitions in the *stages* condition to have a marginally significant positive effect ($[\beta = 2.175, t(11) = 2.05, p = 0.065]$) and the rest to have no significant effect.

**Discussion:** Unlike the results of Experiment 1, participants expected stages to have an all-positive effect, and information to have a small positive non-significant effect. Participants’ predictions were thus incorrect on both accounts. They did not realize the positive impact of progress information, but also, appeared to value partitioning information in any case. This intuition was contradicted by the results of experiments 1 and 2\(^\text{12}\).

\(^{12}\) In addition, they were only correct in their prediction of a vigorous beginning, but they overestimated the effect of the ending — perhaps because in experiments 1 and 2 participants actually get tired.
General discussion

The goal of this work was to investigate the influence of partitioning progress toward end-goals into stages on motivation, effort, and preferences. In particular, we suggested that certainty about progress towards an end-goal would increase motivation, and that partitioning would have a positive effect under progress uncertainty, but negative under certainty.

Two experiments with human participants validated these claims. Experiment 1 demonstrated that partitioning a high uncertainty environment improves performance and liking of the task, whereas the reverse is true for a low uncertainty - high feedback environment. Partitioning a certain environment using progress information decreased both performance and liking of the task. These effects contradict the view that adding more feedback, positive reinforcement, or information can only improve performance and liking of a task. Experiment 2 replicated these results, and extended them in two ways. First, the results persisted even when the task was more complex and involved accuracy as well as sheer effort. Second, the same pattern of results emerged even when the manipulation of task partitioning, feedback, certainty, and information in the environment were made very explicit. Finally, Experiment 3 tested participants' ability to predict behavior under conditions equivalent to those in Experiment 1, and found that people were not able to intuitively predict these effects.

There are several documented reasons for organism's willingness to exert effort in a task to be non-monotonically related to rewards or reinforcements (Duncan & Fantino, 1972; Festinger & Carlsmith, 1959; Killeen, 1982; Korman et al., 1981; Miller et al., 1995). This research extends some of these principles to human behavior. In particular, this research suggests that people treat stages of a task similar to the ways pigeons react to secondary reinforcements - partitioning may dilute the overall appeal of the primary reward or end goal. Moreover, this dilution influences both performance in a task and enjoyment derived from fulfilling it, and thus, subsequent choice. Interestingly, one may also reverse the direction of the analogy and deduce that pigeons seem to have acted in a full-information environment to begin with. This may be due to the nature of the task, the nature of pigeons, or an inherent difference between humans and pigeons.
The implications of the current findings are straightforward. In planning a task or an incentive scheme, one should make sure that providing progress information does not decrease the overall appeal of the task. The sign of the effect would be a function of the relative information and feedback in the task environment. However, as demonstrated in Experiment 3, absent experience, people may ex-ante undervalue a non-partitioned scheme and not choose it.
References


## Appendix A

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Log Likelihood: -443.380, -437.979, -432.205, -417.272, -416.369, -409.263