

Re-Thinking Fast and Slow

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Declaration of Interests

I declare that I have no relevant or material interests that relate to the research described in this paper.

Abstract

Daniel Kahneman's book *Thinking, Fast and Slow* (2011) has had a worldwide impact. The book's insights are profound and have changed the thinking of both decision scientists and general audiences about how choices are made. Kahneman, however, claims that standard utility theory cannot explain these insights because it 1) lacks "reference points" from which gains and losses can be measured, 2) does not predict loss aversion, and 3) assumes preferences are stable (amid supposed counter evidence). These alleged failures of utility theory are what led Kahneman and Tversky (1979, 1991) to develop prospect theory. This brief article shows that a close reading of *Thinking, Fast and Slow* reveals fundamental oversights in these criticisms. Not only does loss aversion arise naturally within utility theory for rational economic agents with stable preferences, but the very measurements of gains and losses rely directly upon reference points. Rather than overturning the insights of prospect theory, proper use of utility theory and its indifference curve representations reveals these behavioral insights and places them within the sturdier, longer-established framework of neoclassical microeconomic theory.

JEL: D01, D11, D91

1. Introduction

Daniel Kahneman's book *Thinking, Fast and Slow* (2011) has had a worldwide impact. It has changed the thinking of both decision scientists and general audiences about how choices are made. The book details many deep and profound behavioral insights. Some of these, according to the author, overturn traditional economic theories of choice and the methodologies used to model them. One that receives particular criticism is utility theory and its graphical depiction with indifference curves. The theory is deemed inadequate because it 1) lacks "reference points" from which gains and losses can be measured, 2) does not predict loss aversion, and 3) assumes

preferences are stable (amid supposed counter evidence). These alleged failures are what led Kahneman and Tversky (1979, 1991) to develop prospect theory and its graphical depiction with value functions. A close reading of *Thinking, Fast and Slow*, however, reveals fundamental oversights in these criticisms of indifference curve analysis. Not only does loss aversion arise naturally within an indifference curve framework for rational economic agents with stable preferences, but the very measurements of gains and losses rely directly upon reference points. Rather than overturning the insights of prospect theory, proper use of utility theory and indifference curve methodology reveals these behavioral insights and places them within the sturdier, longer-established framework of neoclassical microeconomic theory. Clarifying the neoclassical and behavioral linkage that exists within *Thinking, Fast and Slow* will enhance the book's value to economists and prevent potential readers from throwing out the neoclassical baby with the behavioral bathwater.

2. The Endowment Effect Arises for Stable Convex Preferences

The clearest explication of these oversights in *Thinking Fast and Slow* appears in Chapter 27, where Kahneman explores the endowment effect. In this chapter, Kahneman uses the device of two “hedonic twins,” Albert and Ben, with identical tastes and jobs as represented by position 1 shown below in Figure 1 (Kahneman’s indifference curve depiction) and Figure 2 (same as Figure 1, but excludes his superfluous indifference curve and includes his numerical values).

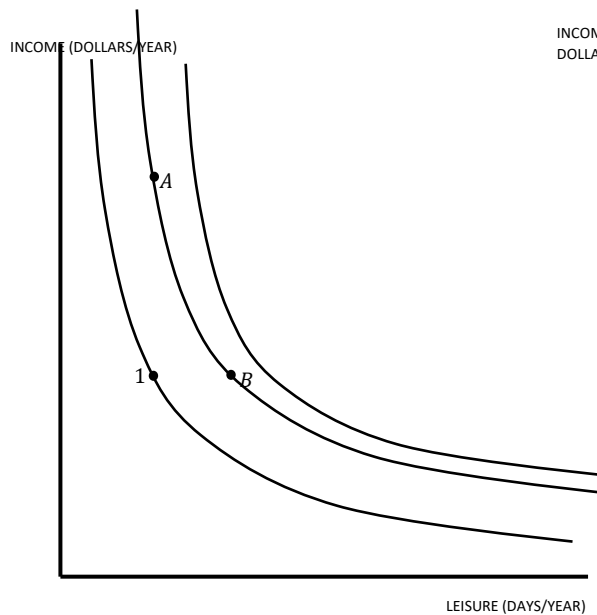


Figure 1: Original Depiction

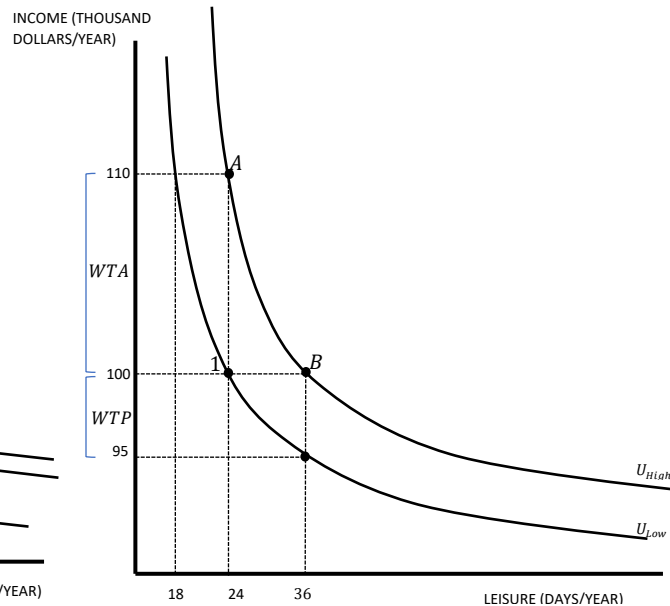


Figure 2: Detailed Depiction

In the scenario, the twins are offered the choice between two new jobs that differ only in the additional benefit each provides: a \$10,000 increase in their salary or 12 more vacation days,

depicted by A and B, respectively.¹ As the twins are indifferent between the two jobs, they flip a coin. Albert moves to position A taking the job offering the additional income, while Ben moves to B with the additional vacation days. After time passes, the twins are offered the opportunity to switch positions. According to Kahneman, this is the point at which utility theory fails and prospect theory succeeds in predicting behavior. He writes (pp. 291-292)

The standard theory represented in the figure assumes that preferences are stable over time. Positions A and B are equally attractive for both twins and they will need little or no incentive to switch. In sharp contrast, prospect theory asserts that both twins will definitely prefer to remain as they are. This preference for the status quo is a consequence of loss aversion [which occurs because even] if a gain of 12 vacation days was as impressive as a gain of \$10,000, the same improvement of leisure is not sufficient to compensate for a loss of \$10,000. Albert will stay at A because the disadvantage of moving outweighs the advantage. The same reasoning applies to Ben, who will also want to keep his present job because the loss of now-precious leisure outweighs the benefit of the extra income.

First, let us address the issue of reference points by asking the following; how should the “impressiveness” of a “gain of 12 vacation days” and “gain of \$10,000” be measured? Standard microeconomic theory uses the Willingness To Pay (WTP) to measure the value of moving from position 1 on the initial utility level, U_{Low} , to the higher utility level, U_{High} , at either A for a gain in extra salary or B for a gain in extra vacation days. The WTP for 12 additional vacation days is measured by how much additional income the twins could forego (pay) and still maintain utility level U_{Low} . This value is \$5,000 in forgone salary (100 – 95 on Figure 2), and not the \$10,000 offered. Similarly, the twins’ WTP for the additional \$10,000 is 6 forgone vacation days (24 – 18 on Figure 2), not the 12 offered. Albert and Ben’s valuations are different, however, at their higher utility levels at A and B on U_{High} . These points serve as references from which standard economic theory measures the amount to “compensate for a loss of \$10,000” by the Willingness To Accept (WTA) at the higher utility level, U_{High} . That is, Ben would need \$10,000 (not \$5,000) in additional income to compensate him for his loss in vacation days as he moves back to position 1, while Albert would require 12 (not 6) more vacation days to lose his additional income and move back to 1.

This analysis contradicts Kahneman’s claim that the “representation of indifference curves implicitly assumes ... evaluation of a possible job does not depend on the terms of your current job.” The WTP and WTA methods of evaluation depend entirely on the twins’ current job characteristics as portrayed by a point on their current indifference curve. In Kahneman’s terms, reference points do matter to valuations with indifference curves. Ben’s WTP for the movement to B can only be measured in reference to where he started, position 1. His WTA for the movement back to position 1 can only be measured in reference to its starting point, B. The same requirements hold for Albert to measure his corresponding WTP and WTA values.

Notice also how the WTA and WTP analysis with indifference curves directly contradicts Kahneman’s claim that indifference curves do not predict that “disadvantages [i.e., losses] will loom larger than advantages [i.e., gains].” This asymmetry between commensurate losses and

¹ Note that a potential problem arises immediately by using income and leisure—standard components in a budget constraint (i.e., “time” and “money”)—as arguments in a utility function. Such a procedure is generally avoided as it easily creates confusion in the analysis as will be shown below.

gains – the loss aversion exhibited by $WTA > WTP$ – arises automatically and necessarily when indifference curves are convex.

3. Preferences Are Fixed; It Is Behavior That Varies with The Reference Point

How was the complementarity between behavioral outcomes and utility theory with indifference curve methodology overlooked by Kahneman? The problem arises from confusing changes in behavior for changes in preferences. This results in prospect theory explaining loss aversion as changes in preferences rather than behavior, as utility theory does.

Consider the utility theory explanation of Ben's behavior. Giving Ben additional vacation days increases his utility and moves him to a higher indifference curve. Greater increases in utility, appear as greater distances between indifference curves which create a larger gap between Ben's WTA and WTP for vacation while lowering its marginal utility. In other words, providing more vacation days to Ben decreases the value of an additional vacation day while raising the amount of salary that must be provided for any decrease in vacation days to maintain the higher utility. Under this explanation, the apparent change that Kahneman notices in Ben's valuation of vacation days comes from the need to maintain U_{High} of utility, rather than a change in his tastes or preferences.

Prospect theory, on the other hand, ascribes the endowment effect to a change in preferences. Endowing Ben with 12 additional vacation days alters his preferences for vacation days which causes WTA to exceed WTP. In fact, the increase in leisure causes leisure to become more, rather than less, valuable (e.g., "now-precious leisure"). The preference change means Ben is no longer indifferent between points A and B. Preferences and the utility function that describes them are unstable and subject to further changes. This explanation is problematic on a few grounds. First, invoking preference instability to explain the endowment effect unnecessarily complicates the analysis and invites ad hoc explanations based on changes in tastes. Such explanations reduce the testability of the theory. Worse, attributing Ben's differing valuation to an increased endowment of leisure creates internal contradictions. For example, economic theory and common experience indicate increases in leisure should become less valuable at the margin. That is, the preciousness of leisure should be lower at B as the flatter indifference curve and common experience both imply. Otherwise, the value of a good increases with its abundance rather than its scarcity. Attributing these impacts to changes in behavior, rather than preferences, fully complies with utility theory and preserves our common notions of value and scarcity.

Kahneman's empirical support for prospect theory's explanation of the endowment effect also requires scrutiny. In fact, it may even provide support for the utility theory explanation. The test of the endowment effect he cites is from his 1990 paper with Knetsch and Thaler (Kahneman et al., 1990) using their famous decorative mugs experiment among undergraduates. After randomly endowing half the participants with a mug decorated with school insignia, these "Sellers" were allowed to sell their mugs to those without mugs, "Buyers." Buyers had to use their own money to purchase a Seller's mug. As utility theory with convex and stable preferences would predict, loss aversion arose with the $WTA > WTP$. Specifically, the average Seller's valuation of the mug was \$7.12; the average Buyer's, \$2.87. To ensure this divergence in values was caused by the endowment effect, a third group was included who could receive either a mug or a sum of money they deemed adequate. These "Choosers" indicated \$3.12 was as desirable as receiving the good. The authors claimed this proved the endowment effect existed and operated

as emotions changed one's preferences for the endowed good. Kahneman argues (p. 296) that the "...gap between Sellers and Choosers is remarkable, because they actually face the same choice! If you are a Seller you can go home with either a mug or money, and if you are a Chooser you have exactly the same two options. The long-term effects of the decision are identical for the two groups. The only difference is in the emotion of the moment."

Utility theory explains the difference between Chooser and Seller valuations as arising from a change in constraints rather than preferences. To illustrate the situation, we revise Figure 2, this time by placing Decorative Mugs on the horizontal axis and the dollar value of all other goods, \$Y, on the vertical axis. Assume the representative non-mug participant to start at position 1 with \$10 and 2 different decorative mugs at home. The WTP for the mug at this position is \$2.87 (\$10 - \$7.13). Participants who have been endowed with the insignia mugs begin at position A and have a WTA of \$7.12 (\$17.12 - \$10). Note that the Buyer and Seller valuations conform to the previous examples and are well-explained within the indifference curve framework.

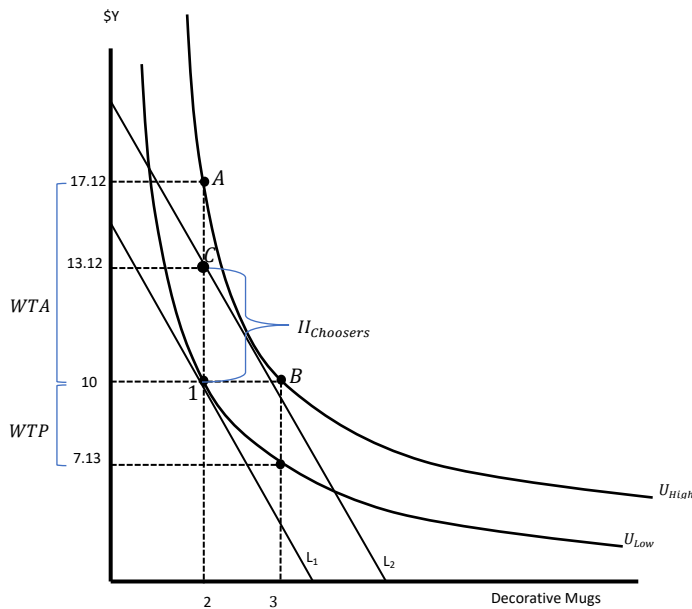


Figure 3: Revision 2 – Decorative Mugs

Contra Kahneman, Choosers are not the same as Sellers. While Sellers endowed with the mug would view themselves at point B, Choosers would view themselves as being at the same position as buyers: starting at point 1 with neither mugs nor money. Their choice is between two "gains". They can either "receive the mug" or "a sum of money" that is "as desirable as receiving the [mug]". This is viewed as a move from 1 to a position on the indifference curve, U_{High} , where the "desirability" of each position is the same by definition. Unlike Buyers who must sacrifice their own income to move to U_{High} , Choosers are asked, in essence, to estimate the increase in income that would move them to U_{High} . To capture the increase in income, two budget lines are drawn. The first, L_1 on U_{Low} , must lie tangent to position 1 if we follow standard economic theory and assume Choosers optimize such that their marginal rate of substitution, MRS, equals

the relevant price ratio (i.e., the slope of utility and the budget line at position 1 are equal). The estimated increase in income is represented by a parallel budget line, L_2 , tangent to U_{High} . Convex indifference curves require the MRS at 1 be smaller than the MRS at A, which requires the income increase for Choosers to be smaller than the WTA for Sellers, in accordance with the empirical results. The income shift for Choosers to U_{High} – the desirability of the mug in terms of income – is shown as the gap between C and 1 and labeled II Choosers in Figure 3. The required income increase is \$3.12 (\$13.12 - \$10). Though there are many possible values that could arise based on the level of convexity, the values will reasonably be closer to the WTP than the WTA value.

4. Eliminating the Endowment Effect: “Thinking Like a Trader” Or Recognizing Perfect Substitutes

A final argument for using neoclassical economic theory to illustrate behavioral insights comes at the end of Chapter 27, where Kahneman considers how one can avoid falling victim to the endowment effect. His answer: think like a “trader.” He argues that expert traders in commerce and finance face multiple gains and losses on a daily basis and must learn to ignore reference points and avoid overweighting losses. To do so, they alter their preferences in order to treat the assets they trade as goods that are simply “carriers of value for future exchanges.” That is, they are to treat their goods as perfect substitutes for the money they can earn, so dollars and the particular good are mutually interchangeable. Under neoclassical utility theory, goods that are perfect substitutes are depicted by straight, linear indifference curves as shown below using the income and leisure example.

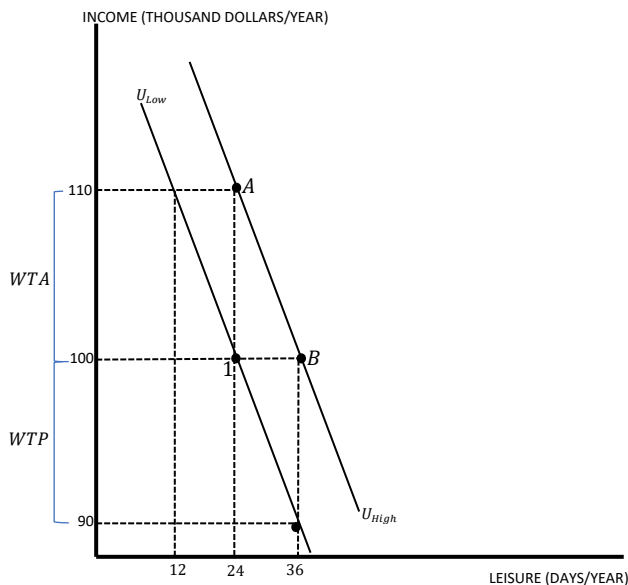


Figure 4: Revision 3

Perfect substitutes exhibit no diminishing MRS. Both the WTP and WTA for 12 vacation days is \$10,000 and the WTP and WTA for \$10,000 is 12 vacation days, regardless of one’s current

level of either. Neoclassical economic theory accounts for the psychological conditions Kahneman requires for “thinking like a trader.” One need not attempt to alter inherent preferences to ignore reference points; gains and losses are invariant to reference points with perfect substitutes. One need not engage in psychological manipulation to cease weighing losses more than gains; loss aversion (and thus the endowment effect) simply cannot exist for perfect substitutes. One merely needs to recognize the goods for what they are: perfect substitutes. Changing how a good is perceived seems simpler than changing one’s psychological response to the good.

5. Conclusion

Thinking, Fast and Slow is a magisterial book whose insights are profound and true. This short note argues that neoclassical economic theory represents and clarifies these insights better than prospect theory. Contra Kahneman, reference points are integral to measuring gains and losses with indifference curves and loss aversion is a built-in feature. These behavioral insights can be modeled without assuming any violations of preference stability. Thinking, Fast and Slow should be read with this neoclassical framework in mind to reveal the link between these new insights and our long-established, standard economic theory.

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