

Introduction

You and a few friends decided to have a beach day. You pick up your friends and drive for two hours excited for fun in the sun. But by the time you get to the beach it is painfully clear that it will rain soon. You could drive back home and watch a movie, which would be enjoyable, or you could stay at the rainy beach, which would be unenjoyable. But it would be a complete waste of the drive and the time to just head back. So you decide to stay at the beach for the day, even despite the nasty weather.

This scenario is just one example of the sunk cost fallacy. A sunk cost is a loss which is unrecoverable and, according to economics and decision theorists, should not affect future decisions since sunk costs are independent of whatever decision one makes next (Hastie & Dawes, 2010). However, people view these sunk costs as factors in their decisions, and pursuing something new can often be viewed as “wasting” one’s investment. However, just like in this scenario, continued investment in the first option leads to a greater loss of resources than would discontinue investment. So going back to the earlier example, the decision tree should look like this:

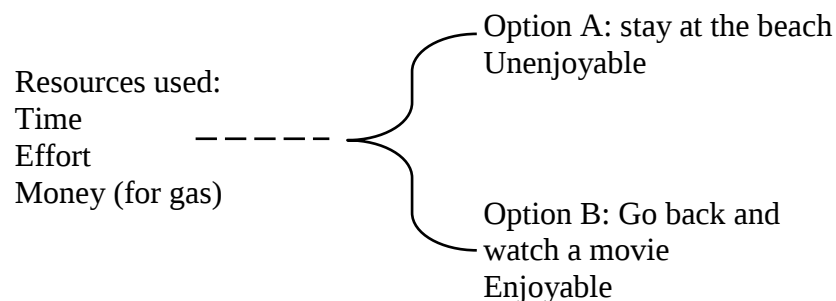


Figure 1: Rational Decision Tree

The dotted line signifies the lack of connection between your initial investments and your following choice. Regardless of whether you stay at the beach, you have already invested time,

effort, and gas money to get there in the first place and that will not change regardless of the decision you make. According to this model, you should choose Option B as it would be more enjoyable than Option A. However, when faced with this situation, and ones similar to it, people will choose Option B, just as was done in the example.

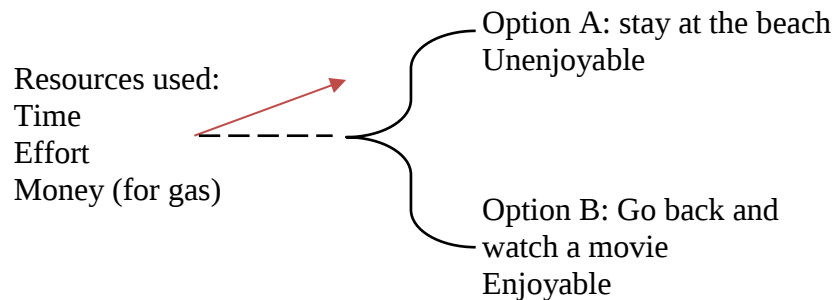


Figure 2: Decision Tree and the Sunk Cost Fallacy

In Figure 2, we see the same decision tree but now there is an added element of the sunk cost fallacy, represented by the arrow. Just as before, the sunk costs are objectively independent of the decisions to be made, again shown by the dotted line, but they are now being taken into account during the decision making process, as shown by the arrow. Because the person is still considering the sunk costs during their decision making process, they are now led to choose Option A, which is objectively not as enjoyable as Option B. By “honoring sunk costs” people end up making decisions which are, according to economic theory and decision theorists, irrational in terms of maximizing one’s utility (Hastie & Dawes, 2010). Ironically, more frequently than not, the need to not “waste” one’s resources in vain, which leads people to commit the sunk cost fallacy, actually leads to even more resources being lost, as demonstrated by the quintessential phrase “throwing good money after bad”.

Mental accounting coupled with prospect theory may hold the answer as to why people would make such an irrational decision. As Daniel Kahneman and Amos Tversky showed in their work on prospect theory, a collaboration which earned Kahneman the Nobel Prize in Economics, people tend to weigh losses more than gains, even if objectively the loss and gain are of equal value. They also show that, in terms of value, or utility as it is labeled by economists, each subsequent loss results in a smaller decrease than the loss before it and each subsequent gain results in a smaller increase than the gain before it (Kahneman & Tversky, 1984). That is to say, in economics terms, losses have decreasing marginal harm and gains have decreasing marginal utility. Therefore one should expect that a loss of \$100 dollars should hurt more than a gain of \$100 should gratify; additionally, under the theory one can expect that a loss of \$101 should hurt only a bit more than a loss of \$100 and that a gain of \$101 dollars should gratify only a bit more than a gain of \$100 (Kahneman & Tversky, 1984). Already there is a divergence from economic theory as a loss and a gain of equal value should lead to a net gain of zero utility (i.e. return to the status quo), yet research on prospect theory suggests, and later shows, that this in fact leads to a net negative utility. Yet the irony of the situation is that it is this very aversion to loss that drives the sunk cost fallacy; a waste of resources (a fruitless sunk cost) is seen as a loss that is more harmful than a gain may be if one were to invest resources into a new option.

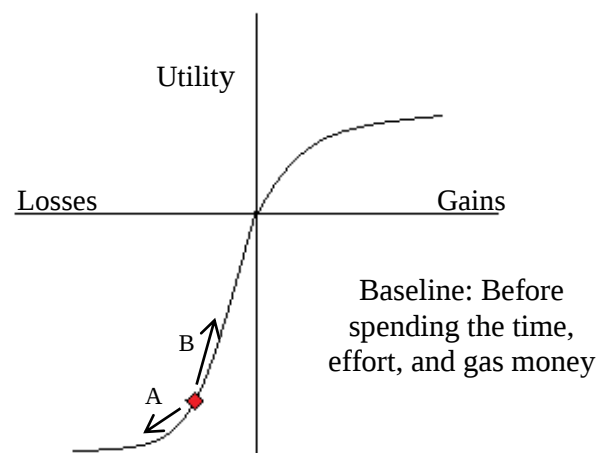
Prospect theory also requires an initial status quo which is determined through a process of mental accounting. As Richard Thaler explains, “a mental account is a frame for evaluation... [and] 'mental accounting'... [is] the entire process of coding, categorizing, and evaluating events” (1999). In essence, people organize events into separate groups with distinct values in order to evaluate their current situation. I.e. their present status quo point and it is once they have established this status quo that people frame their options, which involves weighing the

outcomes of these options. One can frame these options one of three ways: as a minimal account, which involves contrasting options irrespective of their commonalities; a topical account, which looks at the outcomes of decisions as they relate to the situation in which they arise and the status quo at that point; or a comprehensive account, which examines all factors and potential outcomes against the status quo (Thaler, 1999). According to economic theory and rational decision making, people should frame their opportunities using the comprehensive account so that they can maximize their utility. However, as was demonstrated by Kahneman and Tversky, people actually use the topical account when comparing choices which means “framing does alter choices in the real world because people make decisions piecemeal, influenced by the context of the choice” (Thaler, 1999).

So returning to the earlier example, one can see these effects are described in Figure 2. The factoring in of the time, effort, and gas money occurs because you and your friends use a topical account to analyze Option A and Option B. The fact that ultimately you and your friends choose Option A shows that you are less willing to incur a large loss to gain a benefit as staying at the beach would allow one to claim that the time, effort, and money spent driving to the beach was not in vain. With this information, one can model this scenario on Kahneman and Tversky’s value function.

Figure 3 shows the value function for the beach example when both options are framed within the context of the sunk costs, i.e. the topical account. Looking at the value function, it becomes easier to see why it may be that people fall for the sunk

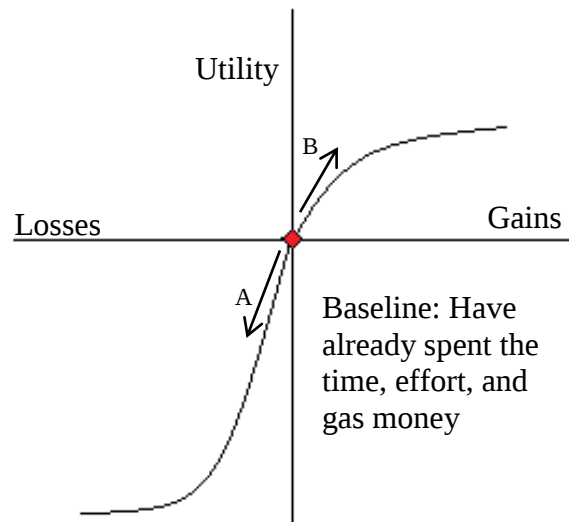
Figure 3: Value Function Derived from the Topical Account



cost fallacy. Option A would lead to greater loss than Option B, but due to the concave nature of losses the added loss of sticking to Option A does not hurt much more than the loss of the sunk costs. On the other hand, though Option B could lead to more utility (because a small gain affects net utility much less than a large loss) people may forgo this option because the “wasting” of resources will so greatly outweigh the gains of an enjoyable time.

However, if the same options are considered using a comprehensive account, the value function reveals a preference for Option B that is expected in Figure 1. In the comprehensive accounting frame (Figure 4) the sunk costs have already been factored into the status quo point and therefore do not affect utility whereas in the topical accounting frame (Figure 3) the costs have not been factored into the current status quo and are therefore still affecting the overall utility. As

Figure 4: Value Function Derived from the Comprehensive Account



can be seen in Figure 4 though, this shift along the curve has now made Option B the obviously correct option. By choosing Option A, one would only stand to lose compared to choosing Option B which, in this case, could only lead to a gain. This is what economic theory would lead us to believe people will do, but instead because people frame decisions using a topical account, they are led to the irrational choice and fall prey to the sunk cost fallacy.

This is not surprising as the only way one would see the sunk cost fallacy would be if people are still taking costs into consideration; however now that sunk costs can be considered as derivative of framing effects, it is reasonable to assume that if one could get people to engage in

comprehensive accounting (thereby changing the frame of reference and the status quo) that one could decrease that person's susceptibility to the sunk cost fallacy. We hypothesize that when presented with more options upfront, participants' attention will shift from the loss of resources to the available amount of resources, thereby shifting the frame from the topical accounting perspective to the comprehensive accounting perspective. According to this hypothesis, when presented with several more profitable (i.e. higher net utility) options in addition to the option to continue to invest in a failed enterprise, participants will be more likely to engage in comprehensive accounting and will therefore be less likely to commit the sunk cost fallacy than participants who are not presented with these viable options. Additionally, as economics has been shown to affect results on similar mental accounting tasks (e.g. determining the cost of drinking a bottle of wine) by training participants to use comprehensive accounting, we also hypothesize that participants with a background in economics will be less likely to commit the sunk cost fallacy overall than participants not familiar with economics and will be even less likely to do so when presented with multiple viable options than when options are not presented (Keys & Schwartz, 2007).