

The Sunk Cost Effect: (De)-Escalation as a Regret Avoidance Behavior

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A common theme in the psychological literature on human decision processes is the failure of orthodox economic theory to predict correctly how people make decisions. Many economists would respond that their framework is intended to explain a more limited domain of decisions, that perhaps people are not cool utility calculators when it comes to matters of the heart, but they are more so when it comes to matters of the pocketbook. But even within the domain of pocketbook matters, where costs and benefits can realistically viewed in economic terms, exceptions abound to the theoretical tenets of standard economic theory and rational decision-making.

An example of a widely observed irrational economic behavior is the sunk cost effect. Sunk costs are simply costs that have been paid in the past. The sunk cost effect is when one of these costs made in the past induce a person to make an economically irrational decision. The most common form of the sunk cost effect is investment escalation, which is the tendency of people to continue in an endeavor after an initial investment is made, even when continuing investments become clearly unprofitable (i.e. the phenomenon of “chasing good money after bad”).

The sunk cost effect is remarkably robust. Instances of the sunk cost effect can be found in formal domains, where costs and benefits are explicit and the stakes are quite large, and instances can be found in informal domains, where the costs and benefits perhaps are not as clearly defined and the stakes can be rather small. Consider these two very different examples from Arkes and Blumer (1985). In the beginning of their paper they discuss the construction of the Tennessee-Tombigbee Waterway Project. The immensely expensive project was up for Congressional review in 1981 while it was still in construction because it was running far over budget and there were concerns about the overall profitability of the project. It was being attacked as a waste taxpayer dollars when one senator in favor of continuing construction argued,

“Completing Tennessee-Tombigbee is not a waste of taxpayer dollars. Terminating the project at this late stage of development would, however, represent a serious waste of funds already invested” (Arkes and Blumer, 124).

Later on in their paper, Arkes and Blumer discuss their experiment showing the sunk cost effect in an entirely different setting. In this experiment, people who came to the ticket window at a

local college theater to buy season tickets were offered the tickets at various prices. Some were offered to buy the tickets at full price, some at a slight discount, and others at a deeper discount. They found that people who had paid full price for season theater tickets attended more plays than those who paid discount prices for season tickets (Arkes and Blumer, 128).

In both situations, the presence of a sunk cost caused the decision-makers to escalate their commitment to investing in their project. According to economic theory, optimal decision making requires that all options be measured only by their present (i.e. marginal) costs and benefits. Factoring in these sunk costs will lead to sub-optimal economic decisions. Contrary to the arguments of that ill-informed senator, no matter how much money has already been poured into the construction of the Tennessee-Tombigbee, if the cost of completing construction exceeds the benefit of a finished waterway, then continuing construction would be a waste of taxpayer dollars. Similarly, in order to maximize the enjoyment of your weekend nights, you should only compare the costs and benefits of a night out at the theater with other possible nightly excursions and ignore the amount you paid for a theater season ticket months ago.

Because the phenomenon of sunk costs is so robust and because the stakes can be quite large, it is important to understand what exactly causes the sunk cost effect. The two most widely accepted explanations of the sunk cost effect, prospect theory and mental accounting, are remarkably similar in their logic. They both argue that people view themselves as “getting into a hole” or “going into the red” when they make an initial unsuccessful investment and that the sunk cost effect is a manifestation of people trying to get out of this hole.

While there is nothing inconsistent with the logic of either of these explanations, they nonetheless seem unsatisfactory because emotions do not play a significant role in either explanation. Prospect theory and mental accounting are indeed different models than the standard economic model of decision-making, but all three models still view the decision-maker as a rational utility calculator. However, describing an individual as a cool, rational utility calculator during the process of making a decision in any one of those commonly cited sunk cost scenarios hardly seems accurate. Poor initial investments typically cause negative, distressful feelings and chasing good money after bad is more a way to ward off these negative feelings than to maximize profits. Indeed, I argue that the sunk cost effect is an example of a *regret avoidance strategy*, where people purposely act in an economically irrational way in order to maximize “emotional utility.” This argument is strengthened by the fact that

many of the quirks of the sunk cost effect correspond to specific properties of regret. What will follow in this paper is a discussion of the existing explanations of why the sunk cost effect occurs, a description of the quirks of the sunk cost effect, an overview of the current literature on the emotion of regret, a more detailed argument on how the sunk cost effect is best explained in terms of regret avoidance, and finally the data from an experiment testing this hypothesis.

Why do sunk costs exist? The prospect theory and mental accounting explanations.

The two most widely accepted explanations for the sunk cost effect, prospect theory and mental accounting, are remarkably similar in their logic. Let's first examine the prospect theory explanation (for a more detailed explanation of prospect theory, see Kahneman and Tversky (1979)). Prospect theory argues that decision-makers define their asset position using a utility function (see Figure 1 for an example of this utility function). Decision-makers define their initial asset position as a neutral point of reference (in Fig 1, point B) and then map out a utility function in terms of gains or losses from this initial asset position. This utility function has several very specific properties. Most noticeably, the loss side is convex and the gain side is concave. The utility from a gain of, say, \$100 is less than the corresponding amount of disutility from losing \$100. This explains why, for instance, people are more risk-averse when thinking in terms of gains and risk-seeking when thinking in terms of losses. This property is known as the reflection effect. Another property is that gains and losses exhibit diminishing returns; as the curve extends out to greater gains and losses, it flattens out. Thus, the utility attained from gaining \$200 is less than twice the utility attained from gaining \$100. This property is known as the reference effect. Finally, there is a third property of prospect theory known as the certainty effect, which is not visible from the diagram. The certainty effect refers to the overweighting of certain outcomes relative to probable outcomes. Therefore, a certain loss of \$100 carries more disutility than a gamble with the expected value of a loss of \$100.

Referring to Figure 1, this is how prospect theory would explain the sunk cost effect using a hypothetical scenario. Let's first start off with someone who is considering making an investment in a risky research and development project, which costs X amount and has a fifty-fifty chance of either making $2X$ (leaving them with a net of $+X$) or making nothing (leaving them with a net of $-X$). Owing to the reflection effect (i.e. the absolute value of Y'' being less than the absolute value of Y),

the person would be risk-averse in this situation and thus unlikely to invest in this project. But let's say the decision-maker does make this investment and it earns them nothing. This puts them at point A, with a loss of X and its associated disutility of Y. Now let's say the decision-maker can decide whether or not to reinvest in this project with the same odds and pay-offs. The additional disutility of a second straight loss ($Y' - Y$) would be much less than the utility gained (Y) if the investment paid off and they were able to recover that first lost investment. Thus, the decision-maker would be much more amenable to repeating the investment after an initial loss. Moreover, when the decision-maker is at point A, withdrawing from the investment is perceived as a certain loss. The certainty effect makes withdrawal even worse. Thus, "a person who has not made peace with his losses is likely to accept gambles that would not be acceptable to him otherwise" (Kahneman and Tversky, 287). The presence of sunk costs, *ceteris paribus*, will make individuals more risk-seeking.

The other major explanation for the sunk cost effect is based upon Thaler's (1985) theory of mental accounting. Thaler argues that when people purchase an item, they open a transaction-specific account when they incur the payment and then close the account when they accrue the benefits of the purchase (Soman, 170). For instance, to take the example of the season theater tickets again, when someone purchases a season ticket, they open a 'Theater Season Ticket' mental account. The account starts at the disutility associated with the paying the price of the ticket. Each time that the season ticket holder attends the play, they add the positive utility to their account. The ticket holder will continue to attend plays until they feel that their account is sufficiently in the black. Thus, it follows that someone who has paid more for a season ticket (i.e. starting out deeper in the red in their mental account) will require more plays in order to bring their mental account in the black.

The mental account approach also explains very well two other hypothetical sunk cost scenarios in Arkes and Blumer (1985). One scenario is commonly referred to as the Basketball ticket scenario. In this scenario, the decision-maker has spent \$40 to purchase a basketball ticket for a game in a couple of weeks. Come the day of the game, there is a snowstorm so large that if the decision-maker had just been given a free ticket, they would rather not trudge through the snow to watch the game. That is, at that moment, the marginal cost of going to see the game exceeds the marginal benefit. Nonetheless, Arkes and Blumer's study showed that the majority of people who had been told that they paid \$40 for the ticket said that they would rather trudge through the snow to see the game rather than watch it on TV. The mental account reasoning goes that when the person pays \$40

to buy the basketball ticket, they open a 'Basketball Ticket' mental account in the red by \$40. When the day of the game comes, they are loath to watch the game on TV, thereby closing that account in the red. In an effort to avoid closing the account in the red, they trudge through the snow to try to "get their money's worth."

Heath (1995) makes a unique observation about the sunk cost effect that is extremely persuasive for the mental accounting argument. Heath shows that, contrary to the assumption of many researchers, some instances of the sunk cost effect are not of escalation but rather of *de-escalation*. In his first experiment, Heath sets up a typical research and development-type scenario where for a given sunk cost, an additional investment can be made to attain some known future benefit. The subjects were divided into high sunk cost group A and low sunk cost group B and then asked in a variety of scenarios to decide whether to make the continuing investment or whether to take that amount of money and invest in some other project that yields 15%. Listed in Figure 2 are the different monetary values that Heath chose and the number of people refusing to continue investment.

For instance, subjects in group A were asked in the first case, given that they had invested \$6.58 in some project, whether they would be willing to invest a further \$1.55 in order to reap \$6.66. If they were not willing, then that \$1.55 would gain a return of 15%. In all six of these scenarios, the return to a continuing investment varied from 356 to 512%. As compared to the opportunity cost of 15%, the overwhelmingly more profitable choice in all six scenarios would be to continue investment, something that the low sunk cost group seems to have noticed clearly. Yet in the high sunk cost group, a significant portion of the subjects refused to continue investment. Curiously, the presence of a greater sunk cost caused the subjects to de-escalate their commitment to these projects.

Heath (1995) argues that in situations like these, people establish budgets within their mental accounts. For these investment scenarios, they establish the budget to what the known return is. If they know that the project will altogether earn \$X, then they set a budget at \$X and hold tight to it, even when it is economically profitable to spend past it. For example, for the third scenario, the mental budget is established at \$9.45, which is the expected total return to this project. In the low sunk cost group, the mental account starts off \$1.50 in the red. The additional investment of \$2.16 brings the account down to \$3.66 in the red, but the \$9.45 return on the investment finally brings the account to \$5.79 in the black. Since the subjects know that their account will close in the black, they are willing to finish the investment. For the high sunk cost group, though, the final tally on their

mental account will be $-\$8.70 - \$2.16 + \$9.45 = -\0.77 . Since this group of subjects see that their mental account will finish in the red if they continue investment, a large proportion of subjects refuse to finish the investment. This is despite the fact that the return to a continuing investment of \$2.16 is 438% and by refusing to finish the project, that \$2.16 will otherwise only earn 15%¹.

Why in some cases does escalation occur while in other cases de-escalation occurs? Heath argues that when investments are easy to keep track of and mental budgets are easy to create, de-escalation will occur. In the above example, the natural mental budget to establish is the expected return of the project. Since for subjects in the high sunk cost group, completing the project will force them to go over their mental budget, many will be unwilling to do so. However, in many cases, the return to an investment is either unknown or difficult to calculate. In these cases, mental budgets are difficult to establish and escalation will occur. A very commonly used sunk cost scenario is the Cell Phone scenario. In this scenario, the subject is told to imagine that they are in charge of an important research and development project for a cell phone company to develop a new model of cell phone. After investing some amount of money and completing some percentage of the project (let's say spending \$7 million to complete 70% of a project initially budgeted \$10 million), the subject learns that a competitor has just released a new model. Their model is so much superior and cheaper than the model the subject is developing that the subject's model stands no chance of making a profit in the marketplace. The subject must decide whether or not to finish the project. In this scenario, establishing a mental budget would be difficult since, though the prospects are known to be poor, it is unknown how much exactly of a return the project will reap. Therefore, escalation is likely to occur. As both Heath (1995) and Tan and Yates (1995) argue, hypothetical scenarios in research on sunk costs typically omit projected returns, which is uncharacteristic of real-life business proposals (Tan and Yates, 314).

Besides using prospect theory and mental accounting, researchers have explored other possible explanations for the sunk cost effect. One theory that occasionally comes up is that the sunk cost

¹ Some might hypothesize that subjects would still want to continue investment, since that would minimize the amount they would close in the red. Looking again at the third scenario for the high sunk cost group, continuing to invest would close the account in the red at $-\$0.77$, but refusing to invest close the account at $-\$8.70 + (15\% * \$2.16) = -\$8.38$. Shouldn't the subjects prefer closing the account a little in the red rather than a lot in the red? I see two possible explanations. One is that people use the mental budget as a heuristic. They are paying such close attention to following this rule that they ignore when their decisions are not maximizing their mental account, let alone maximizing profits. A second explanation is that those refusing to invest do not fully understand the concept of opportunity costs. They do not realize that they are essentially choosing between getting a 15% return and a 438% return.

effect is related to cognitive dissonance theory. Arkes and Blumer (1985) are skeptical of this hypothesis. They argue that dissonance reduction theory shows that “once effort has been expended on an onerous task, the task is revalued upwards” (p. 137). They argue that while sunk costs would encourage someone to engage in an arduous task, they would not necessarily increase someone’s satisfaction with this task. To use the basketball ticket example again, dissonance reduction theory could possibly explain why someone who paid \$40 for a basketball ticket would be more willing to trudge through a blizzard to see the game than someone who was given the ticket. But cognitive dissonance theory would also argue that if both persons went to the basketball game, then the person who paid the \$40 would enjoy the game more. This is not at all an obvious conclusion, albeit a conclusion that is open to testing.

Arkes and Hutzler (2000) take another approach to use cognitive dissonance theory to explain the sunk cost effect. They hypothesize that when people make a poor initial investment, they are in a state of dissonance. One of the ways to reduce this dissonance is to inflate one’s estimate of the probability of success $p(s)$ of future investments. If a person in charge of a development project for a plane company learns that their product will probably lose money in the marketplace, they are likely to be in a state of dissonance. Their earlier state-of-mind, in which the project looks rosy, is in contradiction with the present reality. In order to reduce this dissonance, they can mentally inflate the $p(s)$ of the project they invested in. While living in a fantasy world where the project does succeed may not be profitable, it sure is comfortable.

Arkes and Hutzler are careful to note that if $p(s)$ inflation does occur, it might not be the cause of continuing investment. Instead, it is still possible for sunk costs to cause continued investment for whatever reason and then the $p(s)$ is inflated as a post hoc rationalization for continuing investment (p. 296). In their first experiment, they gave subjects an R&D scenario similar to the Cell Phone scenario, which was varied 2 X 2 along whether sunk costs were present or not and whether or not the $p(s)$ was explicitly stated. In the scenarios where $p(s)$ was explicitly stated, the subjects were told that their project had a 0.34 chance of succeeding. In the scenarios where $p(s)$ was not explicitly given (and subjects were just told that their product will probably not fare well against the competitor’s), subjects were asked to rate what they thought the $p(s)$ would be. If indeed an inflated $p(s)$ was the cause of the sunk cost effect, then within the group that was explicitly told the $p(s)$, there should not be a significant difference in willingness to complete between the sunk cost present group and the

sunk cost not-present group. If $p(s)$ was explicitly stated, then the subject could not justifiably inflate it. Looking at Figure 3, if an inflated $p(s)$ was the cause of the sunk cost effect, then there should be no difference in first row between the proportion of people willing to continue investment and the proportion not willing to continue, while there should be a difference in the second row.

As clearly seen in Figure 3 and born out by ANOVA, there is no significant difference between when $p(s)$ was explicitly stated and when it was not. Therefore, inflated $p(s)$ cannot be the cause of the sunk cost effect. Arkes and Hutzler go on to prove in their second experiment that inflated $p(s)$ do indeed occur but that they can only be viewed as post hoc rationalizations of sunk cost behavior.

Yet another explanation for the sunk cost effect that Boehne and Paese (2000) propose is that it does not even exist. They argue that the phenomenon that we think is the sunk cost effect is actually a project completion effect. First, they point out that sunk costs and project completion are two distinct concepts. Taking a typical R&D scenario which involves a \$10 million budget for example, to say that the project is 70% complete is different from saying that \$7 million has already been spent. Of course, in the real world, sunk costs will covary significantly with completion rates (i.e. the greater the sunk cost, the higher the completion rate is likely to be). But in the vast majority of research previously done, researchers have always paired high sunk costs with high completion rates, and vice versa. Because of this, it is easy to confound one effect for the other. Boehne and Paese (2000), starting with an earlier study by Garland and Conlon (1998), argue that sunk costs do not directly influence the desire to complete a project, but rather what we see as a sunk cost effect is actually the projection completion effect working through its correlation with sunk costs. Garland and Conlon argued that the project completion effect was “a potentially powerful new contributor to escalation phenomena” and that “as progress moves forward on a project, completion of a project itself takes increasing precedence over other goals (e.g., economic profit) that may have been salient at the time the decision was made to begin the project” (Boehne and Paese, 179-80). In other words, let’s take an R&D scenario where \$7 million of a \$10 million budget has been spent and the project is 70% complete as an example. According to the mental accounting explanation of the sunk cost effect, a person would be motivated to continue investment because they would not want to close their mental account of this project \$7 million in the red. Boehne and Paese argue that the real motivation to continue investment is that because only 30% of the project remains, “Lewin’s notion of ‘task-

tension” is running unbearably high; abandoning the project, for whatever reason, be it potential regret or cognitive dissonance, would have a high negative affect (p. 179).

To test whether this phenomenon we are observing is truly a sunk cost effect or a project completion effect, Boehne and Paese create a standard R&D-type scenario varied 2 X 2 X 2 where subjects were asked to rate their willingness to continue investment. These three variations are along the projected revenues [\$1 million or \$13 million], the amount of sunk cost [\$1 million or \$9 million], and the completion rate [10% or 90%]. Thus, one group of subjects faced the situation where for a project with anticipated revenues of \$13 million, they have expended \$9 million but have only completed 10% of the project. Boehne and Paese used this 2 X 2 X 2 set-up to test three different hypotheses for what we observe as the sunk cost effect. The three different hypotheses are graphically summarized in Figure 4. The Sunk Cost Hypothesis predicts that a higher sunk cost will lead to a higher desire to complete the project, regardless of other factors. The Project Completion Hypothesis predicts that a higher completion rate will lead to a higher desire to complete the project, regardless of other factors. The third, slightly more sophisticated than the previous two, is the Profit Maximization Hypothesis. This hypothesis holds that:

the desire [to complete the project] will depend exclusively on whether the anticipated sales prices exceeds the marginal cost of completing the project; the more the sales price exceeds the cost, the greater the desire to complete the project (Boehne and Paese, 180).

In this experiment, the groups where the project completion rate and the sunk cost are the opposite (e.g. high sunk cost paired with low completion rate) are what is going to be critical to disproving either the Project Completion hypothesis or the Sunk Cost Hypothesis. If a high sunk cost and low completion rate are associated with a high desire to complete, then the Completion Rate Hypothesis would be largely discredited. Similarly, if a high sunk cost and low completion rate were associated with a low desire to complete, then the Sunk Cost Hypothesis would largely be discredited.

Boehne and Paese's results are summarized graphically in Figure 5. (Desire to Complete was rated on a scale from 1 to 7. See pp185-6 for mean values for each group.) ANOVA shows that those in the high project completion group had a significantly higher desire to complete the project than the low project completion group ($p < .001$). Secondly, the sales price effect was also significant: those

expecting a return of \$13 million had a significantly higher desire to complete the project than those expecting a \$1 million return ($p < .001$). Finally, the sunk cost effect did not have a significant effect, nor were there any significant interactions (p. 185).

Boehne and Paese argue that though the sales effect was very significant, since no interactions between the three factors were found, there is little support for the Profit Maximization Hypothesis (ibid). Comparing Figure 5 with the figures for the three different hypotheses, the data clearly seem to suggest that the Project Completion Hypothesis is the best hypothesis. They conclude that, “there is virtually no support for the sunk-cost hypothesis in the present study” (p. 191).

As I will argue later on, strictly speaking, the Project Completion Hypothesis actually better fits my regret avoidance-based hypothesis than the Sunk Cost Hypothesis because one characteristic of regret is how close the counterfactual comes to occurring. But before we can completely rule out the Sunk Cost Hypothesis, Boehne (1997) points out a critical flaw in Conlon and Garland’s logic. When Conlon and Garland simultaneously manipulated both the sunk costs and the project completion rates, they neglected the subtle ways in which the subjects could reasonably interpret the marginal cost of finishing the project in a different way. For instance, let’s say that a subject was given a high sunk cost/low completion survey. They would be told that out of a \$10 million budget, they had spent \$9 million but had only completed 10% of the project. Boehne agrees with Garland and Conlon that the subject would more than likely answer that they would not be willing to continue the investment, but for a completely different reason. Conlon and Garland would argue that simply because the project is far from complete, the desire to complete would be low. This argument, though, assumes that the subjects will perceive that spending the remaining \$1 million will be enough to complete the remaining 90% of the project. **But as Boehne points out, the subject can very reasonably assume that if the first 10% of the project cost \$9 million to complete, then each remaining 10% will also take \$9 million to complete.** According to this logic, completing the project would cost an additional \$81 million. In this case, you could argue that the subject would want to abandon the project for economically rational reasons: the marginal cost far exceeds the marginal benefit (which in this case could be \$13 million at most)².

² I am mystified as to why Boehne makes this point in her 1997 thesis, but neglects to take it into account in her co-authored 2000 paper.

Boehne's rather clever and unique criticism leaves us back at square one in terms of understanding whether the "sunk cost effect" is really a sunk cost effect or a project completion effect working through its correlation with sunk costs. It seems nearly impossible to separate distinctly these two ideas. For instance, it is possible that people ignore how much of the project is actually physically completed, and instead focus only on how much of the budget has been spent. Thus, the most reasonable conclusion to be drawn from these competing viewpoints is that both a project completion effect and a sunk cost effect probably exist. When someone is considering whether or not to complete a project which has high sunk costs and is very near completion, they will be likely to finish the project both because they have sunk so much in the project and because the project is so close to completion.

Schaubroeck and Davis (1994) present yet another possible explanation for the sunk cost effect. In their paper they explore the role of responsibility in the sunk cost effect. They argue that in order for the traditional escalation of commitment phenomenon to occur, the decision-maker must be responsible for the original sunk cost. So, for instance, in a typical R&D scenario in which subjects are told that they were responsible for initiating a \$10 million project and they must decide whether or not to spend the last \$1 million after a competitor has released a superior product, escalation is very likely. They argue that if, on the other hand, the subjects were told that someone else was responsible for initiating the project but then they were put in charge of it right before completion, then they would not tend to show signs of escalating commitment to the project.

Indeed, they show in one experiment that not only does responsibility cause an escalation of commitment, but also that non-responsibility causes de-escalation. In this experiment, subjects were told that their R&D department had been making some initial investments in some Project A with disappointing results. They were asked whether they would prefer to continue investing in Project A or switch their focus to some Project B, which has the same risk and expected return as Project A. Subjects that were assigned responsibility for initiating Project A were more likely to commit to Project A while subjects who were not responsible were more likely to switch to Project B (Schaubroeck and Davis, 71-2).

These results are intriguing because prospect theory and mental accounting cannot explain them well. It is easy enough to use prospect theory to establish that a non-responsible subject would be likely to switch to Project B. They would start out at their reference point (point B in Figure 1) and

thus be risk-averse. Given the negative feedback from Project A, choosing to invest Project B is the safer option of the two. For a responsible subject, the initial unsuccessful outcome would put them at point A in Figure 1. As argued before, the subject would be increasingly risk-seeking in order to move back up to point B. However, in this experiment, the choice is not between “escalate or abandon.” The choice is between reinvesting in Project A or investing in Project B, which is equivalent in its payoff and could restore the subject to point B just as well as Project A. Given the initial negative feedback of Project A and their desperateness to return to point B, prospect theory would argue that responsible subjects would also invest in Project B (ibid).

As a result, Schaubroeck and Davis propose that justification-based theory is the best explanation for the sunk cost effect. This justification could be in the form of self-justification or justification to others. Perhaps an escalation of commitment to a failed investment occurs because “the decision maker has an internal need to justify prior failed decisions, and this results in a reinterpretation of previous behavior that gives it retrospective rationality” (Schaubroeck and Davis, 78). Or perhaps, to put it bluntly, people escalate in these R&D scenarios in order to justify their decisions to their boss. While factoring in sunk costs might not be profit maximizing for the company’s bottom line, perhaps subjects perceive factoring in sunk costs as maximizing the likelihood of keeping their job. It is plausible that part of what is happening in these R&D scenarios is an attempt to justify outwardly initial decisions that have failed. But outward justification is not a sufficient explanation since there are plenty of other less formal sunk cost scenarios where there is no need to justify one’s own actions to other people.

While prospect theory, mental accounting, project completion, and justification all have strengths in describing the sunk cost effect, the purpose of this paper is to present yet another way to understand this phenomenon: in terms of a regret avoidance strategy. But before I lay out the reasons why, it will be helpful to lay out a description of some of the quirks of the sunk cost effect as well as some of the major properties of regret.

What quirks does the sunk cost effect have?

So far, all of the sunk cost examples have focused on examples involving monetary expenditures, whether it’s \$9 million on an R&D project or \$40 for a basketball ticket. Soman (2000)

explores the possibility of a time-based sunk cost effect. If an initial investment of money in some endeavor can cause an escalation of commitment, why not an initial investment of time? Soman argues that in order for a time-based sunk cost effect to exist, time must be accountable in a way similar to money. Time, like money, is a scarce resource and so it seems plausible that individuals might treat both similarly. If time is indeed accountable like money, then people could open mental accounts in terms of hours instead of dollars, and you would see situations of escalation of commitment in scenarios involving expenditures of time.

In his first experiment, Soman used a hypothetical scenario similar to Arkes and Blumer's (1985) Ski Trip scenario³. Subjects are told that they have purchased a concert ticket and a more expensive theater ticket. Later on, they realize that both events are at the same time and that neither ticket is refundable. Moreover, the subjects are told that the concert will probably more enjoyable than the theater. They are then asked which event they would rather go to. If the subjects were to ignore the sunk cost, then they would prefer to go to the more enjoyable concert. But if the subjects were to factor in the sunk costs, their preference would tend to shift to the event that they paid more for, the theater. One group of subjects was given this scenario where the cost of the two tickets was expressed in dollar terms (HK\$450 for the theater tickets and HK\$150 for the concert tickets). The other group was given the scenario where the tickets were given to the subject after working for two different professors (working 15 hours for the theater ticket and working 5 hours for the concert ticket). In the sunk money version, 61.7% of the subjects exhibited the sunk cost effect, preferring to go to the theater. In the sunk time version, only 4.8% of subjects preferred to go to the theater (Soman, 174).

In another experiment, Soman pinpointed exactly why a sunk cost effect in terms of time rarely occurs. He gave two groups a variation on the Basketball Ticket scenario, where they had to decide whether or not they wanted to trudge through a snowstorm to see a game. In this case the subjects were told that they had earned the tickets after working for several hours as a research assistant. Moreover, one group of subjects was told that the standard wage of these assistants was \$7 per hour, while wage information was omitted from the other group. In the no wage information

³ In this scenario, subjects are told that, for whatever reason, they have purchased lift tickets for two different ski resorts, one in Vermont, the other in New Hampshire. The Vermont resort tickets cost \$52., while the New Hampshire resort tickets cost \$26. After purchasing the tickets, the subjects realized that the tickets were only good for the same day and

present group, no sunk cost effect was detectable, but in the wage information present group, a significant sunk cost effect was detected (p. 178). Soman argues that it is too difficult to open a mental account for time, due to its fluid nature, so the occurrence of a sunk time effect is unlikely (p. 171). Only when time is explicitly tied to money, a more ‘accountable’ concept, is the presence of a sunk time effect detectable. This study further supports the mental accounting explanation for sunk costs.

Arkes and Blumer (1985) presented another quirk about the sunk cost effect. They showed that even with explicit instruction about the superiority of marginal decision-making, people often still exhibited the sunk cost effect. In one experiment, they gave the aforementioned Ski Trip scenario both to a group of psychology students and a group of economics students who all had been exposed to the concept of sunk costs before in their classes. To the disgust of microeconomics professors across the country, economic students were not less likely to exhibit the sunk cost effect (p. 136).

Tan and Yates (1994) refined Arkes and Blumer’s conclusion. They gave adapted versions of both the informal Ski Trip scenario and the formal Cell Phone scenario to a group of accounting students and to a group of non-accounting students. For the informal Ski Trip scenario, they confirmed Arkes and Blumer’s results that there was no difference between either group. But in the Cell Phone scenario, they found that the accounting group was significantly less likely to exhibit the sunk cost effect than the non-accounting group (p. 314). They argued that this was because the Cell Phone scenario occurs in the domain of the business world. Accounting students are formally taught how to deal with sunk costs in this domain, so in this more familiar conceptual environment, they are more likely to recognize the pitfall of sunk costs.

What are some of the characteristics of regret?

Before I move on to describing how the sunk cost effect might be a regret avoidance strategy, it would be helpful to understand what exactly regret is. However, there is much disagreement on

that it’s impossible to get a refund for either ticket. Moreover, the subjects are told that the conditions are better in New Hampshire. The subjects are then asked which resort they would rather go to.

how to even define regret. Landman (1993) gives a broad definition of regret as “a more or less painful cognitive and emotional state of feeling sorry for misfortunes, limitations, losses, transgressions, shortcomings, or mistakes” (p. 36). This definition is more a laundry list of negative words than a definition. As Connolly *et al* (1997) argues, this definition for regret is barely distinguishable from the definition of unhappiness in general (p. 73). At the other extreme is the economic definition regret given by Bell (1982) and Loomes and Sugden (1982), who use a heavy dose of advanced mathematics to argue essentially that regret is some form of negative utility experienced when comparing one’s own current state with some possible alternate state. Other researchers’ definitions of regret (e.g. Gilovich, Medvec, Kahnemen, 1998) also vary widely in scope and interpretation.

At the most fundamental level, researchers agree that regret is a negative counterfactual-based emotion. A counterfactual is a “what if?” thought, an attempt to imagine a different state of the world. What if I had studied harder in school? What if it had not snowed yesterday? What if I had not bought a thousand shares of Enron stock? Regret is but one possible reaction to these upward counterfactuals (i.e. counterfactuals where the imagined is better than the real). But another possible reaction is disappointment. Indeed, much has been written about the similarities and differences between regret and disappointment.

Zeelenberg *et al.* (1998) argue that both regret and disappointment are essentially the same negative counterfactual-based emotion except for one key difference: regret is caused by behavior-focused counterfactual thinking while disappointment is caused by situation-based counterfactual thinking. In other words, regret stems from a person thinking about what he himself could have done differently to have had a better outcome; *personal responsibility* for a decision is necessary to feel regret. Disappointment stems from a person thinking about how things could have been different if only some external circumstance, which he could not have influenced, was different. You would feel regret for missing a baseball game because you got lost on the way, but feel disappointment for missing the game if it were rained out. In their most ingenious experiment in the paper, they gave two groups an identical scenario involving the purchase of a VCR gone horribly awry. One group was asked to think of situation-based counterfactuals while the other group was asked to think of behavior-decision counterfactuals. Then both groups were asked to rate how they felt about the entire

debacle. The first group tended to express more disappointment while the latter group expressed more regret.

Connolly *et al.* (1997) challenged Zeelenberg's hypothesis that in order to feel regret, it is necessary to have been personally responsible for the action that lead to the regrettable negative outcome. In one experiment, they gave a hypothetical scenario where Alan was initially scheduled to be in section A of a class and Bob scheduled for section B of the same class. Before the semester began, Alan moved to section B. In one subject group, Alan moved to section B out of his own volition and only after a great deal of research, while in another subject group, Alan was reassigned to section B by a computer. Both Alan and Bob moderately enjoyed section B, but the class consensus is that section A would have been better. Subjects in the experiment were asked which one, Alan or Bob, they thought would feel more regret for being in section B. Surprisingly, there was no statistical difference in the regret predictions between the subjects in the responsible pool and the non-responsible pool (p. 78). Connolly *et al.* performed four more variations of this experiment and still were unable to find a general effect for decision agency on regret. They conclude that they "could find little evidence to support the Loomes and Sugden (1982) and Bell (1983) idea of regret as a special kind of unhappiness, associated with decision responsibility" (p. 82).

Zeelenberg *et al.* (1998) criticized the Connolly *et al.* (1997) experiment for having an inadequate set-up. Specifically, Connolly did not measure the intensity of regret that Alan or Bob experienced, and thus any conclusion about the effect of decision agency was premature. Zeelenberg's paper began an enthusiastic back-and-forth between the two groups of researchers. Ultimately, Connolly's group conceded that responsibility plays a large role in regret but Zeelenberg's group conceded that they had not yet proved that responsibility was absolutely necessary for regret (Zeelenburg *et al.*, 2000).

Weighing in on the role of responsibility in regret, Gilovich and Medvec (1995) noted that in one study they performed in which subjects were asked to name the greatest regrets of their life, of the 213 unique regrets they identified, only 10 involved outcomes caused by circumstances beyond the person's control. They went on to argue that a "sense of personal responsibility appears to be central to the experience of regret. People might bemoan or curse their bad fate, but they rarely *regret* (*italics in the original*) it in the same sense that the term is typically understood" (p 383-4).

Even after you define the difference between disappointment and regret, there is still some ambiguity to the definition of regret. Some researchers argue that within what we typically define as “regret,” there are two, three, or maybe even more distinct emotions. For instance, Kahneman (Gilovich *et al.*, 1998) argued that two very distinct emotions share the name “regret.” There is what you might call “hot” regret, in which the sufferers mentally kick themselves for some undesired outcome. “Hot” regret can be evoked both by serious mistakes and by relatively innocuous mistakes, like letting a faux pas slip during a cocktail party. Also, “hot” regret is most typically attached to acts of commission as opposed to omission and the negative affect from “hot” regret disappears relatively quickly after the unfortunate action. On the other hand, there is what you might call “wistful” regret. “Wistful” regret involves fantasies of how one’s life could have been different. This form of regret is associated with the more important events in a person’s life, usually take years to acknowledge, and if anything the passage of time increases its negative affect. Typically, acts of omission rather than commission are “wistfully” regretted. The most common example of “wistful” regret is wishing one had done better in school or wishing one had learned special skill like playing a musical instrument. (Gilovich *et al.*, 1998, p. 602-3) To Kahneman, “hot” regret and “wistful” regret both share the same name not because of any important similarity between the two, but because of an infelicity in the English language.

Gilovich and Medvec (1995) acknowledged this short-term commission/long-term omission divide. They bring up a famous experiment by Kahneman and Tversky (1982):

Mr. Paul owns shares in Company A. During the past year he considered switching to stock in company B, but he decided against it. He now finds out that he would have been better off by \$1,200 if he had switched to the stock of company B. Mr. George owned shares in company B. During the past year he switched to stock in company A. He now finds that he would have been better off by \$1,200 if he had kept his stock in company B. Who feels greater regret?

More than 92% thought that Mr. George, who actively traded away from Company B, would feel more regret (p. 380). They also pointed out how common it is when people are asked what they regret most in their life that they typically cite an inaction, like regretting not doing more travelling, or regretting not finishing school. To Gilovich and Medvec, “hot” regret and “wistful” regret are indeed the same emotion. The difference between the two is in the complex temporal pattern of the perception of actions and inactions (Gilovich *et al.*, 1998, p. 385). Moreover, they were reluctant to

label all long-term, inaction-based regrets as “wistful.” The word “wistful” has a mild, nostalgic feeling to it, which is probably not an apt description for regretting “not having helped someone escape from Hitler” or “not paying more attention to my son’s heart condition before he died of a heart attack” (p. 393).

Much of the debate between Gilovich and Medvec and Kahneman (e.g. if “wistful” regret is more painful than “hot” regret) is immaterial to the purpose of this paper. The sunk cost scenarios discussed in this paper are all short-term scenarios. Thus, all three researchers would agree that acts of commission would cause more regret than acts of omission in these sunk cost scenarios.

In his article on counterfactual thinking, Roese (1997) identified a few important properties of counterfactual thinking (and, by extension, properties of regret) that are relevant to this paper. First, *outcome closeness* plays a key role in counterfactual generation (p. 136). The closer that the counterfactual came to happening, the stronger the effect of the counterfactual. For instance, a reckless, speeding car that comes within inches of hitting someone would be more likely to cause that person to think, “What if that had hit me” than if that car had sped by ten feet away. Similarly, to adapt one of my examples, if you were to abandon an R&D project when it was 90% complete, you would be more likely to think, “What if I had finished the project?” than if you had abandoned the project when it was only 10% complete.

Secondly, *exceptionalism* also plays a key role in counterfactual generation. For instance, Roese cites a study done by Kahneman and Tversky (1982) in which they presented variations of a vignette about an automobile accident to different groups of subjects. One group read that one of the drivers had left work earlier than usual, while another group read that this driver was taking an unusual scenic route. When the subjects were asked how the accident could have been avoided, they typically generated counterfactuals with respect to the exceptional detail. That is, a typical counterfactual would be “If he had only taken his normal route home...” or “If he had only left work at his normal time...” (Roese, 136). Since closeness and exceptionalism help generate stronger counterfactuals, and since regret is a counterfactual-based emotion, it can be reasoned that stronger feelings of regret will be associated with more exceptional events or events that were closer to turning out differently. Extensive scenario experiments have since borne this point out. For instance, studies have shown that missing a flight by a couple of minutes generates stronger feelings of regret than missing it by several hours (Roese, 136).

Finally, Boles and Messick (1995) brought up yet another interesting determinant of regret. They argued that an upward social comparison can also induce regret. For instance, if you were to receive a \$1000 raise, you would normally feel rather happy. But if you were to receive a \$1000 raise while your co-worker received a \$1500 raise, then you would probably feel rather terrible. Boles and Messick argue that this bad feeling could actually be regret. When you see your co-worker's higher raise, it can generate a counterfactual ("What if I had only worked harder?"), which in turn induces feelings of regret for not working as hard as your co-worker.

What is a regret avoidance strategy? What are some examples?

The primary motivation behind Bell's (1982) and Loomes and Sugden's (1982) economic approaches to regret theory was to explore why certain assumptions of rational choice theory were routinely violated. They postulated that people would sacrifice monetary gain in order to avoid potential regret. Indeed, Zeelenberg (1999) even argued that it would be wrong to consider regret-avoiding but economically sub-optimal decisions as "irrational."

We should be circumspect in how we define a regret-avoidance strategy. It would be inaccurate, for example, to label all risk-avoiding activities, like investing in bonds instead of stocks or always wearing a helmet when bicycling, as instances of regret-avoidance strategies. This would be more like just a general negative affect-avoidance strategy. At the very least, counterfactual generation must play a role in the definition. Moreover, this definition is of regret *avoidance*. It is not about how the experience of present regret will influence future decisions. It is about how the *anticipation* of future regret influences current decision-making. Thus, regret-avoidance decision-making can be defined as when the desire to avoid the generation of potentially regret-inducing counterfactuals influences how a person makes choices.

Zeelenberg and Beattie (1997) analyzed several specific examples of regret-avoidance strategies. In one experiment, they gave subjects a choice between two different gambles, one slightly riskier than the other. The subjects were then told that regardless of which gamble they chose, they would be told the results of one of the gambles. One group of subjects was told that the results of the safer gamble would always be revealed, while another group was told that the results from the riskier gamble would always be revealed. In the Safe Feedback group, if the subject chose to do the safe

gamble, then they would simply do the safe gamble leave the risky gamble alone. But if they were to choose to do the risky gamble, they would do the risky gamble, but the safe gamble would also be run to see how it would have turned out. Zeelenberg and Beattie found that while both groups preferred the safer gamble (a finding consistent with prospect theory since these gambles are in terms of gains, and thus risk-averse), the Safe Feedback group preferred the safe gamble significantly more than the Risky Feedback group did.

They argued that in a given feedback group, if the subject chose to do the gamble whose outcome would definitely be known, then generating a counterfactual (“What if I had chosen the other gamble?”) would be difficult because they would not know how the other gamble turned out. If the subject had chosen the other gamble, generating a counterfactual would be easy since they would literally be told what would have happened if they had chosen differently. Because people anticipate this and know that counterfactuals have the potential to cause regret, they will, *ceteris paribus*, prefer the gamble that does not generate easy counterfactuals.

Zeelenberg and Beattie acknowledged that in this experiment it was possible that the influence of regret-avoidance could be very slight. Since subjects are choosing between two gambles that are by design equally attractive, it would only take a slight nudge to push someone’s preference from one gamble to another (p. 65). Tykocinski and Pittman (1995, 1998) offered an even more vivid example of what they believe is a regret-avoidance strategy, a phenomenon that they call inaction inertia. Inaction inertia occurs when an attractive opportunity, for whatever reason, has been forgone, causing subsequent opportunities to become less attractive. Consider this example: You are looking to purchase a particular stereo system, which you think is worth its list price. You hear this system is selling at a 40% discount at one store, but you procrastinate going to the store until it’s too late and they have sold out. Inaction inertia is displayed if you then see the same stereo at a 20% discount at another store and are unwilling to purchase it. Indeed, missing that initial opportunity might discourage you from purchasing a stereo system altogether.

Tykocinski and Pittman (1998) argue that if you were to buy the 20% off stereo, “then the ‘loss’ of a superior outcome is actualized, and one may experience regret” (p. 613). Specifically, the purchasing of a stereo at a 20% discount would trigger a counterfactual thought (“What if I had bought this stereo at 40% off?”), which in turn would cause feelings of regret. The threat of

triggering this counterfactual would discourage you from purchasing this stereo, even if a 20% discount is still a good deal.

A fitting example of inaction inertia was discussed in Tykocinski and Pittman's (1998) Experiment 1. Participants were told to imagine that they were looking to join the fitness club that had recently been constructed near their house. One group was told that the club was about 5 minutes away, while the other group was told that the club was 25 minutes away. They had been considering picking up a membership application to the club for weeks, but had always put it off. When they eventually did get around to picking up an application, they learned that the membership rolls had just filled up the other day. Both groups of subjects were then told that there was a fitness club 30 minutes away from their home and asked how willing they would be to apply to this fitness club. Finally, an interesting addition was included in this scenario. The subjects were further subdivided into two groups. For one group, the description of the scenario ended here. For the other group, they were told that on their drive to work, they would pass by both of the fitness centers (thus, they had to face the fact daily that they had missed the opportunity to sign up at the nearer club).

Tykocinski and Pittman found that both effects, the difference in attractiveness between the initial opportunity and current one as well as that subjects had to pass both clubs, were significant. The large difference group (where the initial club was only 5 minutes away) was found to be significantly less likely to sign up for this second club than the small difference group (where the initial club was 25 minutes away). They argued that the large difference group would feel like they "lost" even more, which would cause even stronger counterfactual thoughts and feelings of regret, and thus discouraging them even more from signing up at the more distant club. Moreover, they found that subjects who could not avoid passing the two clubs were more likely to sign up than those who did not have to pass them every day. They argued that those who did not have to pass the fitness clubs daily could just avoid feelings of regret by not signing up for the farther away club. However, those who pass by both clubs daily, generating counterfactuals was unavoidable. Each time they pass the clubs on their way to work they would be reminded of their missed opportunity. Since they could not avoid feeling regret whether or not they sign up at the other club, the disadvantage to signing up disappeared. (Tykocinski and Pittman, 1998, 612). This is a perfect example of a regret-avoidance behavior. People are able to anticipate whether or not feeling regret is unavoidable. If regret is

avoidable, they will then try to avoid it. If it is unavoidable, people are able to recognize this, ditch this inaction inertia, and resume making decisions along marginal costs and benefits.

The explanation for the inaction inertia effect is remarkably similar to the explanation I propose for the sunk cost effect. Whenever someone makes an initial investment in a project that becomes unprofitable and then is asked whether or not they want to continue, they realize that this decision is a potential trigger of counterfactuals. They anticipate that not continuing with this project, even though it may be the more profitable choice of action, would trigger a potentially regret-inducing counterfactual (“What if I had carried this project to completion and it were successful?”). Moreover, this counterfactual is particularly vivid because its realization (success of the original project) would justify their initial investment, thereby eliminating any cognitive dissonance created when the person realizes in hindsight that their earlier decision to start the project was a poor one. Therefore, it is likely that people, in the presence of sunk costs, will sacrifice a bit of uncertain economic profitability in exchange for avoiding certain regret.

What makes this explanation even more convincing is the sunk cost effect has already been shown to share some common properties with regret. For instance, as argued before, the presence of the sunk cost effect requires the decision-maker to be personally responsible for the decision to incur the sunk cost. The generally accepted explanation for responsibility’s role in the sunk cost effect uses mental accounting language⁴. Perhaps a better explanation for the effect of responsibility is because of its role in triggering regret. If you yourself decide to pay \$40 for a basketball ticket and there is a snowstorm on the day of the game, maybe you are motivated to go to the game in order to avoid feeling regret for purchasing a ticket for such an infelicitous day. But let’s say you were instead given this ticket. Since you were not responsible for the decision to purchase this ticket, there is no possible way for you to feel regret and the desire to avoid regret would not interfere with your decision on how best to maximize your utility. Indeed, it is quite likely that if you would feel disappointment, that other, responsibility-less, counterfactual-based emotion.

Likewise, closeness to completion plays an important role for both regret and the sunk cost effect. Before, I had shown that there probably exists some project completion effect that is independent of the sunk cost effect. This project completion effect stems from people’s desire to

reduce “task-tension.” As a project nears completion, completion for its own sake becomes another goal that is intertwined with the goal of maximizing profits. However, closeness to completion is also known to strengthen the generation of counterfactuals and increase regret. Someone who misses a plane by minutes is likely to feel more regret than someone who misses a plane by hours. Perhaps the reason why someone is particularly averse to quitting an unprofitable project that is 90% complete is not because of reducing “task-tension” but because quitting would generate a vivid counterfactual (“What if I had only stuck out that last 10%”).

Responsibility and closeness to completion are the only two properties that researchers have so far found that the sunk cost effect shares with regret. But if regret avoidance is indeed the principal motivation behind the sunk cost effect, then we would expect the sunk cost effect to exhibit the other properties of regret that I have already discussed. For instance, sunk costs that have been incurred by acts of commission should produce a stronger sunk cost effect than equivalent sunk costs incurred by acts of omission. Similarly, a sunk cost incurred in the presence of a negative social comparison or by some deviation from routine should also exhibit a stronger effect. Neither mental accounting nor prospect theory would make these predictions. Thus, if commission, deviation, or upward social comparisons were found to strengthen the sunk cost effect, this regret-avoidance strategy would be a

There is an even more direct method to test whether regret is a determining factor of the sunk cost effect. A five-question regret scale exists (See Appendix 1) that can be used to measure how prone someone is to feeling regret. The higher a subject scores on this scale, the more prone that they are to feeling regret. Thus, we would expect that, given a list of sunk cost scenarios, people who score higher on the regret scale would be more likely to exhibit the sunk cost effect.

To state formally, I have two hypotheses:

H1: People who are more prone to feeling regret are also more prone to exhibiting the sunk cost effect.

H2: Besides responsibility and closeness to completion, we would expect other determinants of regret to also be determinants of the sunk cost effect. These would include the omission/commission distinction, deviation from the norm, and the presence of a negative social comparison.

⁴ Specifically, the mental account for these scenarios are not opened until the individual himself becomes involved in the decision-making process. If someone else incurs a \$9 million debt on some project and then passes the project on to you,

It is with these two hypotheses that I designed and performed an experiment to test for the role of regret in the sunk cost effect. Moreover, the presence of certain properties of the sunk cost effect, like the time/money difference, were tested for out of curiosity.

Method

Participants

Ninety-nine undergraduates in an introductory psychology class participated in this experiment as required by their class. None of the surveys showed any problems with being completed, so all of them were available for analysis. Of these 99 subjects, 52 were female. The mean age was 18.5 years ($SD = 0.94$).

Design and Procedure

Test participants completed a two-part survey that took approximately a half-hour to finish. In the first section of the survey, they were presented with a list of ten sunk cost scenarios that were varied along the different attributes of regret that were being tested. For each question, subjects had to read a paragraph-long scenario and then answer a Yes/No question. For four questions, if they had answered No, they were required to fill in a value for which they would Yes to the question. Each sunk cost scenario had either two, three, or four variations. These variations were randomly distributed to make up four versions of a survey. For scenarios with fewer than four variations, some of the variations were repeated in two versions of the survey.

The second part of the survey (Appendix 2) consisted of a regret scale combined with a maximization/satisficing scale (see Schwartz *et al.*, pending) as well as some basic demographic questions, like gender, age, class background, and whether the subject had taken any economics classes.

The first sunk cost scenario was about incurring some sort of sunk cost to go to a computer fair to buy a printer and only finding a sub-standard one (see Appendix 1 for the actual text of all the

you still open your mental account at zero.

variations of each of the scenarios). The rational course of action would be not to buy the printer, while the sunk cost effect encourages the individual to buy. There were three different forms of the sunk cost: either a time sunk cost, a time and money sunk cost, and no sunk cost present. Since this question did not vary any of the factors responsible for regret, its primary use was to test the time versus money sunk cost difference mentioned above as well as to check for a correlation between regret scale scores and willingness to buy. The second part of this scenario asks if the subject were unwilling to buy the printer for \$150, what is the maximum amount of money they would be willing to pay to buy the printer at the computer fair. (If the person answers yes to the first portion, then \$150 is assumed to be the most that they would be willing to pay.) The sunk cost effect would tend to inflate the maximum willingness to pay. It was hoped that this second measure could be a more sensitive measure of the sunk cost effect.

The second sunk cost scenario was about missing a concert for which you bought a ticket and deciding whether to buy another ticket to see it. This scenario is an example of Heath's de-escalation. A concert mental budget is created when the first ticket is purchased. When people realize that they will have to buy a second ticket to see the concert, they calculate that this will overrun their mental budget and will resist buying another ticket. On the other hand, the rational choice would be to buy another concert ticket. If the person originally decided that the concert was worth the price of the ticket, then the concert should still be worth the price of the ticket when the person has to decide to buy another ticket. The scenario was varied along how the sunk cost was incurred, whether it was through an action normally taken or from a deviation from the norm. A third version was constructed where there was no sunk cost, but in order to control for the income effect, the subject simply lost \$35 on the way to the concert⁵. Like in the first scenario, people unwilling to buy a second ticket for \$35 were asked what would be the maximum they are willing to pay. And like in the first scenario, the sunk cost effect would tend to deflate this figure.

The third scenario is about selling an unwanted DVD for a piteously small amount of money. This scenario varied 2 X 2, whether the person paid for the DVD or received it for free and whether or not the person was responsible for the choice of the DVD. The rational choice would be to sell the

⁵ It could be argued that not wanting to purchase a second concert ticket might not be a result of the sunk cost effect, but a result of the income effect. The individual is \$35 poorer the second time than the first time around. From this slightly tighter income constraint, it is not necessarily true that not buying a second ticket is irrational. To control for this, I will

DVD. Either the presence of a sunk cost or the presence of responsibility would encourage people not to sell it. If the person was unwilling to sell the DVD for \$2, they were then asked what was the minimum they would be willing to sell it for. The sunk cost effect should tend to inflate the amount for which they would be willing to sell.

The fourth and fifth scenarios are actually one large scenario divided into two. It involved a stockholder who is in need of some liquidity and must choose which of his two stocks he wants to sell. The scenario was varied 2 X 2 X 2, and each survey included two versions. One variation was action/inaction. In one group, the person had earlier considered trading one of their stocks for another but declined to trade. In another group, the person went ahead with this trade. Another variation was whether the stock that the person ended up deciding on holding held steady or declined in value. The third variation was either a positive or negative social comparison. Here, the rational decision would be unaffected by any of these variants and thus indifferent to which stock to sell, because previous decisions should not affect current decisions.

The sixth scenario asks the subject to decide between going to a very distant sub shop and using a frequent customer card or going to a much more conveniently located sub shop which does not have a frequent customer card. The scenario was varied 2 X 2. One variable was how whether the frequent customer card was close to completion or not. The other variable was whether a sunk cost was present or not (i.e. if the person himself bought the subs marked on the card, or if they had found the card already marked). The rational choice would be to go to the closer sub shop, but the sunk cost effect would draw subjects to the more distant sub shop because they have already “invested” in that shop.

The seventh scenario asks the subject if they were to get into a car accident, whether they would want to repair the severely damaged car or buy another, similarly valued used car. Here, both the price of the new car and the amount of money already sunk into the old car are varied between a low value and a high value. It is impossible to say that either repairing the old car or buying a new car is the rational choice. However, it is possible to say that given the marginal costs and marginal benefits of both choices, whether no money or whether \$1100 had already been sunk in previous repairs for the old car should not make a difference in the decision.

compare subjects who sunk \$35 into buying a concert ticket and subjects who simply lost \$35. The sunk cost effect would explain any difference between the two.

The eighth scenario asks the subject to imagine that they are a researcher working on an experiment and finding out that other researchers have already discovered the scientific relationship that they were looking for. They are asked whether or not they would want to continue with the experiment, even though there is no chance that it will be published. This scenario was varied along responsibility. In the responsible version, the other researchers had already discovered and published their work years ago; if the subject had done their background research properly, they would have discovered that this relationship had already been analyzed long ago and would have chosen another topic. In the non-responsible version, the other researchers had just published their results, so there was no way for the subject to know that others were also working on the same topic. Here, the rational choice would be to abandon the current research project and move on to a new project, but the time sunk into the original project would compel the subject to continue⁶.

The ninth scenario asks the subject to decide between some sure amount of money and a gamble between an even larger sum of money and nothing. There were two variables. The first variable was whether it was a gain (i.e. gain a certain small amount of money or gamble for a larger sum of money) or a loss (i.e. lose a certain small amount of money or gamble to lose nothing at all). The second variable was whether they incurred a sunk cost or not. Here the sunk cost was having worked all afternoon for someone and expecting their wage when they were presented with this choice. Like in the used car scenario, neither choice here is necessarily the rational choice; it completely depends on the individual's risk preferences. As argued earlier in this paper, though, the presence of a sunk cost would make someone more risk-seeking since they would be operating in the domain of losses.

Finally, the tenth scenario was a traditional R&D scenario. Subjects were asked whether or not they would like to devote \$3 million to research and development a product for which there was already a superior competing product on the market. There were three different groups. One group was deciding whether or not to start this as a new project. A second group was deciding whether or not to devote this \$3 million in order to finish off an overall \$10 million for which they were responsible for starting. The third group was also deciding whether to finish a \$10 million project, but they were not responsible for starting the project. As has already been emphasized in this paper

⁶ Perhaps it can be argued that continuing is not irrational because someone might want to finish the experiment "for the sake of finishing." However, I emphasized in the scenario that the opportunity cost to continuing the experiment is not

repeatedly, the rational choice would be not to devote resources to this project, but the sunk cost effect encourages people to try to finish the project.

In all ten of these scenarios, either the presence of sunk costs or the form of the sunk costs is manipulated. The other factors that were manipulated, like responsibility or deviation, were present in only one or two of the scenarios. To emphasize once again, the currently accepted explanations for the sunk cost effect, mental accounting and prospect theory, would only predict that the presence or the absence of sunk costs (and perhaps the presence or absence of responsibility) would affect decision-making. If any of the other factors that were manipulated in these scenarios (deviation, commission, negative social comparison, closeness to completion) were found to affect significantly the decision, then regret-avoidance would be the preferred explanation because neither mental accounting nor prospect theory are able to account for these factors in their framework.

Dependent measures

Table 1 summarizes the percentage of people who chose the irrational option for each variation of each scenario⁷. To analyze whether any of these differences were statistically significant, a multiple logistic regression equation was constructed for each of these scenarios. This equation took the form of:

$$Y_i = \alpha + \beta_1(\text{Factor1}) + \beta_2(\text{Factor2}) + \beta_3(\text{Regret}) + \beta_4(\text{Maxsat}) + \beta_5(\text{Takenecon})$$

where Y_i is a dependent dummy variable corresponding to which choice the subject made. Choosing the irrational option was coded as a 1, and choosing the rational option was coded as 0. Factor1 and Factor2 are independent dummy variables corresponding to the manipulated circumstances in each scenario. There could be one, two, or three of these variables. For instance, in Scenario 3, there would be dummy variables for the presence of a sunk cost and for the presence of

being able to work on other, new research that would have the chance to get published.

⁷ Note that the irrational choice can differ. In most scenarios, the irrational choice would be to escalate commitment, whether it is to an R&D project or to owning an unwanted DVD. But in the concert ticket scenario de-escalation was irrational. In scenarios where neither choice was definitely irrational, the direction that the sunk cost effect would push the subject towards (e.g. risk-seeking) was coded as irrational.

responsibility. Regret is the subject's score on the regret scale, which can range from 1 to 7. Maxsat is the subject's score on the maximization/satisficing scale, which also can range from 1 to 7. Takenecon is a dummy variable corresponding to whether the subject has taken or is in the process of taking an introductory course in economics⁸. This variable was used to test Tan and Yate's (1994) hypothesis that the sunk cost effect could not be eliminated through education in the concept. The results of these regressions are summarized in Table 2.

Besides analyzing whether or not someone chose the irrational option, I also analyzed the subjects' willingness to pay or willingness to sell for Scenarios 1, 2, and 3⁹. The purpose of these calculations is to find a more sensitive measure of the sunk cost effect than a binary dummy variable. Table 3 summarizes the average willingness to sell/buy for the first three scenarios, their standard deviations, as well as which direction the sunk cost effect predicts these dollar values would go. To analyze more formally the willingness to pay/sell figures by separating out the effects of the different factors in the first three scenarios, I constructed a censored regression taking the form of:

$$\text{Dollars}_i = \alpha + \beta_1(\text{Factor1}) + \beta_2(\text{Factor2}) + \beta_3(\text{Regret})$$

where Dollars_i is the maximum willingness to pay (or minimum willingness to sell), Factor1 and Factor2 and Regret are the same as above. The results of these regressions are included within Table 2.

Results

First, I would like to discuss how the original construction of some of the scenarios made data analysis problematic. I erred in the construction of Scenario 1, 2, and 10 by not varying them 2 X 2, using two separate dummy variables. For example, in Scenario 1, I was trying to compare the effects of a time sunk cost and a money sunk cost. I should have created a total of four different variations

⁸ A second dummy variable for having taken Intermediate Economics was measured, because the concept of sunk costs are even more formally taught in that class. Unfortunately, only one person in the subject pool had taken or was in the process of taking this class, so this variable was omitted.

⁹ For Scenario 10, I was unable to calculate the willingness to continue the project because roughly half of the subjects (!) were unable to distinguish what was meant by "sales figures."

with a time sunk cost present or not and a money sunk cost present or not. I only created three variations of this scenario though: a time sunk cost, time and money sunk cost, and no sunk cost. There should have been a fourth variation, only money sunk cost present. Without this fourth option, if I were to plug all the observations into a regression, it would fail because of perfect collinearity. To get around this, I had to do two separate regressions. The first regression would be to see if there was a general sunk cost effect or not. I used the data from all four versions, coding a sunk cost present as a 1 and not present as a 0. In the second regression, I focused on the observations with a sunk cost, excluding the observations from the no-sunk cost group. The purpose of this second regression was to see whether having an additional money sunk cost would have an even further effect. In this case, I coded time-only sunk cost as a 0 and time and money sunk cost as a 1. Because of the faulty set-up of this scenario, it could not strictly test Soman's assertion that time sunk costs have less an effect than money sunk costs. I had to take similar approaches with analyzing Scenario 2 and 10.

Another major error that I made in Scenario 2 is that the sunk cost absent version is not equivalent to the two sunk cost present versions. In the sunk cost absent version, the subject lost \$35 on the way to the concert, but was able to purchase a ticket for a concert that night. In the two sunk cost present versions, the subject was unable to make it to the concert and had to decide whether to purchase a ticket for a concert on the next day. The lost \$35 was to control for the income effect, but there was a difference between whether the subject could go to the concert that night or the next. It is quite likely that some percentage of the subjects in the sunk cost absent scenario who were willing to purchase a concert ticket for that night would not be willing to purchase a ticket for the next night.

The t-values and p-values for all the variables are summarized in Table 2. All variables that were at least weakly significant ($p < 0.10$) were highlighted in bold.

In the first scenario, the only variable that was significant was the presence of sunk cost. Those who paid some sort of sunk cost were significantly more likely to buy the printer and were willing to pay more, a result that is so frequently repeated in other studies as to be banal.

In the second scenario, which compares deviated sunk costs with non-deviated sunk costs, deviation was a significant variable. Unfortunately, it was pointing in the wrong direction! According to the data, people who incurred a deviated sunk cost were more likely to do the rational thing than those who had incurred a non-deviated sunk cost, which is the exact opposite of what I predicted. Moreover, people who had incurred deviated sunk costs were willing to pay more for a second ticket,

which also the opposite of what I predicted. In the sunk cost present versus not present regression, the only significant variable was sunk cost, which at least was pointing in the right direction. People who had incurred a sunk cost were less likely to buy another ticket and were willing to pay less for it.

In the third scenario, in the “to sell or not to sell” regression, the only significant variable was the presence of sunk costs. Those who had paid for their DVD were less likely to sell it. In the regression analyzing how much people were willing to sell their DVD for, both the presence of sunk costs and responsibility were significant. Those who had paid for their DVD as well as those who had been responsible for the selection of the DVD required a greater amount of money to part with it.

In both the fourth/fifth scenario and the tenth scenario, the only significant variable again was the presence of sunk costs. In the sixth and seventh scenarios, both of which varied the degree of sunk costs rather than the presence of sunk costs, none of the variables were significant.

In the eighth scenario, responsibility was a significant variable, but this too was pointing in the wrong direction. Those who had been responsible for their sunk cost were less likely to continue their research project, whereas before I had predicted that those that who had been responsible would escalate their commitment. The ninth scenario also contains a surprising finding. Those facing a choice between two gains were less likely to gamble, which is what prospect theory predicts. However, those who faced this choice after incurring a sunk cost were less likely to gamble, which is exactly the opposite of what prospect theory would predict.

Discussion

Overall, these results are worse than discouraging. It brings great sadness to my heart, but it is impossible to reject the established explanations for the sunk cost effect with these results. My first hypothesis, that people more prone to regret are more sensitive to the sunk cost effect, depended up the regret score variable in each regression to be significant, and in each case they were far from being significant. My second hypothesis, that the sunk cost effect shared the same determinants as regret, required that the following variables be significant: responsibility, closeness to completion, deviation from the norm, commission, and the presence of a negative social comparison. Of the three times that any of these variables were significant, two of those times the variable was pointing in the wrong direction!

I wonder if something else was going on in those cases in which the variables were pointing in the opposite direction than predicted. For instance, in Scenario 8, responsibility had the opposite effect of what was anticipated. In the responsibility group, subjects were told that the research that they were working on was already explored several years ago by other researchers. In the non-responsibility group, subjects were told that other researchers had just discovered the relationship that they were working on. Perhaps it was not responsibility that was manipulated, but rather relevance that was manipulated. That is, subjects in the “responsible” group might have seen that this was a field of research had already been thoroughly explored by others a while ago. As such, they saw that they probably did not have any fresh insights into this field and there would be no benefit to continuing. On the other hand, people in the “non-responsible” group might have perceived that even though other researchers beat them to the punch, so to speak, the field was still fresh and relevant, so continuing the project might still have some benefit.

That being said, I am unable to come up for an explanation why, in Scenario 2, someone who missed a concert even though they followed their normal habits would be less likely to buy another ticket than those who missed the concert because they deviated from their normal habits. Perhaps those in the deviated group (i.e. took the car for the first time) might be thinking that they had learned their lesson and would always take the train thenceforth. Meanwhile, those in the non-deviated group (i.e. those with the train delay) view the train as the only way to get into the city, and a rather unreliable method at that. They might be thinking that if they buy another ticket, they could miss it a second time because of another train problem.

Another result that was not predicted was how, in Scenario 9, sunk costs would make someone more risk-averse. Looking at the results in Figure 6 explains this unusual result. In three of the four groups, the vast majority of subjects chose the “rational,” risk-averse option. I would argue that all three of these versions are viewed in terms of gains. The sunk cost/loss version stated that the subject was about to be paid for working all afternoon for someone, but the person wants to dock their wages. Perhaps, subjects are viewing this scenario is really in terms of a gain. Let’s say that the day’s wage is \$150. Then, they could be viewing their choice in terms of a sure gain of \$100 or a gamble between a gain of \$50 or \$150. From this viewpoint, the subject would be risk-averse. It is in the only unambiguously losing version, no sunk cost/loss, that people are risk-averse.

Besides this, another result was that no relationship could be found between whether a person had taken an introductory economics class and how they handled these sunk cost scenarios. Even if I was able to find a relationship, I doubt that it would be valid because of problems of self-selection. Perhaps people who were consciously aware of the sunk cost effect and tried to avoid it would also probably be more likely to choose to take an economics class because they are interested in the behavior of costs and benefits.

Since I was at least able to replicate the sunk cost effect in most of the scenarios, there is nothing to suggest that I was unable to find instances of regret-avoidance because the different versions of the scenarios were not different enough. If I had to choose which theory best explains the sunk cost effect, it would probably be the mental accounting explanation. Of all the papers I read, Heath's was the most ingenious in the way it was able to explain both escalation and de-escalation using the same framework of mental accounting. Other researchers had focused long on various forms of escalation of commitment, which is reasonable, since it is the most common and prominent form of the sunk cost effect. Moreover, examples of escalation, like the construction of large public works projects and large research and development projects, can involve stakes in the billions of dollars. But Heath's clever notion of mental budgeting explains both these and why someone would not want to buy a second theater ticket if they lost their first. As such, it remains the definitive explanation for the sunk cost effect.

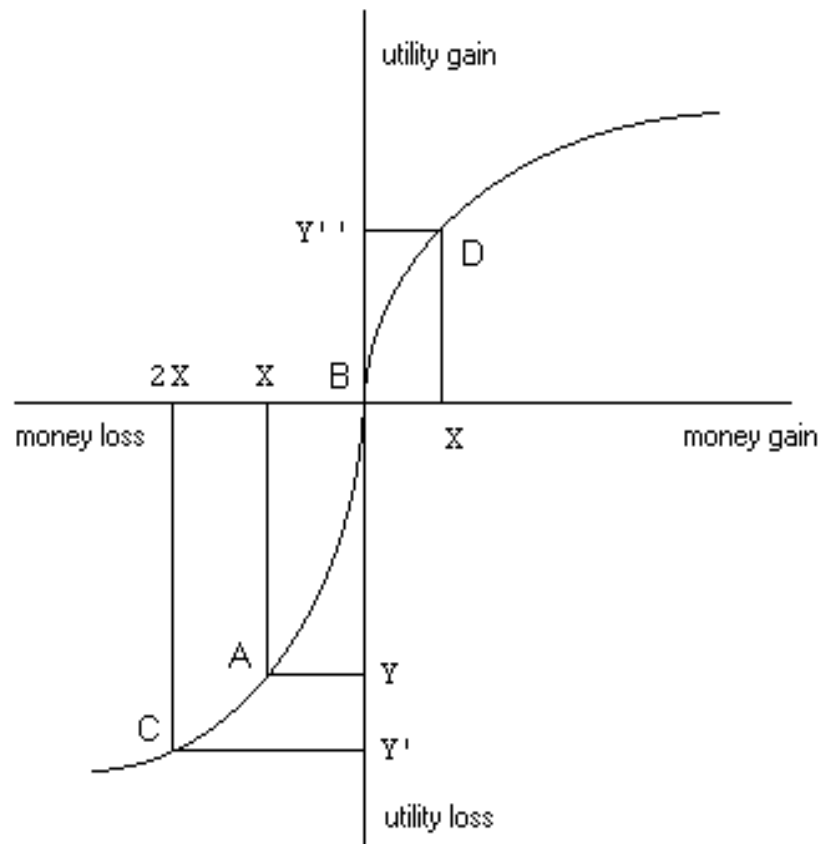


Figure 1 (adapted from Schaubroeck and Davis, p. 61-2)

	Previous costs	Future investment	Return to investment	Refusing to invest (%)
1. A	\$6.58	\$1.55	\$6.66	58%
B	None	\$1.55	\$6.66	0%
2. A	\$9.07	\$2.57	\$9.16	36%
B	\$6.33	\$2.57	\$9.16	14%
3. A	\$8.70	\$2.16	\$9.45	34%
B	\$1.50	\$2.16	\$9.45	2%
4. A	\$9.72	\$1.97	\$10.09	42%
B	None	\$1.97	\$10.09	1%
5. A	\$9.72	\$1.97	20% chance of \$12.10 30% chance of \$10.00 50% chance of \$9.34	48%
B	None	\$1.97	20% chance of \$12.10 30% chance of \$10.00 50% chance of \$9.34	2%
6. A	\$9.72	\$1.97	30% chance of \$15.20 50% chance of \$10.17 20% chance of \$2.23	26%
B	None	\$1.97	30% chance of \$15.20 50% chance of \$10.17 20% chance of \$2.23	2%

Figure 2 (Heath, p. 40)

		Sunk cost			
		Present		Absent	
Probability of success	Invest?	Invest?		Invest?	
Yes		No	Yes	No	
34%	26	11	11	27	
Not specified	24	13	7	29	

Figure 3 (Arkes and Hutzal, p. 299)

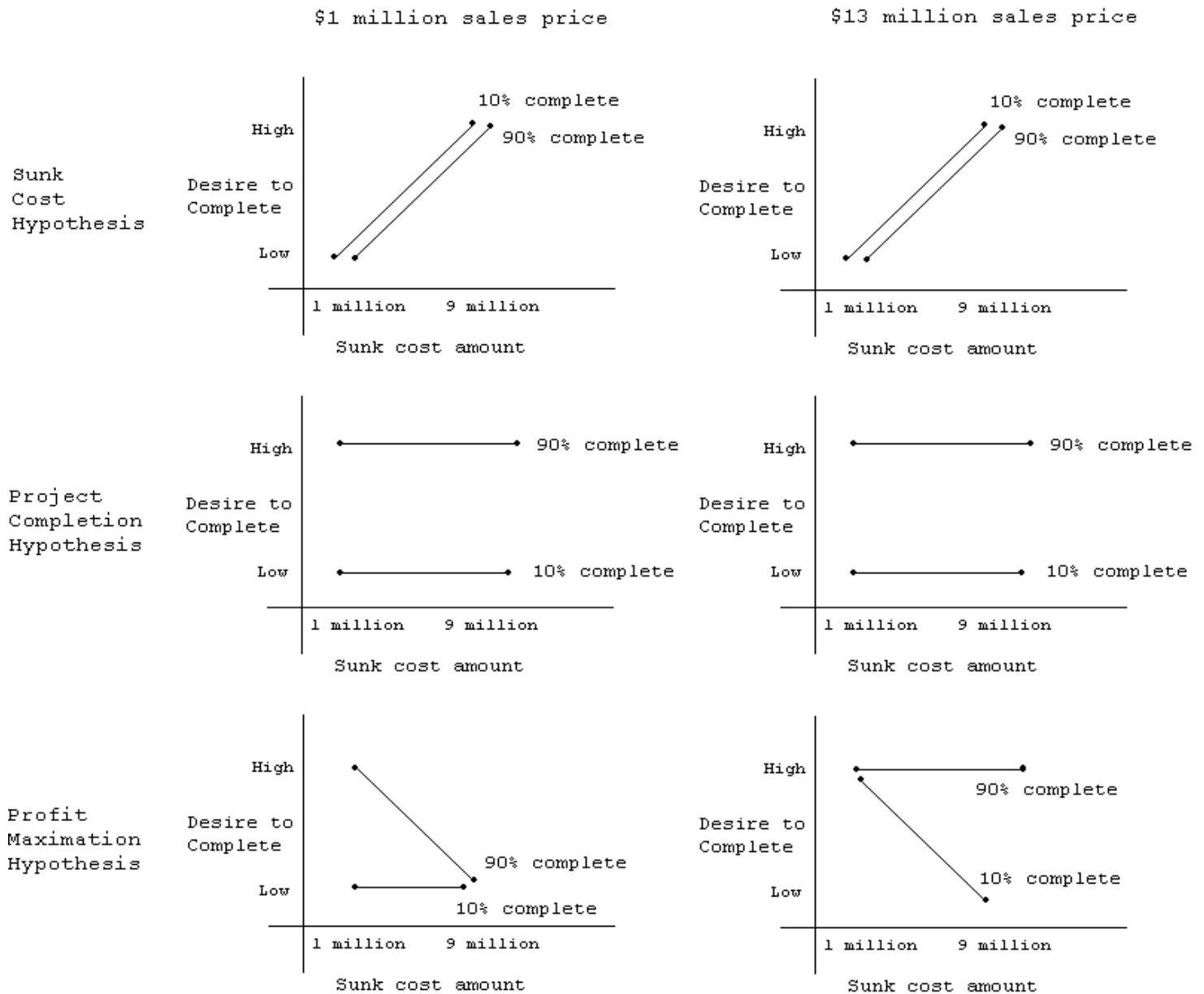


Figure 4 (Boehne and Paese, p. 181)

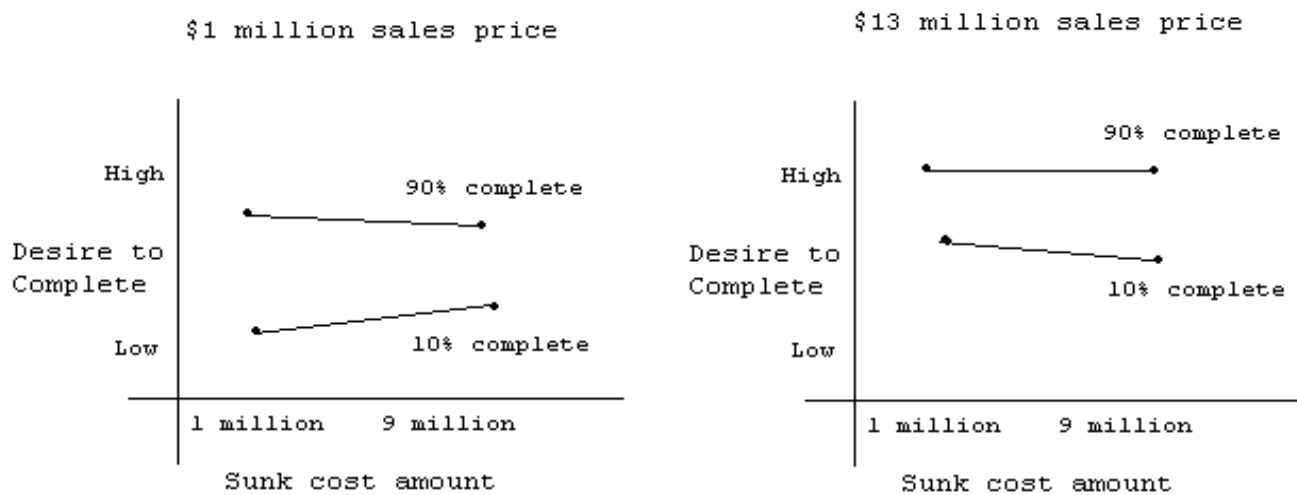


Figure 5 (Boehne and Pease, p. 186)

Table 1
Percentage of People who Chose the Irrational Option in each Scenario.

Scenario 1		Scenario 6	
	%irrational		%irrational
time sunk cost	52.0%	sunk cost/close	68.0%
time and money sunk cost	56.0%	sunk cost/not close	70.8%
no sunk cost	12.5%	no sunk cost/close	64.0%
		no sunk cost/not close	48.0%
Scenario 2		Scenario 7	
	%irrational		%irrational
deviated sunk cost	61.3%	high sunk cost/low switch	24.0%
non-deviated sunk cost	80.0%	high sunk cost/high switch	33.3%
no sunk cost	0.0%	low sunk cost/high switch	20.0%
		low sunk cost/low switch	8.0%
Scenario 3		Scenario 8	
	%irrational		%irrational
sunk cost/responsibility	83.3%	responsible	48.8%
sunk cost/no responsibility	80.0%	not responsible	72.0%
no sunk cost/responsibility	60.0%		
no sunk cost/no responsibility	52.0%		
Scenario 4/5		Scenario 9	
	%irrational		%irrational
sunk cost/inaction/negative s.c.	64.0%	sunk cost/loss	84.0%
sunk cost/inaction/positive s.c.	64.0%	sunk cost/gain	88.0%
no sunk cost/inaction/negative s.c.	36.0%	no sunk cost/loss	25.0%
no sunk cost/inaction/positive s.c.	10.6%	no sunk cost/gain	92.0%
sunk cost/action/negative s.c.	93.1%		
sunk cost/action/positive s.c.	80.0%		
no sunk cost/action/negative s.c.	28.0%		
no sunk cost/action/positive s.c.	20.0%		
		Scenario 10	
			%irrational
		sunk cost/responsible	50.0%
		sunk cost/not responsible	36.0%
		no sunk cost	16.7%

Table 2
Regression Analysis of the Factors in Each Scenario
(Significant Factors in bold)

Scenario 1

time versus time and money

	buy printer or not?	
	t	P> t
fee	0.28	0.784
regret score	-0.05	0.963
maxsat score	-0.01	0.993
taken ec1	0.45	0.656

	willingness to pay	
	t	P> t
fee	0.75	0.455
regret score	-0.17	0.869

sunk cost versus none

	buy printer or not?	
	t	P> t
sunk cost	3.64	0
regret score	-0.01	0.988
maxsat score	0.11	0.913
taken ec1	-0.06	0.95

	willingness to pay	
	t	P> t
sunk cost	3.64	0
regret score	-0.01	0.988
maxsat score	0.11	0.913

Scenario 2

deviating versus non-deviating

	buy ticket or not?	
	t	P> t
deviate	-2.01	0.048
taken ec1	-0.61	0.542
maxsat score	-1.5	0.137
regret score	1.45	0.151

	willingness to pay	
	t	P> t
deviate	1.78	0.08
regret score	-0.2	0.841

sunk cost versus none

	buy ticket or not?	
	t	P> t
sunk	7.06	0
taken ec1	-0.62	0.54
maxsat score	-1.12	0.267
regret score	0.9	0.371

	willingness to pay	
	t	P> t
sunk	-5.97	0
regret score	0.33	0.74

Scenario 3

	sell DVD or not?	
	t	P> t
sunk	2.93	0.004
responsibility	0.5	0.619
regret	0.68	0.499
taken ec1	-0.11	0.911
maxsat score	-1.84	0.069

	willingness to sell	
	t	P> t
sunk	4.03	0
responsibility	1.8	0.074
regret	-0.56	0.576

Scenario 4/5

	sell a particular stock or indifferent?	
	t	P> t
commission	1.09	0.277
sunk	6.76	0
s.c. positive	-1.09	0.277
taken ec1	0.18	0.857
maxsat score	-0.29	0.773
regret score	-0.38	0.706

Scenario 6

	go to faraway sub shop or not?	
	t	P> t
sunk cost	1.15	0.254
close to completion?	0.66	0.509
taken ec1	-0.65	0.52
maxsat score	0.2	0.84
regret score	-0.49	0.624

Scenario 7

	repair civic or not?	
	t	P> t
high sunk cost	1.42	0.158
high switch cost	1.36	0.179
taken ec1	-0.73	0.47
maxsat score	0.92	0.359
regret score	-0.59	0.559

Scenario 8

	continue research?	
	t	P> t
responsibility	-2.17	0.032
taken ec1	-1.09	0.278
maxsat score	-0.24	0.812
regret score	0.24	0.808

Scenario 9

	take gamble?	
	t	P> t
gain	-4.51	0
sunk cost	-3.09	0.003
taken ec1	0.72	0.475
maxsat score	1.03	0.307
regret score	0.03	0.976

Scenario 10

sunk cost versus none

	continue project or not?	
	t	P> t
sunk cost	2.69	0.009
takenec1	-1.06	0.293
maxsat score	-0.55	0.585
regret score	0.85	0.398

responsible versus not responsible

	continue project or not?	
	t	P> t
responsibility	1.14	0.26
taken ec1	-0.52	0.603
maxsat score	-0.77	0.445
regret score	1.26	0.213

Table 3
Average Willingness to Pay/Sell in First Three Scenarios.

Scenario 1 Willingness to Pay

Prediction: Time and \$\$ Sunk > Time Sunk cost > No Sunk Cost

	average WTP	s.d. WTP
none	\$116.41	18.84
time sunk	\$132.86	20.02
time and money sunk	\$137.50	17.82

Scenario 2 Willingness to Pay

Prediction: Deviated Sunk Cost < Non-Deviated Sunk Cost < No Sunk Cost

	average WTP	s.d. WTP
non-deviated sunk cost	\$16.02	11.85
deviated sunk cost	\$21.88	11.04
no sunk cost	\$35.00	0.00

Scenario 3 Willingness to Sell

Prediction: Sunk Cost > No Sunk Cost

Prediction: Responsibility > No Responsibility

	average WTS	s.d. WTS
no sunk cost/no responsibility	\$4.33	3.17
no sunk cost/responsibility	\$5.64	4.04
sunk cost/no responsibility	\$7.36	4.32
sunk cost/responsibility	\$9.29	4.69

Appendix 1

A comprehensive of each version of the ten different sunk cost scenarios.

Scenario 1

[time sunk cost]

You're looking to buy a new printer for your computer. After doing a bit of research, you decide that you want a KP Laserjet 5000. You see advertised on TV a computer fair up at King of Prussia. According to the ad, there are going to be hundreds of vendors there, selling all sorts of computer accessories at deep discounts. So you decide to drive the 30 minutes or so up to King of Prussia. When you get to the fair, you wander around and notice that there aren't any really good deals on printers. The cheapest KP Laserjet 5000 that you can find is about \$150, which is about the price you could pay to buy it online at KPLaserjetprinters.com. Moreover, you have a feeling that you could get better customer support if you bought it online, though there's no reason to suspect that if you buy it from this vendor that there will be any problems.

Would you buy the printer here? YES NO

If you're not willing to buy the printer here for \$150, what then is the most that you'd be willing to pay to buy the printer here at the computer fair? _____

[time and money sunk cost]

You're looking to buy a new printer for your computer. After doing a bit of research, you decide that you want a KP Laserjet 5000. You see advertised on TV a computer fair up at King of Prussia. According to the ad, there are going to be hundreds of vendors there, selling all sorts of computer accessories at deep discounts. So you decide to drive the 30 minutes or so up to King of Prussia. When you get to the door, you have to pay a \$10 charge just to get into this fair. After paying the \$10, you wander around and notice that there aren't any really exceptional deals on printers. The cheapest KP Laserjet 5000 that you can find is about \$150, which is about the price you could pay to buy it online at KPLaserjetprinters.com. Moreover, you have a feeling that you could get better customer support if you bought it online, though there's no reason to suspect that if you buy it from this vendor that there will be any problems.

Would you be willing to buy the printer here? YES NO

If you're not willing to buy the printer here for \$150, what then is the most that you'd be willing to pay to buy the printer here at the computer fair? _____

[no sunk cost]

You're looking to buy a new printer for your computer. After doing a bit of research, you decide that you want a KP Laserjet 5000. You see advertised in the paper a computer fair happening in your neighborhood. According to the ad, there are going to be hundreds of vendors there, selling all sorts of computer accessories at deep discounts. So you walk down to the fair to take a look. When you get there, you wander around and notice that there aren't any really exceptional deals on printers. The cheapest KP Laserjet 5000 that you can find is about \$150, which is about the price you could pay to buy it online at KPLaserjetprinters.com. Moreover, you have a feeling that you could get better customer support if you bought it online, though there's no reason to suspect that if you buy it from this vendor that there will be any problems.

Would you buy the printer here? YES NO

If you're not willing to buy the printer for \$150, what then is the most that you'd be willing to pay to buy the printer here at the computer fair? _____

Scenario 2

[non-deviated sunk cost]

Several weeks ago you paid \$35 for a ticket for a concert in Philly. On the day of the concert, you decide to take the 7:17 PM train into the city as you usually do when you go to concerts in Philly. The train leaves on time, but halfway there, the train suddenly stops in the middle of a tunnel. Somebody announces that the train has stopped because of a mechanical failure. By the time they fix the problem and you make it to the venue, the concert has already finished! You try explaining to the ticket salesperson your situation but she says that you she can't refund your money. However, she can sell you another ticket for a concert the next day at the same price of \$35.

Would you be willing to buy another ticket? YES NO

If you're not willing to buy another ticket for \$35, then what would be the most that you'd be willing to pay for another ticket? _____

[deviated sunk cost]

Several weeks ago you paid \$35 for a ticket for a concert in Philly. On the day of the concert, rather than take the train into the city as you usually do, you decide to borrow your friend's car and drive down to the concert. However, you leave campus a little late. To try to make it to the concert on time, you try to take a short-cut, but you end up getting completely lost. By the time you arrive, the concert is just about over. (Of course, if you had taken your normal route, you would have only arrived a few minutes late.) You try to get a refund for your ticket, but the ticket salesperson says that it's not policy to refund money for people who are late to concerts. However, the salesperson says that she can sell you another ticket for a concert the next day at the same price of \$35.

Would you buy another ticket? YES NO

If you're not willing to buy another ticket for \$35, what would be the most that you'd be willing to pay for another ticket? _____

[no sunk cost present]

You are heading into Philly to go to a concert. You were planning on buying the \$35 tickets with cash, but when you get to the salesperson, you realize that you had lost your jacket, which had the \$35 with which you were going to buy the ticket. Fortunately, though, you still have your wallet that has a credit card in it.

Would you use your credit card to buy a ticket? YES NO

If you're not willing to buy a ticket for \$35, then what would be the most that you'd be willing to pay for a ticket? _____

Scenario 3

[sunk cost/responsibility]

A while ago you bought a movie on DVD for \$28. You hadn't seen the movie before, but you thought from the catchy title and snazzy cover that you would enjoy it. You end up actually despising the movie and never even bother watching it a second time. Recently you've been feeling a little short on cash, so you decide to go to a store that buys used DVDs and try to sell this DVD. They only offer you \$2 for it.

Would you sell the DVD to them? YES NO

If you're not willing to sell it for \$2, what would be the least amount that you would be willing to sell the DVD for? _____

[sunk cost/no responsibility]

A while ago, your long-term boy/girlfriend went shopping. You gave him/her \$28 to buy a DVD for you to watch later that night. He/she asked you which movie you want and you said, "Surprise me." He/she bought a DVD of a movie that neither of you had seen but thought that both of you would enjoy. Later on that night, you watch the movie together and you both end up hating it.

A long time has passed since then. Recently you've been feeling short on cash, so you decide to go to a store that buys used DVDs and try to sell this DVD. You're pretty sure that your boy/girlfriend wouldn't even find out if you sold it and if they did, that they wouldn't mind. They only offer you \$2 for it.

Would you sell it to them? YES NO

If you're not willing to sell it for \$2, what is the least amount that you'd be willing to sell the DVD for? _____

[no sunk cost/responsibility]

A while ago, you bought a movie on DVD using a free DVD coupon that you had received as a gift. (You could only use the coupon for a few titles, and this seemed like the only one that you might enjoy.) You hadn't seen the movie before, but you thought from the catchy title and snazzy cover that you would enjoy it. You end up actually despising the movie and never even bother watching it a second time. Recently you've been feeling short on cash, so you decide to go to a store that buys used DVDs and try to sell this DVD. They only offer you \$2 for it.

Would you sell it to them? YES NO

If you're not willing to sell it for \$2, what would be the least amount that you would be willing to sell the DVD for? _____

[no sunk cost/no responsibility]

A while ago, you received a DVD as a gift from your aunt. You hadn't seen the movie but you thought, because of the catchy title and snazzy cover, that you would enjoy it. You ended up actually despising the movie and never even bother watching it a second time. Recently you've been feeling low on cash, so you decide to go to a store that buys used DVDs and try to sell them the DVD. They only offer you \$2 for it. (You know that your aunt won't find out if you sold the DVD and if she did find out, she really wouldn't care anyway.)

Would you be willing to sell it to them? YES NO

If you're not willing to sell it for \$2, what would be the least amount that you would be willing to sell the DVD for? _____

Scenario 4

[sunk cost/inaction/negative social comparison]

Imagine that you are a well-to-do businessperson with several kids that you have to put through college. You have a stock portfolio with 5000 shares of Company A stocks and 5000 shares of Company B, which a month ago were valued at \$30/share and \$20/share respectively. At that time, your friend had heard a tip and urged you to trade your Company A stocks for Company C stocks. He made the trade, but you passed up the opportunity and stuck with your Company A stocks.

Much to your dismay, you've watched the value of your Company A shares decline slowly over the past month from \$30/share to \$20/share. Company B stocks have remained steady at \$20/share. Company C's stock, on the other hand, has risen from \$20/share to \$30/share, so your friend made a nice profit.

Now your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell?

COMPANY A

COMPANY B

INDIFFERENT

[no sunk cost/inaction/negative social comparison]

Imagine that you are a well-to-do businessperson with several kids that you have to put through college. You have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were both valued at \$20/share. At that time, your friend had heard a tip and urged you to trade your Company A stocks for Company C stocks. Your friend made the trade, but you passed this opportunity up and stuck with your Company A stocks.

In the past month, your Company A and Company B stocks have remained at \$20/share. Your friend, though, earned a nice little profit, since his Company C stocks have increased from \$20/share a month ago to \$30/share now.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell?

COMPANY A

COMPANY B

INDIFFERENT

[sunk cost/inaction/positive social comparison]

Imagine that you are a well-to-do businessperson with several kids that you have to put through college. You have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were valued at \$30/share and \$20/share respectively. At the time, your friend had heard a tip and urged you to trade your Company A stocks for Company C stocks. Your friend made the trade, but you passed this opportunity up and stuck with your Company A stocks.

Much to your dismay, in the past month, your Company A stocks have declined from \$30/share to \$20/share. Your friend fared much worse, though. His Company C stocks, which were originally valued at \$30/share at the time of his trade, have since declined to \$3/share.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell?

COMPANY A

COMPANY B

INDIFFERENT

[no sunk cost/inaction/positive social comparison]

Imagine that you are a well-to-do businessperson with several kids that you have to put through college. You have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were both valued at \$20/share. At that time, your friend had heard a tip and urged you to trade your Company A stocks for Company C stocks. Your friend made the trade, but you passed this opportunity up and stuck with your Company A stocks.

In the past month, your Company A and Company B stocks have remained at \$20/share. Your friend, though, fared poorly. His Company C stocks have declined from \$20/share at the time of his trade to \$10/share now.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it.

Which stock would you rather sell? (Circle one)

COMPANY A

COMPANY B

INDIFFERENT

Scenario 5

[no sunk cost/action/positive social comparison]

Imagine, again, that you are a well-to-do businessperson with several kids that you have to put through college. This time, you have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were both valued at \$20/share. At that time, you had heard a tip and urged your friend to trade his Company A stocks for Company C stocks. You made the trade, but your friends passed this opportunity up and stuck with his Company A stocks.

In the past month, both your Company B and Company C stocks have remained steady at \$20/share. Your friend, though, has fared poorly since the Company A stocks that he kept have dropped in value from \$20/share to \$10/share.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it.

COMPANY B

COMPANY C

INDIFFERENT

[sunk cost/action/positive social comparison]

Imagine, again, that you are a well-to-do businessperson with several kids that you have to put through college. You have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were valued at \$30/share and \$20/share respectively. At that time, you had heard a tip that you should trade your Company A stocks for Company C stocks. You make the trade and urge your friend, who also owns a lot of Company A stocks, to trade for Company C stocks. He decided, though, to pass up this opportunity and stuck with his Company A stocks.

In the past month, your Company B stocks have remained steady at \$20/share. Much to your dismay, your Company C stocks have declined from \$30/share at the time of your trade to \$20/share. Your friend has fared even worse, though. The Company A stocks that he stuck with have declined even further, from \$30/share to \$3/share.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell?

COMPANY B

COMPANY C

INDIFFERENT

[no sunk cost/action/negative social comparison]

Imagine, again, that you are a well-to-do businessperson with several kids that you have to put through college. This time you have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were both valued at \$20/share. At that time, you had heard a tip and urged your friend to trade his Company A stocks for Company C stocks. You made the trade, but your friends passed this opportunity up and stuck with his Company A stocks.

In the past month, both your Company B and Company C stocks have remained steady at \$20/share. Your friend, though, has fared nicely since the Company A stocks that he kept have risen in value from \$20/share to \$30/share.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell?

COMPANY B

COMPANY C

INDIFFERENT

[sunk cost/action/negative social comparison]

Imagine, again, that you are a well-to-do businessperson with several kids that you have to put through college. This time, you have a stock portfolio with 5000 shares of Company A and 5000 shares of Company B, which a month ago were valued at \$30/share and \$20/share respectively. At that time, you had heard a tip that you should trade your Company A stocks for Company C stocks. You make the trade and urge your friend, who also owns a lot of Company A stocks, to trade for Company C stocks. He decided, though, to pass up this opportunity and stuck with his Company A stocks.

In the past month, Company B stocks have remained steady while Company A stock have gained in value from \$30/share to \$40/share, so your friend has made a bit of profit. On the other hand, your Company C stocks have declined in value from \$30/share at the time of your trade to \$20/share now, so you have lost money.

Your kid's tuition bill has arrived and you need to sell off some stock to pay it. Which stock would you rather sell? (Circle one)

COMPANY B

COMPANY C

INDIFFERENT

Scenario 6

[sunk cost/close to completion]

Several weeks ago, you went to Subboy's, a sub shop with pretty good subs and which seems to have locations all over the place. You ordered a foot-long tuna salad sub, which is your favorite type of sub. When you paid for

your sub, the cashier handed you a “frequent customer” card. Each time that you ordered a foot-long sub, they’ll stamp your card. After the 12th stamp, you are entitled to a free foot-long sub.

You have since gone to Subboy’s several more times, and you now have a total of 11 stamps on your card, one away from a free sub.

You go into Philly to watch a movie. After the movie is over, you feel rather hungry and decide that you want to have a foot-long tuna sub. You could go to Subboy’s and get that final stamp on your card. Or you could go to Joe’s Sub, which has roughly the same quality subs, but is also closer than Subboy’s to the movie theatre.

Which sub shop would you rather go to? [Note: If you go to Subboy’s, you don’t have to eat your free sub now; you can save the card for later.]

SUBBOY’S JOE’S SUBS

[no sunk cost/close to completion]

You go into Philly to watch a movie. After the movie is over, you notice that someone has dropped a card. You pick it up and noticed that it’s a “frequent customers” card for Subboy’s, where each time you buy a sub, they stamp the card. After the 12th stamp, you get a free foot-long sub. You notice that the card already has 11 stamps on it, one away from a free sub. There’s no indication of the card’s original owner, so you decide to keep it.

After picking up this card, you realize that you’re rather hungry and decide that you want to have a foot-long tuna sub. You could go to Subboy’s, which has excellent tuna subs and which has locations all over the place. Or you could go to Joe’s Subs, which has roughly the same quality subs, but is also closer than Subboy’s to the movie theatre.

Which sub shop would you rather go to? [Note: If you go to Subboy’s, you don’t have to eat your free sub now; you can save the card and eat your free sub at another time.]

SUBBOY’S JOE’S SUBS

[sunk cost/not close to completion]

Several weeks ago, you went to Subboy’s, a sub shop with pretty good subs and which seems to have locations all over the place. You ordered a foot-long tuna salad sub, which is your favorite type of sub. When you paid for your sub, the cashier handed you a “frequent customer” card. Each time that you ordered a foot-long sub, they’ll stamp your card. After the 12th stamp, you are entitled to a free foot-long sub.

You have since gone to Subboy’s a few more times and now have 4 stamps on your card.

You go into Philly to watch a movie. After the movie is over, you feel rather hungry and decide that you want to have a foot-long tuna sub. You could go to Subboy’s and get another stamp on your card, or you could go to Joe’s Subs, which has roughly the same quality subs, but is also closer than Subboy’s to the movie theatre.

Which sub shop would you rather go to? SUBBOY’S JOE’S SUBS

[no sunk cost/not close to completion]

You go into Philly to watch a movie. After the movie is over, you notice that someone has dropped a card. You pick it up and noticed that it’s a “frequent customers” card for Subboy’s, where each time you buy a sub, they

stamp the card. After the 12th stamp, you get a free foot-long sub. You notice that the card already has 4 stamps on it. There's no indication of the card's original owner, so you decide to keep it.

After picking up this card, you realize that you're rather hungry and decide that you want to have a foot-long tuna sub. You could go to Subboy's, which has excellent tuna subs and which has locations all over the place. Or you could go to Joe's Subs, which has roughly the same quality subs, but is also closer than Subboy's to the movie theatre.

Which sub shop would you rather go to? SUBBOY'S JOE'S SUBS

Scenario 7

[high sunk cost/low switching cost]

Last year, you bought a used 1987 Honda Civic with about 110,000 miles on it for \$2000. You spent another \$1100 to fix the brakes and the exhaust system and install a new stereo system, but other than that, it has been driving very smoothly and you haven't had any problems with it. However, just the other day you got into a pretty nasty accident and seriously damage the front of your car. You take the car to the mechanic and he estimates that to repair the alignment and the damage to the engine would cost about \$2000. While at the mechanic, you decide to call your parents about what happened to your car and how much it is going to cost to repair it. They then mention to you that your cousin is trying to sell her used 1991 Toyota Corolla. It has about 100,000 miles on it, in fairly decent condition, and, since you're family, she could probably sell it to you for \$1800. You urgently need to resolve your car situation soon so that you can get back to your normal, daily life.

Would you rather fix your Civic or buy your cousin's Corolla?

REPAIR CIVIC BUY COROLLA

[low sunk cost/high switching cost]

Last year, you bought a used 1987 Honda Civic with about 110,000 miles on it for \$2000. It has been driving very smoothly and you haven't had any problems with it. However, just the other day you got into a pretty nasty accident and seriously damage the front of your car. You take the car to the mechanic and he estimates that to repair the alignment and the damage to the engine would cost about \$2000. While at the mechanic, you decide to call your parents about what happened to your car and how much it is going to cost to repair it. They then mention to you that your cousin is trying to sell her used 1991 Toyota Corolla. It has about 100,000 miles on it, in fairly decent condition, and, since you're family, she could probably sell it to you for \$2700. You urgently need to resolve your car situation soon so that you can get back to your normal, daily life.

Would you rather fix your Civic or would you rather buy your cousin's Corolla?

REPAIR CIVIC BUY COROLLA

[low sunk cost/low switching cost]

Last year, you bought a used 1987 Honda Civic with about 110,000 miles on it for \$2000. For the past year, it has been driving very smoothly and you haven't needed to do any serious repairs. However, just the other day you got into a pretty nasty accident and seriously damage the front of your car. You take the car to the mechanic and he estimates that to repair the alignment and the damage to the engine would cost about \$2000. While at the mechanic, you decide to call your parents about what happened to your car and how much it is going to cost to repair it. They then mention to you that your cousin is trying to sell her used 1991 Toyota Corolla. It has about

100,000 miles on it, is in fairly decent condition, and, since you're family, she could probably sell it to you for \$1800. You urgently need to resolve your car situation soon so that you can get back to your normal, daily life.

Would you rather fix your Civic or would you rather buy your cousin's Corolla?

REPAIR CIVIC

BUY COROLLA

[high sunk cost/high switching cost]

Last year, you bought a used 1987 Honda Civic with about 110,000 miles on it for \$2000. You spent another \$1100 to fix the brakes and the exhaust system and install a new stereo system, but other than that, it has been driving very smoothly and you haven't had any problems with it. However, just the other day you got into a pretty nasty accident and seriously damage the front of your car. You take the car to the mechanic and he estimates that to repair the alignment and the damage to the engine would cost about \$2000. While at the mechanic, you decide to call your parents about what happened to your car and how much it is going to cost to repair it. They then mention to you that your cousin is trying to sell her used 1991 Toyota Corolla. It has about 100,000 miles on it, in fairly decent condition, and, since you're family, she could probably sell it to you for \$2700. You urgently need to resolve your car situation soon so that you can get back to your normal, daily life.

Would you rather fix your Civic or would you rather buy your cousin's Corolla?

REPAIR CIVIC BUY COROLLA

Scenario 8

[responsible]

Imagine that you are in the middle of working on a large research project about long-term memory. You've spent several months scouring through journals to research the theory behind it and to design the experiments. Of the several hundred subjects you were planning on testing, you've so far completed the experiments on about half of them.

You get an email from your advisor telling you to check out an old issue of an obscure psychology journal. Much to your dismay, you discover that several other researchers in the field have already explored the very same relationship that you were researching and they found results that you were expecting. Moreover, this article was published ten years ago by a couple of experts in the field, so you really should have encountered this article when you were doing your original background research. You're so far into the project that you can't alter the experimental set-up.

Would you rather attempt to complete this project by finishing the experiments or give up on this project and dedicate your time to researching some other topic?

FINISH PROJECT

WORK ON OTHER PROJECT

[not responsible]

Imagine that you are in the middle of working on a large research project about long-term memory. You've spent several months scouring through journals to research the theory behind it and to design the experiments. Of the several hundred subjects you were planning on testing, you've so far completed the experiments on about half of them.

You get an email from your advisor telling you to check out the latest issue of a popular psychology journal. Much to your dismay, you discover that several other researchers in the field have just discovered the very same relationship that you were researching and they found results that you were expecting. Moreover, you've talked with the authors of this paper before and they never mentioned this topic, so you had no idea that they were also looking into this field of study. You're so far into the project that you can't alter the experiment.

Would you rather attempt to complete this project by finishing the experiments or give up on this project and dedicate your time to researching some other topic?

COMPLETE PROJECT WORK ON OTHER PROJECT

Scenario 9

[sunk cost/gain]

You decide to take a job where you're promised \$50 to help someone clear a bunch of rough brush in front of his yard. It takes the entire afternoon and when you finish, you rest on his porch, salving your cuts and scratches with iodine and quenching your thirst with a tall glass of iced tea.

Your neighbor comes out and offers you an unusual choice. You could simply take \$50 and call it a day or you can play a gamble. The gamble goes as follows: You'll flip a fair coin and call it in the air whether it will land heads or tails. If you guess correctly, he'll give you \$100; if you guess incorrectly, then you get absolutely nothing.

Would you rather take the \$50 or do the gamble? TAKE \$50 GAMBLE

[sunk cost/loss]

You decide to take a job where you're promised \$150 to help someone clear a bunch of rough brush in front of his yard. It takes the entire afternoon and when you finish, you rest on his porch, salving your cuts and scratches with iodine and quenching your thirst with a tall glass of iced tea.

This person, though, is annoyed that you damaged his prized flower garden and threatens to dock \$50 of your pay. However, he then offers you a choice: you could either definitely lose \$50 from your pay or you could play a gamble. The gamble goes as follows: You'll flip a fair coin and call it in the air whether it lands heads or tails. If you guess correctly, he won't deduct a cent from your pay; if you guess incorrectly, though, he'll take \$100 from your pay.

Would you rather lose \$50 or do the gamble? LOSE \$50 GAMBLE

[no sunk cost/gain]

Let's say that you're offered a choice between receiving a certain \$50 or doing a gamble. The gamble goes follows: you flip a fair coin and you guess whether it lands heads or tails. If you guess correctly, you'll receive \$100; if you guess incorrectly, you'll receive nothing.

Would you rather take the \$50 or do the gamble?

TAKE \$50 DO GAMBLE

[no sunk cost/loss]

You are offered a choice between two distinctly bad options. You can either lose a certain \$50 or take a gamble. The gamble goes as follow: you flip a coin and guess whether it lands heads or tails. If you guess incorrectly, you will lose \$100; if you guess correctly you will lose nothing. You could either take the gamble or lose a certain \$50.

Would you rather lose \$50 or do the gamble? LOSE \$50 GAMBLE

Scenario 10

[sunk cost/responsible]

a) Let's say that you are in charge of the research and development section of a cell phone company. You're overseeing a \$10 million project to design a new model that would incorporate video along with all of the other standard features that cell phones have. So far, this project has spent \$7 million (70%) of the budget and the project is set to be completed after going through the remaining 30% of the budget. You hear from some of your salespeople that a competing company has just released a similar model that incorporates video, other new features, and is expected to be much cheaper, so that your model will probably do pretty poorly in the market.

Would you rather continue the development project or abandon the project?

CONTINUE PROJECT

ABANDON PROJECT

b) Your salespeople say that in a couple of weeks they can get more concrete sales projections for you. What is the minimum projected sales projection that would induce you to continue with the project? _____

[sunk cost/not responsible]

a) Let's say that you were just made in charge of the research and development section of a cell phone company. You've taken over a \$10 million project started by someone else to design a new model that would incorporate video along with all of the other standard features that cell phones have. So far, this project has spent \$7 million (70%) of the budget and the project is set to be completed after going through the remaining 30% of the budget. You hear from some of your salespeople that a competing company has just released a similar model that incorporates video, other new features, and is expected to be much cheaper, so that your model will probably do pretty poorly in the market.

Would you rather continue the research project or abandon the project?

CONTINUE PROJECT ABANDON PROJECT

b) Your salespeople say that in a couple of weeks they can get more concrete sales projections for you. What is the minimum projected sales projection that would induce you to continue with the project? _____

[no sunk cost]

a) Let's say that you are in charge of the research and development section of a cell phone company. You're considering starting a new R+D project to design a new model that would incorporate video along with all of the other standard features that cell phones have. Your proposed R+D project will cost \$3 million. Your salespeople come to you, though, saying that a competing company has already released a similar model that incorporates

video, other new features, and is much cheaper than what your phone is expected to cost. Thus, this proposed new model of yours might not do well in the marketplace.

Would you rather start this new project or abandon it? START ABANDON

b) Your salespeople say that in a couple of weeks they can get more concrete sales information for you. What is the minimum projected sales figure (in dollars) that would induce you to continue with the project?

Appendix 1

On the following pages, there are a number of questions to answer. Please indicate your response to each by **circling the appropriate number**.

Please try not to skip any items.

Please complete the questions in order.

Indicate how much you agree with each of the following by **circling the appropriate number**:

1. I am typically satisfied with what I have.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

2. Once I make a decision, I don't look back. **[Regret]**

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

3. I rarely pay much attention to how others around me are doing.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

4. Whenever I make a choice, I'm curious about what would have happened if I had chosen differently. **[Regret]**

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

5. Whenever I make a choice, I try to get information about how the other alternatives turned out. **[Regret]**

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

6. If I make a choice and it turns out well, I still feel like something of a failure if I find out that another choice would have turned out better. **[Regret]**

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

7. No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

8. Once I agree to do something, I make the best of it, even if it's a bad situation.

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

9. When I think about how I'm doing in life, I often assess opportunities I have passed up. **[Regret]**

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

10. When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I'm listening to.

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

11. When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.

1	2	3	4	5	6	7
Completely						Completely
Disagree						Agree

12. I treat relationships like clothing: I expect to try a lot on before finding the perfect fit.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree\

13. I often find it difficult to shop for a gift for a friend

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

14. Renting videos is really difficult. I'm always struggling to pick the best one.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

15. When shopping, I have a hard time finding clothing that I really love.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

16. I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

17. I'm comfortable with the fact that life is a series of compromises—most of the time I have to make do with “good enough” rather than “perfect.”

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

18. I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

19. No matter what I do, I have the highest standards for myself.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

20. I never settle for second best.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

21. Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

22. I often fantasize about living in ways that are quite different from my actual life.

1	2	3	4	5	6	7
Completely Disagree						Completely Agree

Please circle your answers to these questions. Remember that your answers are completely anonymous.

Gender: Female Male

Age: _____

What is your native language (i.e., the first one you learned to speak)? _____

Which income/class background do you consider yourself coming from?

- Lower class
- Lower/middle class
- Middle class
- Upper/middle class
- Upper class

Have you taken or are you currently taking any of the following economics classes here at Swarthmore (or their equivalent at another college or high school)? If so, then circle the classes you have taken.

Econ 1 (Intro to Economics) Econ 12 (Games and Strategies) Econ 11 (Intermediate Micro)

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