

A Methodological Appraisal of Experienced Utility

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Abstract

I offer a methodological appraisal of Kahneman et al.'s (1997) theory of experienced utility and discuss its application to welfare evaluation. I examine the philosophical limits of two temporal axioms—Separability and Time Neutrality—and investigates the informational basis of the theory by contrasting moment utility with remembered utility. I argue that remembered utility holds greater normative value than moment utility, as personal welfare judgments are more strongly determined by retrospective evaluations than by instantaneous experiences. While some underlying assumptions of the theory remain contestable, I propose refinements to measurement tools such as the Day Reconstruction Method (DRM), emphasising the importance to include the distance between two events being evaluated (*temporal distance*) and the relative weight of different time periods (*temporal significance*). These refinements aim to enhance the interpretive accuracy of experience-based data and to clarify how such data can inform welfare-relevant judgments.

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1 Introduction

The ambition to quantify pleasure and pain for welfare evaluation relies on a central assumption, namely that preferences can be meaningfully measured on a cardinal scale. For utilitarians such as Edgeworth (1881), preference intensity was a legitimate foundation for welfare analysis. This view, however, lost traction with the rise of the “ordinalist” revolution in the early 20th century, led by Pareto (1909), Robbins (1932) and Hicks and Allen (1934), who argued that only ordinal preference rankings—those that reflect choice without assuming measurable utility—were scientifically defensible. While some proponents of cardinal utility like Harsanyi (1953, 1955) continued to pursue this line of thought throughout the 20th century, a major turning point came in the 1990s, when interest in cardinality was renewed. This resurgence was spurred by results from experimental studies that suggested a theoretical distinction between the utility revealed through choices (*decision utility*) and the hedonic outcomes actually experienced (*experienced utility*).¹ In Kahneman et al.’s usage, decision utility refers to the numerical representation of preferences over outcomes, as revealed through choices. This interpretation is used in formal decision models such as expected utility theory (von Neumann and Morgenstern 1944 [2007]). Experienced utility is the hedonic quality as in Bentham’s (1780) usage. It specifically pertains to the experience of pain and pleasure. Since decision utility is inferred from observed choices, and because choices are prone to errors of judgement, a major concern of Kahneman et al. (1997) is that individuals may not always choose the outcome that makes them better off.² The idea behind using experienced utility instead of decision utility as a welfare criterion is that it refers to the *direct measurement* of individuals’ actual experiences—how good or bad they feel—thereby avoiding the problem that some choices may not reflect people’s “true” welfare due to various errors of judgment about their own welfare.³

There have been notable contributions about the role of hedonic measurement for welfare evaluation and its limits (Alexandrova 2005, 2018; Layard 2006; Colander 2007; Loewenstein and Ubel 2008; Hausman 2010; Angner 2013; Fumagalli 2013, 2019; Fabian 2022; among others). While these contributions provide valuable insights into the conceptual, empirical, and methodological challenges of hedonic measurement, none of them exclusively focus on the normative theory of experienced utility, as originally conceived by Kahneman et al. (1997). What makes this theory particularly important is that

¹For the individual contributions (in chronological order), see Kahneman and Snell (1990), Kahneman and Varey (1991), Kahneman and Snell (1992), Varey and Kahneman (1992), Kahneman et al. (1993), Fredrickson and Kahneman (1993), Kahneman (1994), Redelmeier and Kahneman (1996), Kahneman et al. (1997), Kahneman (1999), Kahneman (2000), Kahneman et al. (2004), Kahneman and Sugden (2005), Kahneman and Krueger (2006), Dolan and Kahneman (2008).

²Errors of judgment are interpreted through the large number of biases documented in the behavioural economics literature, such as *framing*, *status quo*, *anchoring*, *present bias*, among many others. This later shaped the development of behavioural welfare economics, which seeks to evaluate welfare under the assumption that individuals systematically make suboptimal or mistaken choices due to these biases. See Camerer et al. (2003), Thaler and Sunstein (2003), and Bernheim and Rangel (2007, 2009) for influential contributions to this field. For a literature review, see Mitrouchev (2024).

³Note that experienced utility is not to be considered as a more accurate proxy for welfare than decision utility in general. Experienced utility aligns with a hedonistic account of welfare—where positive and negative experiences are what ultimately matter—whereas decision utility typically corresponds to a preference-satisfaction view. For an argument that subjective measures of welfare presuppose hedonism, see Angner (2011).

it represents the first systematic attempt to provide an axiomatic framework for aggregating moment-to-moment hedonic states into a single welfare measure. Unlike broader debates about the evaluative relevance of hedonism, the epistemic status of hedonic reports, or the comparison between hedonic measures and preference-based indicators, the normative theory of Kahneman et al. (1997) explicitly lays out the conditions under which pleasure and pain over time can be aggregated. This constitutes a shift from the relevance of hedonic welfare to its formal structure. Thus, the discussion here is not about whether hedonic states are useful or valid for welfare evaluation, but how these states must be organised and interpreted in order to support welfare judgments. The present contribution therefore aims to assess the internal coherence of this theory, not as a defence of hedonism, but as an operational framework for welfare analysis grounded in hedonic psychology.⁴

The rest of the article is organised as follows. Section 2 briefly presents the normative theory of experienced utility, as originally formulated in Kahneman et al. (1997), by explicitly outlining the experienced utility criterion, the axioms of the theory that are the focus of the present methodological assessment, as well as the key concepts of the theory, which are also required to expose my appraisal. Section 3 discusses the philosophical limits of two particular axioms—Separability and Time Neutrality—which, I argue, are incomplete and require conceptual refinement by introducing the notions of *temporal distance* and *temporal weighting* (respectively). Section 4 provides a discussion about reconsidering the informational basis of experienced utility measurement with *remembered utility*—the hedonic feeling associated with the recollection of a past event—rather than *moment utility*—the hedonic feeling experienced in the present moment. I conclude in Section 5 by suggesting some directions for future research, in particular investigating more concretely whether the empirical difference between decision utility and experienced utility is significant—a question that remains largely unexplored at this stage.

2 The Normative Theory of Experienced Utility

According to the experienced utility criterion, a situation is judged to be better than another if it maximises the level of total utility. Total utility is defined as the temporal integral of experienced utility. Formally, let $x = (x_1, \dots, x_n) \subseteq X$ be a realisable set of an individual's situation (e.g. a consumption bundle or health states) and let X be the set of outcomes. I denote $i = \{0, \dots, n\}$ as the index of time for each element of the vector x . For example, x_1 is a certain level of health state at time 1, x_2 is another level of health state at time 2, and so on. Total utility is an individual welfare function $W(x)$ of the form,

$$W(x) = \int_0^n u(x_i) di$$

⁴Naturally, if hedonic states were not at least minimally informative about welfare, then questions about how to organise or interpret them would be meaningless. For such a long-established view of ethics as hedonism (following Bentham and, much earlier, Epicurus), it does not seem necessary to provide a full defence of hedonism to examine the internal coherence of the normative theory of experienced utility (Kahneman et al. 1997). Also, contributors to the experienced utility framework acknowledge that hedonic experience is *one* factor in welfare evaluation, alongside other factors. See in particular Varey and Kahneman (1992, p. 169), Kahneman (1994, p. 21), Kahneman et al. (1997, p. 377) and Kahneman and Sugden (2005, p. 176).

where $u(x_i)$ is the individual's utility profile of x at time i and \int the integral of all utility profiles, which allows for the calculation of the total utility of the individual over the time period being considered.⁵ The central evaluative rule of the experienced utility criterion can be formulated by the following premise. *An individual's situation is better than another if it has more level of total utility than another.* The experienced utility criterion is then satisfied under the following condition.

$$W(x) \geq W(x') \implies x \succeq x'$$

The construction of the temporal integral of moment utilities relies on a set of assumptions, presented in the form of axioms as defined by Kahneman et al. (1997) and further clarified in Kahneman (2000). Specifically, Kahneman et al. (1997) provide the initial axiomatisation of experienced utility theory, while Kahneman (2000) offers a more refined version in which certain implicit assumptions embedded within earlier axioms are made explicit and reformulated as distinct axioms. In this paper, three axioms, as formulated by Kahneman (2000), are of particular interest, as each entails distinct philosophical commitments regarding how experiences should be evaluated over time:

- **Separability.** *The order in which moment utilities are experienced does not affect total utility.*
- **Time Neutrality.** *All moments are weighted alike in total utility.*
- **Inclusiveness.** *The measure of moment-utility should incorporate all the aspects of experience that are relevant to this evaluation, reflecting the affective consequences of prior events (e.g. satiation, adaptation, fatigue), as well as the affect associated with the anticipation of future events (fear, hope).*

Separability and Time Neutrality are normative rules that specify how total utility is constructed from moment utilities. They are necessary for summing moment utilities into total utility. In particular, Separability means that the contribution of an element to the total utility is independent of the elements that are preceded and followed it. Time Neutrality means that the temporal distance between an outcome and its retrospective assessment is entirely irrelevant to its evaluation. As for Inclusiveness, it specifies the boundaries of the welfare-relevant domain by stating that only moment utility—that is, what is experienced here and now—constitutes the informational basis of experienced utility theory. Before discussing these axioms in detail, it is essential to clarify the key concepts introduced by Kahneman et al. (1997) in order to fully grasp the core limitations that will be discussed in Section 3 and Section 4. In what follows, I briefly define these concepts and provide a graphical representation of their relationships.

In standard microeconomic theory, the utility function $u : X \rightarrow \mathbb{R}$ assigns a number to each feasible alternative, such that more preferred alternatives receive higher numerical values than less preferred ones. However, the numerical value is here only relevant to allow for an ordinal ranking of decision utilities. It does not express the *preference intensity* of the alternative chosen. Instead, this is what the concept of experienced utility does. For any given alternative (e.g. a consumption good or health state), it is assumed

⁵Although a sum can be used instead of an integral to represent the aggregation of utility profiles over time, the integral provides a more accurate representation, as it captures the area of pleasure (or pain) under the utility curve. This also reflects the continuous nature of time.

that an individual has an assigned hedonic state expressed in a numerical value, which describes her preference intensity. Typically, we have $u : X \rightarrow \Psi$, where the set of hedonic states (or scale) is denoted by $\Psi = \{-10, \dots, 10\}$. I now incorporate the temporal dimension to account for the different points in time at which hedonic states are experienced.

Moment (or instant) utility refers to the hedonic value associated with an experience at a given point in time. It captures both the valence (pleasant or unpleasant) and the intensity (mild to strong) of an individual's current affective state. For example, the enjoyment a person derives from consuming a good or performing an activity has a particular intensity that depends on her subjective evaluation, which can be reported on a hedonic scale. An *episode* denotes a continuous time interval defined by its temporal boundaries. For example, during the time an individual consumes a bundle, one episode passes. Formally, let $[B, E] \in N$ be a time interval that contains all time points relevant to the analysis and let X be the set of outcomes. An episode is a function $f : [b, e] \rightarrow X$, for $B \leq b$ and $e \leq E$.⁶

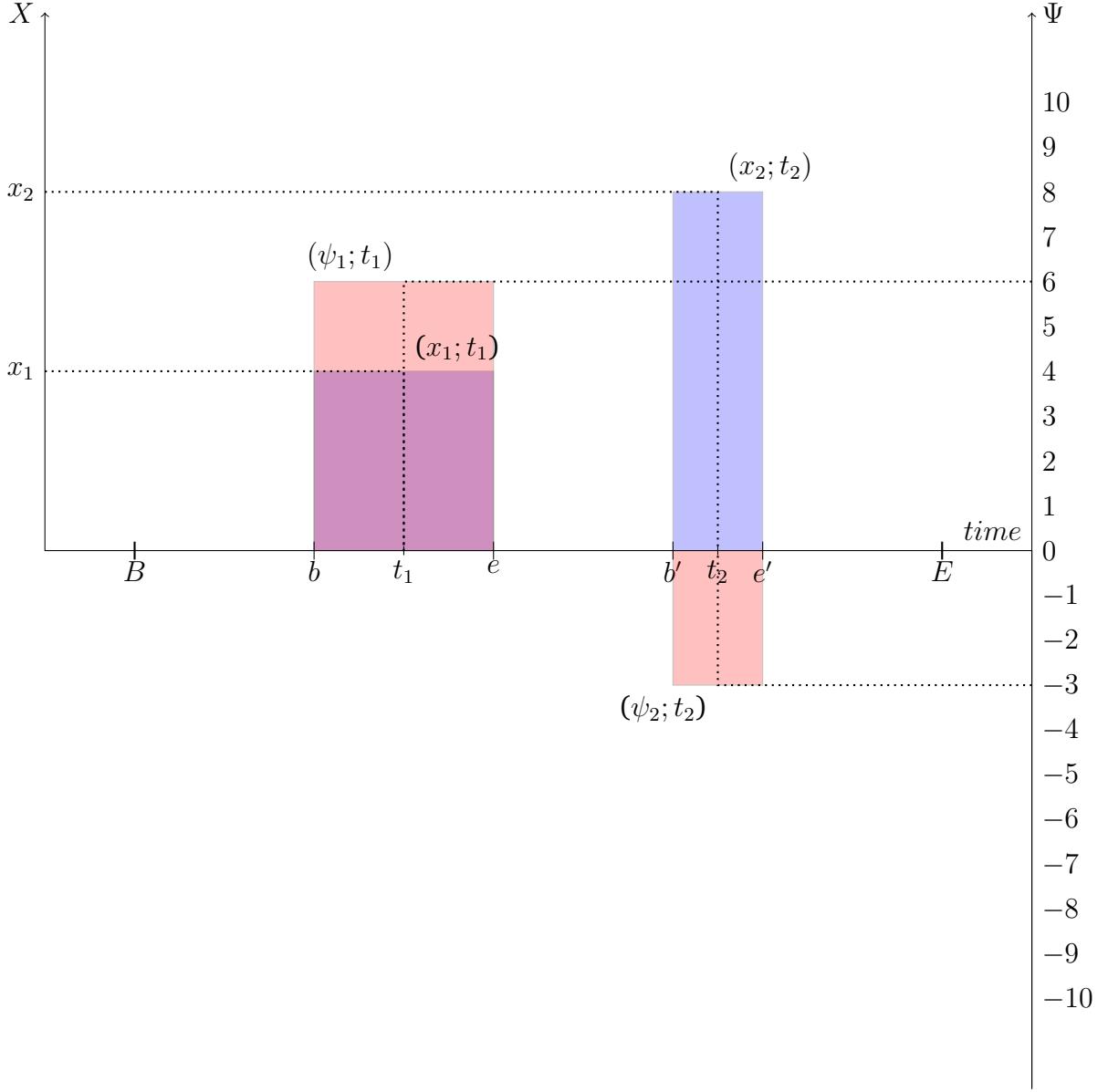
A *temporally extended outcome* (TEO) is the union of two or more separated episodes. For example, the consumption of x_1 and x_2 represents two episodes. Formally, a TEO is a mapping from a finite disjoint union of subintervals of the time interval $[B, E]$ to the set of outcomes X . That is, $f : [b, e] \cup [b', e'] \rightarrow X$ is one TEO, $f : [b, e] \cup [b', e'] \cup [b'', e''] \rightarrow X$ is another TEO, and so on.⁷ A utility profile of a TEO (or simply *utility profile*) is a function that assigns a level of moment utility to each time point. Informally, we can interpret it as an extensive definition of moment utility by introducing time as an explicit variable. This allows moment utility to fit into any temporality: either a time slice, an episode, or a TEO. For example, the enjoyment of an individual in consuming a good (in a given intensity) can be represented at time 1, time 2, etc. Formally, a utility profile is a function $u : 2^{[B, E]} \rightarrow \Psi$, with $[B, E]$ the set of slices in time.

To maintain the standard notation $u(x)$, I denote a utility profile by $u(x_i)$, where $i = \{0, \dots, n\}$ is the index of time. Eventually, *total utility* is the addition of all utility profiles of an episode or TEO. For example, during the time period at which the social planner observes an individual's behaviour, she consumed two goods. The addition of the two utility profiles x_1 and x_2 is described by the total utility of the time interval in which she experienced these two things separately. Formally, let $u(x_1)$ be one utility profile at time 1 and $u(x_2)$ another utility profile at time 2. $W(x) = u(x_1) + u(x_2)$ represents the total utility of experiencing x_1 at time 1 and x_2 at time 2. From a welfarist standpoint, $W(x)$ is an objective function that a benevolent social planner aims to maximise. Figure 1 below provides a visual representation of the relation between time (N), outcomes (X) and hedonic states (Ψ).

⁶All time intervals are assumed left-closed and right-open because the union of episodes should not include two slice times of different episodes.

⁷We can denote the general definition of a TEO by $f : 2^{[B, E]} \rightarrow X$, where $2^{[B, E]}$ is the set of all possible collections of subintervals in $[B, E]$.

Figure 1: Graphical representation of experienced utility measurement



The x -axis represents the time variable N , to which each slice of time or interval belongs to. The time interval $[B, E]$ contains all time points relevant to the analysis, typically the evaluation of one's experience. The intervals $[b, e]$ and $[b', e']$ contained in $[B, E]$ are two distinct episodes, e.g. $[b, e]$ represents one hour and $[b', e']$ represents thirty minutes. The finite disjoint union of $[b, e]$ and $[b', e']$, which maps to a set of outcome X , is a TEO. Visually, it is represented by the blue area, where $\{x_1, x_2\} \in X$. For the sake of illustration, x_1 gives the individual a hedonic feeling of 6, while x_2 gives her a hedonic feeling of -3. The y -axis on the left represents outcomes, given by e.g. one consumption good or health state (x_1), and another consumption good or health state (x_2). The y -axis on the right represents the hedonic scale $\Psi = \{-10, \dots, 10\}$. The higher the value, the more enjoyable the experience is—and conversely. The experience of one or several outcomes (e.g. consumption goods or health states) is represented by a utility profile. In the present illustration, we have two utility profiles: $f : [b, e] \rightarrow \Psi$ and $f : [b', e'] \rightarrow \Psi$. Visually, a utility profile is represented by the red area, where $\{\psi_1, \psi_2\} \in \Psi$.

This graph illustrates two crucial points of utility integration, which I develop in Section 3 and Section 4. First, we can represent the sum of two utility profiles as a total utility function of the form $f : [b, e] \cup [b', e'] \rightarrow \Psi$, or using the simplified notation I suggest, $W(x) = \int_0^n u(x_i) di$.⁸ Since there are here only two experienced outcomes at two different slices of time, we have $W(x) = u(x_1) + u(x_2)$. On the assumption that Separability and Time Neutrality hold, this means that (i) the order of the experiences of x_1 and x_2 can be reverted at will without affecting total utility, and that (ii) the moment at which an outcome (here, x_1 or x_2) is experienced should not affect the evaluation of total utility. While necessary for formal representation, I argue in Section 3 that the assumptions of Separability and Time Neutrality are philosophically contestable and require extensive justification to serve as qualified foundations for the integration of total utility.

Second, the relationship between time (N), outcomes (X) and hedonic states (Ψ) is far from straightforward. As Kahneman et al. (1997, p. 398) put it, "the instant utility at a time point depends on the outcome associated with that time point, but also on outcomes associated with other time points". Under the axiom of Inclusiveness, not only a moment utility includes the present hedonic feeling ψ_i of doing x_i , but also of thinking about x_{i-1} being done and of anticipating doing x_{i+1} . In other words, *all* the information about experienced and anticipated outcomes is already included in ψ_i .⁹ This raises the deeper question of which aspects of the temporal structure of experienced utility—for instance, present experience, memory, or anticipation—should be considered genuinely relevant for an individual's welfare. Addressing these issues requires a more nuanced investigation into how hedonic states are distributed over time and how they interact across time points (Section 4).

3 The Temporal Structure of Hedonic Experience

3.1 Decomposing Experience Over Time

According to Separability, the order in which moment utilities are experienced does not affect total utility. That is, the contribution of an element to the total utility of the episode (or TEO) is independent of the elements that are preceded and followed it. This axiom is fundamental. Without it, the concept of total utility cannot arise from the summation of moment utilities, as total utility does not preserve the order in which moment utilities are experienced. Indeed, this axiom is necessary to sum all moment utilities of an episode or a TEO "at will".

⁸Note that representing total utility in terms of utility profiles would require writing $W(n) = \int_B^E u(2^{[B, E]}) dn$. This notation is avoided for the following reasons. As previously mentioned, the notation $u(x_i)$ simplifies matters by allowing us to treat x as an element included in the two nested sets X and $[B, E]$. To further simplify, I use the set of time N instead of $[B, E]$, where i is the index which captures each time slice.

⁹This psychological phenomenon is hard to represent graphically. It cannot be illustrated in a three-dimensional graph because the relation between variables N , X and Ψ is not a one-to-one mapping. That is to say, one element of X at time i maps to one element of Ψ at time i , but one element of Ψ at time i maps to several elements of X at different times, e.g. $i-1$ and $i+1$. Mathematically, it would also require specifying the particular relation between X and Ψ . Since ψ_i depends not only on x_i but also on x_{i-1} , x_{i+1} , and so on, we should technically denote $\Psi_i = f(X_i, X_{i'})$, $\forall i' \in 2^{[B, E]} \neq i$.

Philosophically speaking, it may also be the most challenging. As an illustration (Kahneman 2000, p. 192), the axiom asserts that the sum of the experiences of winning two lottery prizes \$10 000 and \$500 in a row is not influenced by the order in which these two outcomes occur. That is, whether it is \$10 000 or \$500 which occurs first, it should not change one's total hedonic evaluation of receiving the two prizes. While it seems much more plausible that to first receive \$500 then \$10 000 is more enjoyable than the other way around (mainly due to adaptation effect), Kahneman et al. (1997, p. 391) and Kahneman (2000, p. 192) respond to this objection by emphasising that the episodes of a TEO to be evaluated are not outcomes, but *moment utilities associated with outcomes*. Recall that under the axiom of Inclusiveness, *all* the effects of the order of outcomes are already incorporated into moment utility.

Considering that this axiom holds—which may not necessarily be the case—this implies that when summing all moment utilities, the social planner need not worry about the order in which those moment utilities are experienced, as the information related to past and future outcomes is already embedded in the individual's moment utilities. The concern is that by incorporating all previous and anticipated information into moment utility, one has good reason to believe that a total hedonic experience *will* be affected by the order in which these two moment utilities associated with outcomes are experienced. In other words, it seems that while physical outcomes can be rearranged in time, once they are linked to a psychological affect, the subjective experiences associated with those outcomes inevitably change. Two further points are worth being discussed.

First, as conceived in the theory of Kahneman et al. (1997), the role of the social planner as an external evaluator of an individual's total utility remains ambiguous. Because hedonic states are inherently private and subjective, momentary utilities primarily matter to *the experiencing individual* rather than to an external observer. One must therefore recognise that the sequence in which experiences occur carries normative significance—that is, it influences personal welfare-relevant judgments about how an episode or TEO ought to be evaluated overall. Second, Separability is defined in terms of moment utilities associated with outcomes, but abstracts from any notion of temporal distance. That is, the total utility remains the same regardless of how much time separates the episodes in question. But if the temporal gap between two experiences is large enough for them to be considered psychologically independent, then it seems reasonable to claim that the order in which these moment utilities are experienced should not affect total utility. In other words, the plausibility of Separability increases under the condition that the temporal distance between two finite disjoint episodes is sufficient to ensure that the hedonic evaluation of one does not influence the other.¹⁰

Yet, in Kahneman et al. (1997), there is no specified condition regarding the temporal separation of finite disjoint episodes in the definition of a TEO. To account for this, a notion of time distance could be incorporated into the axiom of Separability. One way to formally characterise this modified condition would be as follows. Let $\psi_i = u(x_i, t_i)$

¹⁰An important question remains: what does “large enough” mean, and by what criterion can we distinguish it from “not large enough”? While the theory is intended to apply broadly across life domains (e.g. monetary gains, health states, social experiences, among many others), this notion of sufficient temporal separation is admittedly vague and difficult to formalise in general terms. It is likely a case-dependent matter, influenced by idiosyncratic psychological characteristics: some individuals have better memory than others, some are more emotionally affected by past experiences, and so on.

and $\psi_j = u(x_j, t_j)$ denote two moment utilities experienced at time points t_i and t_j , respectively, where $|t_j - t_i| = \Delta t$. Let $\delta > 0$ represent a minimal threshold of temporal separation such that:

$$\text{If } \Delta t \geq \delta, \text{ then } \frac{\partial \psi_i}{\partial x_j} = 0 \text{ and } \frac{\partial \psi_j}{\partial x_i} = 0$$

This condition implies that when the temporal distance Δt between two episodes exceeds the threshold δ , the moment utilities are psychologically independent of one another. Then, Separability with temporal distance holds if and only if:

$$W(\psi_i, \psi_j) = W(\psi_j, \psi_i) \text{ for all } i, j \text{ such that } |t_j - t_i| \geq \delta$$

In words, the total utility function is invariant to the order of moment utilities *only* when the experiences occur at sufficiently distant points in time, such that their hedonic evaluations do not causally or psychologically influence one another. On the one hand, this would however restrict the use of the theory to time periods that are distant enough to avoid dependence. On the other hand, any empirical method relying on self-reports—such as verbal questionnaires or diary methods—inevitably reflects a degree of psychological interdependence between experiences. In this respect, introducing a restriction that explicitly accounts for temporal distance and potential dependence can be seen as a step toward methodological rigour.

The assumption does not eliminate dependence but rather acknowledges and attempts to manage it. For example, the Day Reconstruction Method (DRM) (Kahneman et al. 2004) is designed to capture affective experiences by having respondents recall and describe the previous day's episodes in chronological order. While such retrospective reports are undoubtedly shaped by memory biases and the order of events, they are nevertheless temporally structured in a way that enables respondents to isolate discrete episodes. This allows for the assessment of hedonic states with reduced influence from momentary emotional fluctuations—although this influence can never be fully eliminated.¹¹

3.2 Valuing the Past, Present and Future

Time Neutrality is the thesis that individuals—or a normative evaluator such as a social planner—should attribute no intrinsic normative significance to the temporal location of pleasure or pain, *ceteris paribus*. In other words, the timing of a hedonic experience should not affect its contribution to total utility. The rationale for this assumption is that, if the social planner evaluates individual welfare by aggregating all moment utilities across time, then—under the principle of Time Neutrality—each moment utility

¹¹For additional philosophical literature that complements—but remains somewhat tangential to—the theoretical and practical discussion of the Separability axiom provided here, see the "Shape of a Life" hypothesis (Dorsey 2015), as well as Hersch (2023) for the implications for welfare and policy. According to this hypothesis, the temporal sequence of hedonic states matters for welfare evaluation. Typically, for two equal levels of welfare over time but with different sequences, an upward trend in momentary welfare (i.e. an improvement in welfare over time) is better than a downward trend (i.e. a decline in welfare over time)—all else being equal. This view draws on the narrative conception of personal identity over time, which holds that the meaning of life events depends on their narrative structure. However, this conception of personal identity is not uncontroversial. See in particular Mitrouchev and Buonomo (2024).

should be assigned *equal weight*, regardless of when it occurs. In this context, the social planner adopts a "temporally neutral stance", meaning that he/she does not prioritise utilities based on their temporal position (e.g. earlier vs. later), but treats each time slice symmetrically in the aggregation process. Judging this neutrality amounts to accepting (or questioning) the evaluative premise that "when" a hedonic experience occurs is normatively irrelevant, provided all other factors are held constant.

To understand why Kahneman et al. (1997) and Kahneman (2000) hold this evaluative premise, consider first how individuals tend to weight time in decision utility and remembered utility. In decision-making, temporality does matter: economists assign to each intertemporal choice a discount factor, which captures the individual's patience. The more the outcome occurs late in time, the heavily the outcome is discounted. Remembered utility works the other way round: individuals' retrospective judgement tend to give more weight to the time at which the peak of pain is experienced and the final time at which the last intensity of pain is experienced.¹² Kahneman (2000), however, judges both decision utility and remembered utility to have a "dubious normative status" (p. 193). According to the former, he brings up the classical argument about "self-control failures" that myopic preferences are normatively irrelevant (Thaler and Shefrin 1981; Laibson 1997) because they do not maximise total utility. According to the latter, the author judges that "an experience that ended very badly could still have positive utility overall, if it was sufficiently good for a sufficiently long time" (p. 193).

Perhaps the most straightforward objection to Time Neutrality is that attributing a "neutral" value to time requires at least some justification. Individuals may have personal reasons for assigning different weightings to time throughout the day. For instance, an individual who wakes up every morning to go to work may feel that his hedonic state of -3 does not carry the same weight as his hedonic state of 6 when he returns home. The time associated with the negative feeling of engaging in an unpleasant task may not be perceived equivalently to the time associated with the positive feeling of playing with his dog after work. In this case, the individual values the second activity significantly more than the former, which leads him to care less about the time of day when he engages in something unpleasant. Conversely, he may have the opposite reasoning, which would still align with time weighting. For example, the pain he experiences upon waking up every morning might weigh more heavily on him than the enjoyment of playing with his dog later in the day. Consequently, this individual might develop a negative remembered utility regarding his past total experiences of the day. Even if his total utility remains positive, he may have valid reasons for not wanting to repeat that TEO, as he assigns greater importance to pain-time over pleasure-time, potentially leading to a negative retrospective evaluation of that TEO.¹³

Philosophically speaking, this leads us to a rather general question: on what psychological grounds can Time Neutrality be rejected? In our example, the individual values playing with his dog after returning home more than going to work, because he *desires*

¹²This refers to the "peak-end rule". See Redelmeier and Kahneman (1996) for the first empirical study to report this effect in the pain domain, Do et al. (2008) for additional evidence related to material goods and pain, and Kemp et al. (2008) and Mah and Bernstein (2019) for nuanced findings in the pleasure domain.

¹³This thought experiment implies that remembered utility has normative value, which is the point of discussion in Section 4.

one action more than the other. And it is precisely because of this desire that he might *reasonably* weigh time differently. In some cases, individuals might have personal or contextual motivations to prefer that a certain experience occurs at one point in time rather than another. For example, an individual might prefer to undergo a more painful experience—despite remembering it as more unpleasant—because it aligns with a personal goal or psychological motive (e.g. feeling stronger, braver, or more in control). We can even go further and argue that an individual need not provide a clearly articulated reason for action, but simply express a persistent *desire*.¹⁴

From a theoretical perspective, this implies that Time Neutrality may be too strong if it rules out these kinds of subjective distinctions. As an alternative, we may consider a *weighted* version of total utility, where moment utilities are weighted by a time-dependent factor w_i , reflecting the normative or subjective significance attached to the time at which they occur. The extended function of total utility would take the following form:

$$W(x) = \int_0^n w_i \cdot u(x_i) \, di$$

Here, $w_i \in [0, 1]$ is a subjective weight assigned to time slice i , such that:

- If Time Neutrality holds strictly, then $w_i = 1$ for all i , and the integral reduces to the original unweighted sum.
- If *temporal significance* matters normatively or psychologically, then w_i varies across time, reflecting how much importance the individual (or the planner) places on experiences at different time points.

These weights may naturally vary across individuals and be influenced by idiosyncratic factors—such as mood patterns, circadian rhythms, or personal routines—that affect how experiences are valued depending on the time of day. This idea also has empirical implications, particularly for the DRM (Kahneman et al. 2004). In addition to reporting their activities and affective states throughout the day, respondents could be asked to rate *how important* each experience felt at the time it occurred, using a Likert scale (e.g. from “not important at all” to “very important”). These self-reported importance scores can be interpreted as empirical estimates of the weights w_i , allowing a more nuanced reconstruction of experienced utility that reflects temporal asymmetries in subjective valuation.

4 Remembered Utility Matters

We now turn to a reconsideration of the informational basis of experienced utility theory, as captured by the Inclusiveness axiom. In short, is moment utility truly what matters in individuals’ subjective evaluation of hedonic experience? Kahneman is undoubtedly the author who contributed the most to experienced utility theory. However, in an interview

¹⁴This e.g. marks a point of disagreement between Parfit (1984, pp. 124-126) and Hume (1739 [2003]). While Hume holds that desires are not subject to rational evaluation, Parfit argues that one must provide a reason for action. Ultimately, this debate concerns the very nature of rationality—in this case, whether it is reason-based or desire-based—which is an important issue that I set aside for the purpose of this paper.

given to *Hareetz* (an Israeli online newspaper), he explicitly declared that he did not believe anymore in the research programme he pursued for twenty years. In overall, he said to have abandoned it because he might have failed to characterise what happiness is about:

"People don't want to be happy the way I've defined the term—what I experience here and now. In my view, it's much more important for them to [...] experience life satisfaction, from the perspective of 'what I remember', of the story they tell about their lives." (Daniel Kahneman interviewed by Amir Mandel in 2018)¹⁵

In the experiments of Kahneman et al. (1993), Fredrickson and Kahneman (1993), Redelmeier and Kahneman (1996) and Schreiber and Kahneman (2000), the authors initially considered that subjects made errors of judgement because they failed to accurately remember the moment utilities experienced during the episodes, which led them to prefer the worst experience according to the logic of utility integration. Accordingly, Kahneman et al. took utility integration as a normative standard and considered failures of maximising moment utilities as *mistakes*, i.e. something that make individuals worse off.¹⁶

But as Kahneman acknowledged in his later years, the logical rule of utility integration may fail to represent individuals' welfare. In fact, if we consider that what matters is not happiness as "living in the moment" but happiness as a durable mental state, then we may have a better interest in characterising happiness in terms of remembered utility rather than in terms of moment utility. The "late" Kahneman was sympathetic to the idea that what matters is not the utility experienced at the moment (as in Benthamite utilitarianism) but the memory individuals have of those experienced utilities—disregarding whether they reflect the highest intensity of pleasure or the lowest intensity of displeasure experienced during those episodes. The idea is that, contrary to an experience that is enjoyed at the present moment, memory is a durable mental state that stays in one's mind for a long period of time. In this sense, individuals choose their next vacation not as a *present experience* but as a *future memory*. This could explain why individuals typically like to buy souvenirs or take pictures of their vacation. In doing so, they can enjoy their vacation not only at the moment they experience it but also for the rest of their lives. This point relates to one of the objections Kahneman and Sugden (2005) stated early against moment utility:

"Because the mental representation of memory is [...] made up of discrete snapshots of 'representative' moments [...] the life plan that maximises the integral of a person's happiness over time may not be the one that maximises the value of her accumulated stock of memories." (p. 177)

People may make a choice—such as selecting a vacation—based on decision utility, yet later recall that experience in a way that diverges significantly from how it was actually felt in the moment. In such cases, it is the remembered utility, not the actual moment-by-moment experience, that may carry normative significance for the individual. But a mismatch between these two dimensions—what drives a choice and what is

¹⁵The full interview is available at <https://www.haaretz.com/israel-news/.premium.MAGAZINE-why-nobel-prize-winner-daniel-kahneman-gave-up-on-happiness-1.6528513>.

¹⁶This possibly shows one example (among others) of what Gigerenzer (2018) calls the "bias bias" critique, namely the tendency among behavioural economists to "spot biases even when there are none" (p. 303).

later judged to have been valuable—is not necessarily problematic. It may reflect different psychological processes involved in prospective *versus* retrospective assessment.¹⁷

The key point is if remembered utility provides a more accurate reflection of how individuals evaluate their lives overall, then the normative foundation of experienced utility, based on the summation of moment utilities, becomes questionable. A straightforward implication would be to adopt remembered utility as the core informational basis for experienced utility measurement. For example, in the cold-water and colonoscopy experiments of Kahneman et al. (1993) and Redelmeier and Kahneman (1996), participants reported preferring experiences they actually rated as more painful in real time, because the memory they had of those experiences was more positive overall. In such cases, prioritising remembered utility might yield different—and arguably more meaningful—welfare evaluations than relying on the sum of moment utilities.¹⁸

Of course, it may still be argued that individuals can hold false beliefs about how unpleasant an experience was—believing, for example, that a longer but less painful procedure was worse than a shorter but more painful one. In this sense, maximising remembered utility cannot be normatively relevant because it is considered to be *biased*: it gives more weight to the peak-time and the end-time of the procedure.¹⁹ This disagreement reveals two normative perspectives. The first—defended by Kahneman et al.—suggests that relying on distorted memories constitutes errors of judgement, as they are based on inaccurate representations of past experiences. The second perspective, more prominent in the "late" Kahneman, holds the idea that what ultimately matters for the individual may not be the full hedonistic account of the experience, but how it is remembered. In this view, the belief that a longer procedure was less painful, even if it was not, may still be subjectively valid—not in the sense that it is factually correct, but in that it accurately reflects the person's self-evaluation of the experience in retrospect.

Alternatively, could remembered utility not be considered a form of moment utility, given that—under the definition provided by the Inclusiveness axiom—it already incorporates information about past and anticipated feelings? The justification for integrating remembered utility into the overall assessment of experienced utility depends on whether experienced utility is interpreted broadly. Specifically, if remembered utility systematically determines how individuals evaluate their lives or experiences, then it arguably contributes to the hedonic character of those moments in which such retrospective evaluations occur. In this broader, integrative sense, remembered utility would form part of the ongoing stream of hedonic experience, rather than standing apart from it.²⁰

¹⁷For a discussion on the importance of retrospective judgements related to subjective well-being measurement, see Alexandrova (2005).

¹⁸The possibility of considering remembered utility as being more valuable than moment utility was, in fact, already mentioned by Redelmeier and Kahneman (1996), who concluded their study with the following words: "For procedures where some pain is unavoidable, clinicians may need to decide whether it is more important to optimize patients' experiences or memories" (p. 7).

¹⁹As previously mentioned, the peak-end rule has, however, only been reported in the domain of pain (Redelmeier and Kahneman 1996; Do et al. 2008) and regarding material goods (Do et al. 2008), but not in the domain of pleasure (Kemp et al. 2008; Mah and Bernstein 2019).

²⁰One might argue, however, that experienced utility defined in this way becomes difficult to operationalise. In this case, the Inclusiveness axiom may need to be reformulated in order to accommodate welfare evaluation based on remembered utility. I thank Peter Wakker for this remark.

Still, an important caveat should be acknowledged: the divergence between decision utility and experienced utility, while conceptually appealing and supported by some illustrative examples, is—strictly speaking—not an established empirical regularity. Although Kahneman et al.’s experiments, notably the cold-water and colonoscopy studies, show that subjects sometimes prefer options associated with objectively greater total pain, such findings are interpreted as evidence for a mismatch between remembered (or anticipated) utility and actual moment utility. These interpretations often assume that subjects make mistakes due either to *fallible memory* or to *incorrect anticipation* of their future experiences, leading to a violation of Monotonicity—the rule according to which adding a moment of pain should reduce individuals’ total utility.²¹ However, such interpretations implicitly rely on counterfactuals—namely, assumptions about what subjects *would have preferred* had they been able to track their experienced utility accurately. In contexts where these counterfactual preferences are unobservable, it becomes difficult to determine whether decision utility is truly misaligned with experienced utility, or whether individuals attach normative value to remembered or anticipated experiences.

At this stage, the empirical distinction between decision utility and experienced utility has, in fact, not been confirmed. Carter and McBride (2013) propose a test of the similarity in shape and behaviour between the value function of prospect theory—which reflects individuals’ choices, therefore their decision utility—and the experienced utility based on how it is theoretically posited in the normative theory of Kahneman et al. (1997). According to their results, experienced utility exhibits an S-shaped curve (like the value function of prospect theory) when expectations and social comparison are used as the reference point, but it is not consistently S-shaped when past outcomes serve as the reference point. Another empirical comparison between decision utility and experienced utility is provided by Akay et al. (2023). Analysing British households’ observed preferences alongside their reported hedonic states, the authors find that a majority of individuals make choices that are broadly consistent with the maximisation of their hedonic states. Given the limited number of studies at this point, further empirical research—across various domains such as risk, time, and social preferences—is needed to deepen our understanding of the relationship between decision utility and experienced utility.

5 Conclusion

In this article I offer a methodological assessment of experienced utility as a theory for welfare evaluation by revisiting two key axioms—Separability and Time Neutrality—and by addressing the normative and operational role of remembered utility. The aim is to evaluate the internal coherence of the theory, as initially conceived by Kahneman et al. (1997), and its implications for empirical measurement. Several points emerge from this analysis. First, the Separability axiom may be carefully refined by incorporating *temporal distance*, which would more clearly justify the soundness of the axiom. The same applies for the Time Neutrality axiom by incorporating *temporal weighting*. In both

²¹See Kahneman et al. (1997, p. 390) for the precise definitions of the axioms of Monotonicity in Instant Utility and Monotonicity in Total Utility. Note also that Kahneman et al. (1997, p. 376) illustrate the divergence between decision utility and experienced utility through a thought experiment rather than actual evidence.

cases, survey instruments such as the DRM (Kahneman et al. 2004) can be refined by integrating questions about significant life events or temporal salience, thereby improving the operational validity of hedonic data. Second, the informational basis of experienced utility may need to shift from moment utility to remembered utility, as memory plays a critical role in how individuals retrospectively evaluate their lives. In addition, the *subjective* authority of the individual—which is central to the normative stance of the experienced utility theory—supports using remembered utility as a welfare-relevant criterion. Finally, the distinction between decision utility and experienced utility, though theoretically appealing, remains empirically under-explored. So far, the literature provides no significant evidence of a divergence between decision utility and experienced utility. Still, this literature remains very limited. Further experiments across different domains could yield results supporting either a divergence or a convergence between the two concepts.

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