

The End of Experienced Utility? A Critical but Hopeful Appraisal

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Abstract

Experienced utility was the first normative theory to seriously reconsider observed choice as a reliable indicator of welfare in the behavioural paradigm. Despite significant efforts to develop the theory in the 1990s, it became rather unpopular as a welfare measurement due to various limitations. In this article I provide a critical appraisal of experienced utility measurement as initially conceived by Kahneman et al. (1997). I argue that although experienced utility suffers from conceptual and empirical limits, it is not (entirely) a dead-end. Those interested in hedonic measurement may refine some axioms of this normative theory and/or seek further evidence about the discrepancy between decision utility and experienced utility.

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1 Introduction

There is an important and now well-recognised methodological problem at the intersection of individual behaviour and welfare. If people fail to behave according to rationality principles, how can we know what makes them better off?¹ Among the most prominent alternatives (Thaler and Sunstein 2003, 2009; Sugden 2004, 2018; Bernheim and Rangel 2007, 2009), *experienced utility* (Kahneman et al. 1997) aims to measure people's hedonic states (pain and pleasure) and to use this data for welfare analysis. From the early 1990s until the late 2000s, the development of the experienced utility programme can be summarised in three main phases: (i) accumulation of evidence about how individuals perceive and remember experiences of hedonic states, (ii) theoretical contributions on the axiomatisation of experienced utility measurement and the definition of objective happiness, and (iii) methodological improvements in measuring the aggregation of hedonic states.² However, since the late 2000s, the experienced utility programme has maintained a relatively low level of visibility. Some contributions document errors in hedonic forecasting and provide arguments for measuring experienced utility in the health domain (Kahneman and Thaler 2006; Dolan and Kahneman 2008), discuss practical issues (Loewenstein and Ubel 2008), provide empirical tests of the peak-end rule (Do et al. 2008; Kemp et al. 2008; Mah and Bernstein 2019), as well as the empirical distinction between decision utility and experienced utility (Carter and McBride 2013; Akay et al. 2023), and focus on particular issues regarding the measurement of health states (Oliver 2017). Moreover, applied studies using experienced utility as a tool for welfare measurement are scarce (Cai et al. 2022). In this regard, one may question the unpopularity of experienced utility as a whole in the last few decades.

Collecting data on hedonic states typically involves lab or field experiments using extensive surveys or real-time tracking, which can be costly. Economists also rarely prioritise data other than choice for welfare analysis, arguing that choice can be directly observed and is more straightforward to analyse compared to less familiar concepts like experienced utility or 'true' preferences (Manzini and Mariotti 2014; Bernheim 2016). Because measuring experienced utility relies on subjective self-reports and introspection, it is also prone to several biases. People may have difficulty accurately recalling or describing their experiences (memory bias), be subject to adaptation, and emotional states. Their self-reports regarding their hedonic states may also change over time and across different contexts (although this problem applies to all kinds of self-reports). More generally, hedonic psychology has never been well received in economics, although the 'Back to Bentham' approach of Kahneman et al. (1997) attempted to revive the utilitarian interest in giving utility a psychological intensity (Read 2007).

¹See Mitrouchev (2024) for a literature review.

²For 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).

The question I address in this article is, despite its unpopularity, what remains of experienced utility as a relevant programme for welfare evaluation.³ Most of the critical literature on alternative normative approaches within the behavioural paradigm has overwhelmingly focused on libertarian paternalism (Grüne-Yanoff 2012; Guala and Mitton 2015; Hédoïn 2017; Hands 2020; among many others), on the broad field of ‘behavioural welfare economics’ (Infante et al. 2016; Bernheim 2021; Grüne-Yanoff 2022; among others), or on the opportunity approach as an anti-paternalistic and non-welfare alternative (Schubert 2015; Dold and Rizzo 2021; Fumagalli 2024; among others). It is, however, surprising that *experienced utility* – which was historically the first normative theory to seriously address the problem that observed choice cannot be a reliable indicator of individual welfare due to ‘irrational’ behaviour, and which was developed over more than a decade – has played an extremely marginal role in these debates.⁴ My aim is to offer a methodological assessment of this normative theory, which I believe has not received the attention it fully deserves.

On the one hand, experienced utility measurement arose from evidence that people often fail to predict their hedonic states (Kahneman and Snell 1990, 1992). It is, therefore, an *evidence-based* normative theory. This later motivated Kahneman et al. (1997) to axiomatise experienced utility measurement, and Kahneman (1999, 2000) to propose an *objective* theory of happiness – in the sense that the aggregation rule is external to people’s beliefs about their hedonic states. Yet if we consider libertarian paternalism, which is certainly the most popular and discussed alternative approach to evaluate welfare in the literature, the evidence-based motivation is less obvious. Libertarian paternalism is certainly motivated by the vast number of biases documented in behavioural research. However, it does not rely on *actual* evidence that people are worse off experiencing those biases (Gigerenzer 2015, 2018). When proponents of libertarian paternalism claim to respect people’s preferences – encapsulated by the important ‘as judged by themselves’ clause of Thaler and Sunstein (2009) – it is assumed that the normative criterion at stake is people’s ‘true’ preferences, defined as preferences individuals would like to satisfy in order to be better off, but due to limited abilities (typically informational, cognitive, and self-control-related), fail to satisfy. There is an important debate on the relevance of the true preference criterion for welfare analysis (Infante et al. 2016; Hausman 2016), and my intention is not to address this debate. What I aim to emphasise is that true preference is a psychological assumption that, so far, has not been supported by empirical evidence. Yet, few would doubt that pleasure and pain are real sensory experiences that can, in some way, be measured. In this regard, if the appeal of a normative theory (and eventually of a policy application) hinges on its empirical foundation (as behavioural public policies explicitly claim), experienced utility should warrant more attention than it has received.

On the other hand, Fumagalli (2013) is (to my knowledge) the only assessment of experienced utility. The author discusses issues related to measurability, integrability, and interpersonal comparability. I depart from Fumagalli (2013) in the following respects. First, the author proposes an assessment about replacing decision utility with experi-

³Anecdotally, in his later years, Daniel Kahneman stated that he no longer believed in his own normative programme. See <https://www.haaretz.com/israel-news/.premium.MAGAZINE-why-nobel-prize-winner-daniel-kahneman-gave-up-on-happiness-1.6528513>. I return to this point in the relevant section.

⁴An exception is Fumagalli (2013), to be discussed below.

enced or neural utility (which he refers to as ‘true utility’) across economics as a whole. His contribution is directed towards those who support a return to the psychophysical interpretation of utility in explaining human decision-making (Camerer et al. 2005; Glimcher et al. 2005). My ambition is more modest. I intend to assess experienced utility solely as a reliable *welfare criterion*. In this sense, this article is addressed to those interested in alternative ways to evaluate welfare when people deviate from rationality principles.⁵ More particularly, it is directed towards those who have an interest in *hedonic* well-being, although I recognise that hedonism as a theory of well-being/ethics is not mainstream among proponents of subjective well-being measurement.

There is indeed a vast literature on measuring subjective well-being using life satisfaction measures (Diener et al. 2018), as well as on efforts to prioritise life satisfaction over happiness in deriving well-being measures that could eventually be used for policy (Fleurbaey 2009, 2012; Fleurbaey and Maniquet 2011; Fleurbaey and Blanchet 2013; Decancq et al. 2015). Instead of asking people about their *hedonic states*, i.e. how they feel over a period of time (‘How happy are you at the moment?’ or ‘How happy were you yesterday?’), life satisfaction measures are *evaluative*. They ask how satisfied people are with their life in general (‘Overall, how satisfied are you with your life nowadays?’).⁶ One may find some advantages in life satisfaction measures compared to hedonic measures. For example, life satisfaction can cover a larger time period, and people are perhaps more familiar with the word ‘satisfaction’, as it is already widely used in customer service surveys (Layard and De Neve 2023). Yet there is still good interest in focusing on hedonism. First, although hedonic measures are more costly to collect over a long time period, they are more *direct* measures of experience as they straightforwardly aim to capture one’s psychological feeling of doing or choosing something. Second, hedonic well-being is quite consistent as a well-being measurement. When conducting test-retest consistency checks (do people give consistent answers when retested?), Krueger and Schkade (2008) found that hedonic measurement is more strongly correlated (0.64) than life satisfaction measurement (0.59). Third, there is a thesis suggesting that subjective measures of well-being in fact presuppose *hedonism* (Angner 2010). If this interpretation is correct, it provides even further motivation for assessing the approach that has put the most effort into theorising the aggregation of hedonic states – namely, the normative theory of *experienced utility* as initially conceived by Kahneman et al. (1997).

The rest of the article is organised as follows. Section 2 briefly presents the theory of experienced utility measurement. Section 3 discusses each of the ten axioms of experienced utility measurement, which allow for aggregating individuals’ moment utilities into a total utility. Section 4 is an attempt to reconsider the content of experienced utility measurement, i.e. what matters for welfare evaluation may not be *moment utility* but *remembered utility*. I then conclude in Section 5 by suggesting some directions for future research.

⁵This methodological literature has become quite consistent. See e.g. some recent debates between Bernheim (2021) and Sugden (2021), and McQuillin and Sugden (2012) for an overview.

⁶Scaling can vary across measures, but is typically from 0 to 10.

2 Experienced Utility Measurement: Theory

Measuring happiness in the Benthamite (1780) way has been the subject of approximately twenty years of research by Kahneman and co-authors (henceforth ‘Kahneman et al.’). The bulk of this research programme aimed to realise a utilitarian dream left unfulfilled by Edgeworth (1881):

‘Let there be granted to the science of pleasure what is granted to the science of energy; to imagine an ideally perfect instrument, a psychophysical machine, continually registering the height of pleasure experienced by an individual. ... The continually indicated height is registered by photographic or other frictionless apparatus upon a uniformly moving vertical plane. Then the quantity of happiness between two epochs is represented by the area contained between the zero-line, perpendiculars thereto at the points corresponding to the epochs, and the curve traced by the index.’ (p. 101)

The discrepancy between ‘decision utility’ and ‘experienced utility’ was initially suggested by March (1978), who argued that decision value and experience value typically do not converge for ordinary decision makers. *Decision* utility refers to the weight of an outcome in a decision, as in standard models of decision-making. *Experienced* utility is the hedonic quality as in Bentham’s (1780) usage. Specifically, it pertains to the experience of pain/pleasure, which is not necessarily related to one’s observed choice. Since decision utility is inferred from observed choices, and because these choices are sometimes subject to biases, the problem is that individuals may not always choose the outcome that makes them better off. The conceptual appeal of experienced utility lies in its potential to serve as a more reliable proxy for well-being than decision utility, making it an alternative welfare criterion for policy evaluation. The primary advantage of the experienced utility criterion is that it is independent of the choices individuals make, thus allowing for the evaluation of which choices enhance well-being and which detract from it.

In the 1990s, one of the main interests of this research programme was to understand the connection and gap between what individuals *experience* in real time – i.e. the way they actually lead their lives – and what they *remember* of those experiences – i.e. the narrative they construct about how they lead their lives. With the experienced utility criterion, individual and social evaluations can be based on *total utility*: the collection of utility profiles that follow certain normative rules (which I discuss in Section 3). According to the experienced utility criterion, a situation is judged to be better than another if it maximises the level of total utility. Its central ethical rule can then be formulated by the following premise.

Ethical premise. *An individual’s situation is better than another if it has more level of total utility than another.* 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. $W(x)$ is an individual welfare function of the form,

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

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.⁷ The experienced utility criterion is then satisfied under the condition that:

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

The theory of experienced utility measurement is about formulating the conditions that allow for the integration of utilities into a timeline, enabling the comparison of experiences over time and among subjects. This attempt is encapsulated in the seminal contribution of Kahneman et al. (1997). In their ‘back-to-Bentham’ approach, they propose a formal normative theory of what they call the total experienced utility of temporally extended outcomes (TEOs): a sequence of life experiences that can include anything related to sensations of pleasure and pain. The authors aim to measure TEOs with the normative concept of ‘total utility’: an aggregation of temporal profiles of utility that individuals experience instantly. Through the concept of ‘utility integration’, the authors aim to specify ‘the conditions under which the total utility of an extended outcome is the temporal integral of some transformation of instant utility’ (p. 388). They suggest that a social planner can ultimately maximise the sum of the total utility of each individual into an objective function. In the next section, I discuss some limits of the theory of utility integration.

3 Experienced Utility Measurement: Limits⁸

The construction of the temporal integral of moment utilities relies on six assumptions about subjects’ ratings of instant utility (Kahneman 2000) and four additional assumptions about a social planner who is knowledgeable about the scale (Kahneman et al. 1997). Axioms 1, 2, 3, and 4 impose requirements on the measurement of moment utility. These are epistemic judgements made for the practical purpose of measuring total utility. Axioms 5 and 6 are normative rules that specify how total utility is constructed from moment utilities. They are necessary for summing moment utilities into total utility (or an individual welfare function). As we shall see, Axioms 5 and 6 are perhaps the most problematic from a philosophical standpoint. Axioms 7, 8, 9, and 10 are technical assumptions about the transformation of utility profiles. I now discuss each axiom in turn.

3.1 AXIOM 1 (Inclusiveness)

Ratings must contain all the relevant information required for its temporal integral to be a plausible measure of the total utility.

This axiom merely consists of bounding the welfare-relevant domain. The informational basis of the experienced utility criterion is *moment utility* (what is experienced here and now). Moment utility also encompasses the affective consequences of prior

⁷Although it is not absurd to use a sum, the integral better captures the summation of utility profiles because such a summation graphically represents an ‘area’ of pleasure (or pain) if we consider time to be a continuous variable.

⁸I provide a glossary of experienced utility in Appendix A, which explains the technical concepts that allow for utility integration. Readers who have no background in the theory can consult it before reading this section.

events (e.g. adaptation, fatigue) and future events (e.g. fear, hope). Disputing the informational basis of the welfare-relevant domain (here, moment utility) would lead to an external critique, which argues that sensations of pleasure and pain are not relevant for welfare evaluation. However, such an assessment is outside the scope of the present analysis.⁹

3.2 AXIOM 2 (Ordinal Measurement across Situations)

The measurement of positive and negative deviations from zero is ordinal.

By definition, moment utility is the valence (good or bad) and the intensity (mild to extreme) of current affective or hedonic experience. This axiom states that the valence and intensity of a stubbed toe can be compared with the ones of a humiliating rebuke. For example, a pain rating of 7 in one situation (e.g. a stubbed toe) is considered of being worse than a pain rating of 6 in another situation (e.g. a humiliating rebuke), but the interval between 6 and 7 need not be psychologically equivalent with the interval between 3 and 2, although they must be measured on a common scale.¹⁰ Holding this axiom requires to accept that different psychological perceptions (e.g. a stubbed toe and a humiliating rebuke) are categorised under a similar hedonic feeling. Whether the two psychological phenomena of hedonic feeling (e.g. physical pain) and emotional feeling (e.g. emotional pain) are assumed to be commensurable is, however, left unclear in Kahneman et al. (1997). The authors mention the affective experience of plotless film clips of Fredrickson and Kahneman (1993) to support the observation that individuals violate monotonicity (the rule according to which adding a moment of pain should reduce individuals' total utility). Yet they make it quite explicit that their normative theory only applies to hedonic states that are naturally interpreted in terms of *physical* pleasure and pain, e.g. enjoying the taste of an ice cream or suffering through a colonoscopy procedure.

Kahneman (2000) considers both psychological phenomena of hedonic *and* affective experiences to be commensurable, which can be seen as a natural extension of experienced utility measurement aimed to be applied in a wide range of domains. The author advances that 'reporting the sign and intensity of current hedonic and affective experience is not essentially different from the standard psychophysical tasks of reporting color or smell' (p. 195). Here, Kahneman refers to his own point in Kahneman (1999) about the extensive body of empirical studies in psychology regarding how human sensory experience operates. Specifically, he draws an analogy between the human sensory system and hedonic states. However, the author acknowledges an important difficulty: 'it is more difficult – but not impossible – to compare the loudness of sounds that differ in pitch and timbre than to compare sounds that share these attributes.' He further argues that 'the question of whether people can compare physical and emotional pain or the

⁹Advocates of using experienced utility as a measure of well-being typically acknowledge that evaluating outcomes based on pain and pleasure is not always appropriate. Instead, they argue that experienced utility is valuable in situations where 'a separate value judgment designates experienced utility as a relevant criterion for evaluating outcomes' (Kahneman et al. 1997, p. 377). See also Varey and Kahneman (1992, p. 169), Kahneman (1994, p. 21), and Kahneman and Sugden (2005, p. 176).

¹⁰Note that the experienced utility that is integrated remains cardinal. For example, if decreasing the pain from 3 to 2 in one day is not worth an operation a day before, but the decrease of pain from 7 to 6 is, then, *ceteris paribus*, the latter decrease is bigger than the former.

thrills of food and music is ultimately empirical' (p. 197). While empirical studies may provide some insight into this issue, Kahneman's question also appears to be philosophical. Can evidence tell us whether the sensation of eating chocolate while being sad allows for a meaningful comparison between the two feelings? Some may disagree with Kahneman's simplification, which suggests that almost every psychological perception can fit into a 'good-bad' scale (to be discussed below). Further empirical and philosophical assessments could potentially clarify this point, particularly concerning the assumption of interpersonal comparisons of utilities (to be discussed below).

3.3 AXIOM 3 (Distinctive Neutral Point)

The scale has a stable and distinctive zero point ('neither good nor bad', 'neither pleasant nor unpleasant'), which permits comparisons across outcomes and individuals.

This axiom is closely related to the notion of a reference point, akin to reference-dependent models of decision-making such as prospect theory (Tversky and Kahneman 1992). In prospect theory, the reference point generally represents the *status quo* and serves as the benchmark to distinguish gains from losses. Following the same logic, the neutral point in the normative theory proposed by Kahneman, Wakker, and Sarin (1997) acts as the benchmark for differentiating positive from negative feelings.¹¹

Some may argue that the existence of such a neutral point is not a weak assumption, as when we ask an individual to evaluate her happiness, we ask her to imagine an abstract state in which she evaluates her current mood from a 'zero point'. Yet even if this neutral point can be identified by the individual, a concerning problem is that it may not be stable. Typically, how can an individual who adapts to her life circumstances can evaluate a similar perception of pain and pleasure than before? For example, if she becomes wealthy to the extent that she no longer derives the same level of pleasure from eating tuna (because she can now afford caviar), it is difficult to imagine that her hedonic level would not change according to her new circumstances. Kahneman (1999, pp. 11-15) extensively discusses this point, acknowledging that while it is challenging, it is not impossible to overcome. The main argument of Kahneman et al. (1997) is that 'the stimulus that gives rise to a neutral experience may be different in different contexts, but the neutral experience itself is constant' (p. 380). Thus, if individuals' behaviour is observed for a short interval of time – so that they do not have time to durably adapt – the evaluation of pain in relation to a neutral point may not be that problematic. This can be illustrated by the colonoscopy experiment of Redelmeier and Kahneman (1996) (to be discussed in Section 4). However, experienced utility measurement would be quite restrictive if it cannot be applied to situations where these conditions are not satisfied.

¹¹Abstraction is made of any additional content associated with the reference point, such as loss aversion. See Kahneman (1999, p. 18) for a discussion and Carter and McBride (2013) for an empirical test of whether the value function of prospect theory is of a similar S-shape to the experienced utility function of Kahneman, Wakker, and Sarin (1997). The authors found mixed evidence for loss aversion in experienced utility.

3.4 AXIOM 4 (Interpersonal Comparability)

The comparisons of individuals experiencing different outcomes (e.g. a colonoscopy and the sensation of drinking tea) are ordinal, but the comparisons of individuals experiencing the same outcome (e.g. a colonoscopy or the sensation of drinking tea) are cardinal.

This axiom refers to the classical assumption of interpersonal comparisons of utility, a concept that has been a focal point of controversy in the history of welfare economics. Although it was not a central focus in Kahneman et al. (1997), this assumption is made explicit in Kahneman (2000) to allow for comparisons between individuals and groups. Given the extensive historical debate surrounding this issue, my discussion is limited to the arguments presented by Kahneman et al.¹²

Kahneman and Varey (1991) argue that *adaptation* is an important reason that permits interpersonal comparisons of utilities. According to the authors, when two individuals are fully adapted to different levels of stimulation, they can be said to be matched in their absence of response to their states. Another reason they provide is that if individuals' responses to stimuli differ in the same direction from their respective adaptation levels, those responses can be matched in signs, if not in magnitude. The main argument advanced by Kahneman et al. (1997) is that the functions relating subjective intensity to physical variables are qualitatively similar across different individuals. This echoes the earlier point regarding the non-impossibility of individuals perceiving the loudness of a sound similarly, even when it varies in pitch and timbre. Because the cardinal measurement of deviations in sign or magnitude may not perfectly reflect the adequate perception of feelings between individuals, this may explain why Kahneman et al. (1997) restricts cardinality to individuals experiencing the *same* event (e.g. a colonoscopy) but not to those experiencing different events (e.g. a colonoscopy and carrying a heavy suitcase).

Others may, however, find the assumption of interpersonal comparisons of utilities unsatisfying, even for individuals experiencing the same event (e.g. a colonoscopy). The reason is that, despite the empirical arguments provided by Kahneman (2000) – which assert that the sign and intensity of current hedonic and affective experience are not fundamentally different from the standard psychophysical tasks of reporting colour or smell – some may still argue that individuals possess incommensurable perceptions of pain. This could lead them to react to the same pain in very different ways. As Kahneman et al. (1997) put it,

'Of course, not all human pleasures and pains are biologically programmed in detail. Prior consumption experiences and various cultural and social influences can alter the hedonic

¹²For a synthesis of this historical controversy, see Fleurbaey and Hammond (2004). It is also worth noting a well-known criticism of utilitarianism regarding interpersonal comparisons of utility, which argues that no amount of a mildly painful or joyful experience can sum to equate a more severe experience. For instance, no number of headaches could ever equal the suffering of a spinal cord injury (I thank an anonymous referee for this remark). As stated in Axiom 4, this issue is circumvented since cardinality is assumed only for *identical* outcomes. However, it is important to acknowledge that real-life situations often involve outcomes that cannot be strictly characterised as identical, or even 'similar' to varying degrees. For example, a health issue like a spinal cord injury is often complex, involving multiple body parts, and could be considered identical in diagnosis according to medical criteria that are relatively consensual, such as when the consequences are unambiguously comparable (e.g. the same type of paralysis in two patients experiencing the same body part injury).

value of stimuli, as when people learn to like coffee or chili peppers, develop a dislike for rich desserts, or acquire a passion for opera.’ (p. 379)

The difference between proponents and opponents of interpersonal comparisons of utility would then be a matter of degree, specifically regarding how far we can accept – biologically and sociologically speaking – that individuals perceive experiences similarly.

3.5 AXIOM 5 (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 of a TEO ‘at will’. Philosophically speaking, it may also be the most problematic. For illustration, the axiom asserts that the sum of the experiences of playing a football game and having a beer is not influenced by the order in which these two events occur. While it may seem evident that having a beer after a football game is more enjoyable than vice versa, 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 (or events)*, but *moment utilities associated with outcomes (or events)*. Recall that under Axiom 1 (*Inclusiveness*), all the effects of the order of outcomes (or events) are already incorporated into moment utility. 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 events 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 events are experienced. In other words, it seems that while physical events can be rearranged in time, once they are linked to a psychological affect, the subjective experiences associated with those events inevitably change.

The counter-intuitive aspect of the *Separability* axiom requires to discuss some of its underlying assumptions. In order to grasp the intuition of this axiom, Kahneman (2000, p. 192) proposes the following thought experiment. Assume an individual wins two unexpected prizes in a row: \$500 and \$10 000, then suddenly dies (or loses his memory). In evaluating the total utilities of both scenarios (*Scenario 1*: receiving \$500 then \$10 000; *Scenario 2*: receiving \$10 000 then \$500), *Scenario 1* would surely be preferable to him because the enjoyment of a smaller prize is greater when it comes first (equivalently, the enjoyment of the bigger prize is greater when it comes second). Now let us imagine that all we know is that just before his sudden death (or amnesia), an individual had two pleasurable experiences, respectively $u(a)$ and $u(b)$, where $u(a) \gg u(b)$. Kahneman asks, ‘would we still think that their order matters?’, to which he replies that ‘when outcomes are moment-utilities, there is no compelling reason to reject separability’ (p. 192). Two points are worth being discussed.

First, in this thought experiment, the relevance of the social planner’s role in evaluating the individual’s total utility is unclear. The moment utilities experienced by the individual must matter to *the individual*, not to an external observer. If the difference in total utility ultimately matters to the individual (and not to the social planner), the difference between the individual welfare function (or total utility) of *Scenario 1*’ and that of *Scenario 2*’ should provide enough information to observe a salient magnitude between both individual welfare functions just before the individual dies. As Kahneman (2000) seems to acknowledge, as long as *Scenario 1*’ yields more total utility than *Scenario 2*’, the first should be preferred to the second, even if the difference in magnitude between the two total utilities is extremely small. If the order of moment utilities slightly disrupts the value of total utility, the ethical premise of experienced utility states that the aim of the social planner is to maximise one’s total utility (see Section 2). Under this maximisation principle, it would be sufficient to assert that the order does matter. Second, it remains unclear what the introduction of death (or amnesia) contributes to the argument if the evaluation of the individual’s total utility is relevant *before* he dies (or experiences amnesia). In fact, *Separability* seems to be relevant when the evaluation of one’s total utility is made *after* the individual becomes amnesic. For example, assume the lottery winner receives \$500, becomes amnesic, and then receives \$10,000. Would his total utility change had he received \$10,000, become amnesic, and then received \$500? Presumably not. For the sake of practical appeal (it is rather uncommon for individuals to experience amnesia suddenly), let us assume that two episodes are experienced on different days. If the time between these two experiences is ‘large enough’ so that they can be considered independent of one another, then it seems reasonable to conclude that the order in which moment utilities are experienced does not affect total utility.

The *Separability* Axiom thus holds under the condition that the distance between two temporally finite disjoint episodes or events is sufficiently large so that the subjective evaluation of one moment utility associated with an event does not affect the subjective evaluation of the moment utility associated with another event. In other words, the greater the temporal distance between two episodes, the more plausible it is for the total utilities of both scenarios to be equal. However, in Kahneman et al. (1997), there is no specified condition regarding the distance between two finite disjoint episodes in the definition of a TEO. If the present argument is valid, a notion of *time distance* could be incorporated into the definition of *Separability*. In practice, this would necessitate avoiding the measurement of individuals’ hedonic states between two time periods that are relatively close, in the sense that they are ‘too’ interdependent (as illustrated by the football-beer example). The drawback is that normative analysis would then be restricted to situations where events are relatively independent of each other. This limitation is significant because, over the course of one’s life, many actions and choices are interdependent, making such analysis challenging to apply in real-world scenarios.

Note that my assessment of *Separability* is closely related to a discussion in analytic philosophy regarding the ‘Shape of Life Hypothesis.’¹³ According to this hypothesis, the sequence (order) in which hedonic states are experienced matters for one’s welfare evaluation. Typically, proponents of this hypothesis argue, as in the examples discussed above, that for two equal levels of well-being over time but with different sequences, an

¹³See Dorsey (2015) for a review and Hersch (2023) about the implications for well-being science and well-being policy.

upward trend in momentary well-being (i.e. an improvement in well-being over time) is better than a downward trend (i.e. a decline in well-being over time) – all else being equal. Several attempts have been made to justify the ‘Shape of Life Hypothesis’ in the analytic philosophy literature. My aim is not to delve into these explanations in detail (see Dorsey (2015) for a comprehensive assessment), though these philosophical debates can help clarify whether certain principles of experienced utility should be retained or abandoned. For example, Dorsey (2015) argues that the ‘relational view’ – according to which well-being is not just the temporally discrete events that make up one’s life, but the meaning of these events determined by their narrative relations – neither rejects the aggregation of moment utilities over time (a fundamental principle for constructing the welfare function of experienced utility) nor challenges *Time Neutrality* (an important principle of experienced utility measurement discussed below).¹⁴

3.6 AXIOM 6 (Time Neutrality)

All moments are weighted alike in total utility. That is, the temporal distance between an outcome and its retrospective assessment is entirely irrelevant to its evaluation.

Time neutrality is the thesis, according to which individuals should attribute no normative significance to the temporal location of their pleasure and pain (all else being equal). It is important to emphasise that total utility is always assessed *after* the moment at which the outcome is experienced. The rationale is if the social planner adopts a ‘neutral’ stance in summing all utility profiles, there is no apparent reason to assign greater weight to one time at which one experience is evaluated by the individual instead of another.

To understand why Kahneman et al. (1997) and Kahneman (2000) make this normative judgement, 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 (according to peak-end rule, to be discussed in Section 4). 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).

One objection to this axiom is that attributing a ‘neutral’ value to time is far from obvious. 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 rationally think that his hedonic state of -2 does not carry the same weight as his hedonic state of 7 when he returns home. The time associated with the negative

¹⁴For a defence of the relational view, see in particular Velleman (2000).

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 (TEOs). Even if his overall 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.¹⁵

Philosophically speaking, this leads us to a rather general question: *is it irrational not to consider time as being neutral?* Kahneman's normative stance about the relationship between time and rationality is in fact very similar to the one of Parfit (1984), who holds the time-neutrality thesis. In our example, the individual values more to play with his dog when he gets back home rather than going to work because he *desires* one action more than the other. And it is because he desires one action more than the other that he has *reason* to weight time differently. Parfit, however, disputes the Humean view, according to which rationality is only grounded on reasons to believe, and since a desire cannot be false (according to Hume), it cannot be open to rational criticism. Parfit disagrees with this, arguing that rationality is not only grounded on reasons for *believing*, but also on reasons for *acting* (p. 120). According to Parfit (1984, p. 124), for temporal biases to be considered as normatively relevant (e.g. hyperbolic discounting), one must provide *reasons* for such a behaviour:

'Someone is not irrational simply because he finds one experience more painful than another. But he may be irrational if, when he has to undergo one of these two experiences, he prefers the one that will be more painful. This person may be able to defend this preference. He may believe that he ought to suffer the worse pain as some form of penance. Or he may want to make himself tougher, better able to endure later pains. Or he may believe that by deliberately choosing now to undergo the worse of two pains, and sticking to this choice, he will be strengthening the power of his will. Or he may believe that greater suffering will bring wisdom. In these and other ways, someone's desire to suffer the worse of two pains may not be irrational.' (p. 123)

With this point in mind, we can provide some reasons to question time neutrality in the construction of total utility, and Parfit would likely agree. In the colonoscopy experiment (discussed in Section 4) an individual may prefer, for the reasons Parfit mentions (e.g. strengthening the power of one's will), to repeat the procedure which is more painful than the other, even if he actually remembers this experience to be more painful. Now the point is, what if the individual does not have *reason* to do so but simply has a *desire* for it?

Parfit answers this argument with another thought experiment involving an individual who has '*future-Tuesday-indifference*' (p. 124 – his emphasis). Imagine an individual who cares in a perfectly equal manner about the pain (or pleasure) that occurs to him

¹⁵This thought experiment implies that remembered utility has normative value, which is the point of discussion in Section 4.

in the future, except on Tuesday, when he does not care at all about the pain (or pleasure) he endures then. Keeping only one kind of hedonic state (pain), this means that 'he would choose a painful operation on the following Tuesday rather than a much less painful operation on the following Wednesday' (p. 124). Parfit argues that preferring more pain to less simply because the agony will be on Tuesday '*is no reason*' (p. 124 – his emphasis). He then extends his argument by asking what the difference in principle would be for an individual who cares equally about everything that will happen to him within a year, but once a full year has passed, discounts the rest of his future by half. That is to say, this individual would rather choose, for example, two days of pain twelve months and one day from now rather than one day of pain twelve months from now. Parfit judges this kind of psychological rule to be simply arbitrary – along with those that discriminate between equal pleasures or pains:

'It is irrational to care less about future pains because they will be felt either on Tuesday, or more than a year in the future.' (pp. 125-126)

With Parfit's (1984) defence of time neutrality, we can first complete Kahneman's (2000) implicit argument that, should the individual have no reason for having this kind of preference, there is no point in considering each of her moment utilities extended over time as being non-neutral. Second, if one agrees with Parfit (1984), one may need to justify this reason with something more than a belief. For example, to say that 'I prefer to give more value to the evening rather than the morning because I desire more what I do in the evening than what I do in the morning, even if I enjoy both equally' would be irrational according to Parfit if there is no *reason* associated with such a desire ('I simply desire it, but I cannot tell you why'). But do we have to provide reasons for acting rationally? Further assessment is perhaps worth considering.¹⁶

Still, discriminating between the values of different times within one period is not more demanding in terms of ethical judgements than not discriminating. It seems that Kahneman et al. (1997) and Kahneman (2000) assume *Time Neutrality* not only for practical appeal – this assumption prevents the social planner from invoking arbitrary criteria to discriminate between different times within one period – but also to conform to the assumption of the social planner in standard welfare economics, which aims solely at maximising individual welfare without adding extra ethical judgements, such as why individuals should weight time. Indeed, discussing why (and how) time should be weighted inevitably leads us to some philosophical assessments, as previously discussed.

I now consider the last four axioms of experienced utility measurement. The external observer (or social planner) in the normative theory of Kahneman et al. (1997) possesses knowledge about the use of the scale (because he is omnipotent). His task is to make comparative judgements about utility profiles. These judgements must satisfy the following axioms to determine an equivalent relation between the original utility scale and duration.

¹⁶See Parfit (1984, pp. 170-177) and Brink (2011) for an extensive discussion of time neutrality, as well as Dorsey (2015) in relation to the 'Shape of Life Hypothesis'.

3.7 AXIOM 7 (Concatenation of Neutral Utility Profiles)

The global utility of a utility profile is not affected by concatenation with a neutral utility profile.

This axiom considers neutral utility profiles, defined as profiles in which instant utilities are hedonically neutral (i.e. ‘neither good nor bad’). Discussing this axiom would lead us back to Axiom 3 (*Distinctive Neutral Point*).

3.8 AXIOM 8 (Monotonicity in Instant Utility)

Increases of instant utility do not decrease the global utility of a utility profile.

(See comment below).

3.9 AXIOM 9 (Monotonicity in Total Utility)

Replacing one profile by another with a higher global utility increases the global utility of the concatenation of two utility profiles.¹⁷

Axioms 8 and 9 impose the requirement that a measure of instant utility should comprise all the information required for the determination of total utilities. That is to say, all the information needed to evaluate the goodness or badness of an episode must be incorporated in its utility profile. This means that any effect of previous or anticipated consumption on the utility of present consumption must be incorporated into the measure of instant utility. This refers to what has been said about Axiom 1 (*Inclusiveness*).

3.10 AXIOM 10 (Cardinality of Instant Utility)

The ordering of total utility of two utility profiles does not change if for both the instant utility level is increased by the same constant over an equally long period.

This last axiom is necessary for making cardinal measurement. As Kahneman et al. (1997) put it, ‘the analysis becomes simpler if cardinal measurement of instant utility can be assumed, so that differences of instant utility are meaningful’ (p. 392). Once cardinality is assumed, the social planner can rescale moment utility by its relation to duration. For example, if the social planner judges that one minute of pain at the hedonic state of -5 is equivalent with two minutes of pain at the hedonic state of -3, the social planner can rescale this original hedonic report by considering that -5 of the transformed scale is equivalent to the double of the original hedonic state of -3. The properties of the original scale (Axioms 2 and 3) and the possibility of making interpersonal comparisons of utilities with cardinal measurement (Axiom 4) have already been discussed. We can

¹⁷Note that Axioms 7, 8 and 9 hold under the theorem which states that there exists a non-decreasing (‘value’) transformation function of moment-utilities, assigning value 0 to 0, such that global utility orders utility profiles according to the integral of the value of moment utility over time (Kahneman et al. 1997, p. 391). For the proof of this theorem, see Kahneman et al. (1997, pp. 400-402).

now move on to the main point emphasised by Kahneman in his last years as a self-critique of the experienced utility criterion: it exclusively takes *moment utility* as its informational basis.

4 Remembered Utility Matters

Kahneman is perhaps the author who contributed the most to the experienced utility research programme. However, in an interview 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:

‘I gradually became convinced that people don’t want to be happy ... They want to be satisfied with their life. 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 be satisfied, to experience life satisfaction, from the perspective of “what I remember”, of the story they tell about their lives. I furthered the development of tools for understanding and advancing an asset that I think is important but most people aren’t interested in.’ (Daniel Kahneman, interviewed by Amir Mandel in 2018)¹⁸

Kahneman et al. initially considered that subjects in the experiments of Kahneman et al. (1993), Fredrickson and Kahneman (1993), Redelmeier and Kahneman (1996) and Schreiber and Kahneman (2000) 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*.¹⁹

But as Kahneman acknowledged in his later years, the logical rule of utility integration may fail to represent individuals’ overall happiness. 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 the experienced utility criterion:

¹⁸The 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>.

¹⁹This can be seen as one example (among others) of the ‘bias bias’ critique of Gigerenzer (2018), according to which behavioural economists have a ‘tendency to spot biases even when there are none’ (p. 303).

‘It is possible to view life, not as a flow of pleasurable and painful experiences, but as the accumulation of a stock of good and bad memories. Because the mental representation of memory is more like a photograph album than a home movie – it 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)

Note that people might also choose their vacation (i.e. a behaviour) on the basis of decision utility, but have a future memory of it that is radically different from their experience of it, and it might be this memory that has normative value. What drives the choice and what gives normative value are conceptually distinct, but a potential incoherence between them is not inherently a problem.²⁰ If the logical rule of utility integration is considered unwarranted (given the way individuals represent the experience of their life taken as a whole), then the ethical premise of experienced utility seems no more convincing. Considering that moment utility may not hold more normative value than remembered utility, what are the implications for experienced utility measurement? A straightforward answer is to replace *moment* utility with *remembered* utility as the informational basis of experienced utility measurement. That is, even if one’s total utility is more painful than another – as in the cold-water experiment of Kahneman et al. (1993) or in the colonoscopy experiment of Redelmeier and Kahneman (1996) – one should prevail if most subjects hold the memory that it is less painful than the other, *even if they actually experienced more total pain*. As an example, consider the colonoscopy experiment of Redelmeier and Kahneman (1996).

Figure 1: Real-time recordings from two patients undergoing a colonoscopy.
Source: Redelmeier and Kahneman (1996).

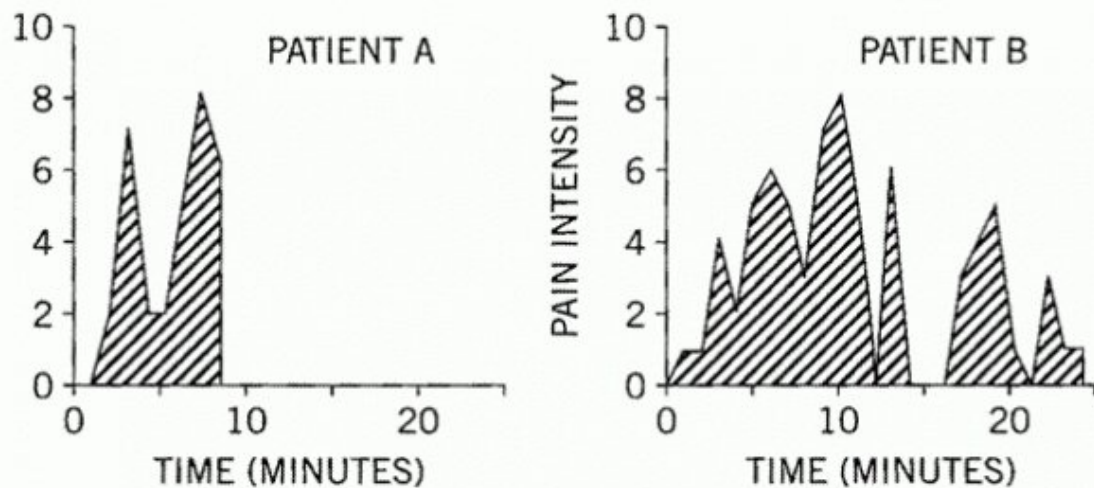


Figure 1 displays the intensity of pain (y -axis) recorded each minute (x -axis) by two patients undergoing a colonoscopy. The intensity of pain is measured by $\Psi = \{0, \dots, 10\}$ and the outcome X (colonoscopy) associated with time $N = \{0, \dots, 25\}$ is measured by the vector $x = \{x_1, \dots, x_{25}\}$. Patient A experienced the short procedure (8 minutes) and Patient B experienced the long procedure (24 minutes). According to peak-end rule, the total utility of the experiment with the added extra pain is remembered as less unpleasant than when no extra pain was added (specifically because this extra pain was *less*

²⁰I thank an anonymous reviewer for this comment.

unpleasant). It is however clear that the total utility of the experiment with the extra pain (undergone by Patient A) is more unpleasant in terms of total utility than the short experiment (undergone by Patient B).

Imagine now that we, as social planners, have to choose for a patient C, who has undergone both types of colonoscopies, one of the two colonoscopies to repeat (Kahneman et al. 1993). We have two alternatives: repeat the short experiment or repeat the long experiment. If Axiom 5 (*Time Neutrality*) and Axiom 6 (*Separability*) hold, we can sum up the three colonoscopy episodes in order to have two TEOs (temporally extended outcomes) of the possible alternatives to evaluate: (i) the concatenation of ‘short + long + short colonoscopies’ episodes and (ii) the concatenation of ‘short + long + long colonoscopies’ episodes. Assigning a utility level of instant utility to each time point, we have the total utility profile of a TEO,

$$\sum_1^3 \int_0^N u(x_i) di$$

In terms of *experienced utility* (or utility profiles), we have,

$$\int_0^n u(x_i) di + \int_0^{n+m} u(x_i) di + \int_0^n u(x_i) di > \int_0^n u(x_i) di + \int_0^{n+m} u(x_i) di + \int_0^{n+m} u(x_i) di$$

where $m \in N$ represents the extra added pain (which equals to 16 minutes in the example above). According to the logic of utility integration, the concatenation of ‘short + long + short colonoscopies’ episodes dominates the concatenation of ‘short + long + long colonoscopies’ episodes. However, in terms of *remembered utilities*, it is the concatenation of ‘short + long + long colonoscopies’ episodes which dominates the concatenation of ‘short + long + short colonoscopies’ episodes (under the assumption that the extra added pain is *less unpleasant* than the short procedure, as in the example above). That is,

$$\int_0^n u^r(x_i) di + \int_0^{n+m} u^r(x_i) di + \int_0^n u^r(x_i) di < \int_0^n u^r(x_i) di + \int_0^{n+m} u^r(x_i) di + \int_0^{n+m} u^r(x_i) di$$

Here $u^r(x_i)$ is the *remembered* utility of the patient at time i . The possibility of considering remembered utility as being more valuable than moment utility was, in fact, already suggested by Redelmeier and Kahneman (1996), who concluded 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)

In our example, it may be said that patient C has a *false belief* that the total utility of ‘short + long + long colonoscopies’ is less unpleasant than the total utility of ‘short + long + short colonoscopies’. With respect to the discussion about Parfit’s (1984) reasons for acting (Section 3.6), we have two possible schools of thought. One would argue that any action based on a false belief is necessarily irrational behaviour (Kahneman et al.’s viewpoint), while the other would argue that the individual’s self-report is not irrational/wrong/mistaken in the sense that his belief about experiencing less pain in the

long experiment is *true to him* (perhaps Kahneman’s later viewpoint). Since the aim of the experienced utility criterion is not to maximise the social planner’s well-being but the *individual’s* well-being, we may judge that it is preferable to assign normative value to *remembered* utility because the individual’s memory is what ultimately matters *to him*.

The point of Kahneman et al. is that 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. However, the concept of remembered utility is, after all, only a matter of interpretation by the observer. Is remembered utility not a form of moment utility, which, as the definition of moment utility holds, incorporates the information of past and anticipated feelings in its evaluation (see Appendix A, Remark 5)? The integration of experienced utility can be justified if experienced utility is taken in an all-encompassing manner. If remembered utility plays a role, then one can say that it contributes to the experienced utility of all the moments at which it played a role.²¹ Ultimately, the ethical premise of a normative approach that would give importance to individuals’ remembered utility could be reformulated in terms of *negative utilitarianism* of remembered utilities: it is good to *minimise* the remembered disutility of one’s suffering.

Ethical premise (bis). *An individual’s situation is better than another if it has less remembered disutility than another.* Formally, let $x = (x_1, \dots, x_n) \subseteq X$ be a realisable set of an individual’s situation (e.g. a consumption bundle, health states, etc.) and let X be the set of outcomes. I denote by $i = \{0, \dots, n\}$ the index of time for each element of the vector x . For example, x_1 is one physical pain at time 1, x_2 another physical pain at time 2, and so on. $W(x)$ is an individual welfare function of the form,

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

where $-u^r(x_i)$ is the individual’s remembered disutility experienced at time $i = \{0, \dots, n\}$ and \int the integral of all utility profiles, which allows to have the total utility of this individual (here the total disutility of suffering). The remembered utility criterion is satisfied under the condition that,

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

Yet an important and fundamental caveat remains. In fact, the divergence of decision utility from experienced utility is – strictly speaking – more a theoretical assumption than an observation supported by evidence. That most subjects in Kahneman et al.’s experiments prefer the addition of suffering in their decisions (rather than neutrality during a period, leading to a violation of monotonicity) is taken as important evidence to support the claimed difference between decision and experienced utility. Yet it must be emphasised that Kahneman et al. assume their subjects make mistakes either because of retrospective judgement about their past experiences, which shows that decision utility does not maximise experienced utility, or because of a failure to predict their future (or anticipated) utility. That is, they are assumed to make a mistake because of *fallible memory* and incorrect evaluation of *past experiences*, or because of *wrong anticipation*.

²¹One may argue that in this form, experienced utility would, however, be hardly operational. Axiom 1 may need to be reformulated in order to make welfare evaluation based on remembered utility. I thank Peter Wakker for this remark.

But if this observation is not at hand, one needs a counterfactual: what subjects would have done had they been able to maximise their experienced utility. In the many situations where a counterfactual preference is required to justify the experienced utility criterion (for lack of evidence about the effect of another normative recommendation), it is actually difficult to assume that individuals' decision utility does not reflect their own well-being.²²

Some evidence disputes the common assumption that decision utility is fundamentally different from experienced utility (although we may accept the conceptual difference). Carter and McBride (2013) propose an empirical test of the similarity of shape and behaviour between the value function of prospect theory (which depicts individuals' choices) and the experienced utility function that is theoretically assumed in the normative theory of Kahneman et al. (1997). Their empirical result can essentially be summarised as follows: experienced utility is S-shaped (like the value function of prospect theory) when using expectations and social comparison as the reference point, but is not always S-shaped when using past outcomes as the reference point. The result of their study leads them to suggest that decision utility and experienced utility are fundamentally related, although conceptually different.²³ Another empirical test is provided by Akay et al. (2023). Comparing British households' observed preferences with their reported hedonic well-being, the authors found striking similarities on average between decision utility and experienced utility. Their empirical study concludes that a majority of individuals made decisions that are actually consistent with the maximisation of their hedonic well-being.

5 Conclusion

In this article, I propose a methodological assessment of experienced utility as a welfare criterion. While I have addressed several issues regarding the axiomatisation of experienced utility (Section 3), what grounds its normative value, and the lack of empirical support for the discrepancy between decision utility and experienced utility (Section 4), my conclusion does not undermine confidence in the concept of experienced utility. There are ways to refine the axiomatisation, such as by incorporating a time distance element in the *Separability* axiom and more robustly defending the *Time Neutrality* axiom, which warrants serious philosophical investigation. In practice, the conceptual problems of *Separability* and *Time Neutrality* should also lead economists interested in hedonic measurement to adapt their survey accordingly. Regarding *Separability*, knowing that people may be exposed to psychological effects (such as adaptation) during the period in which economists collect their hedonic states, these psychological effects can influence self-reports over time. In other words, two events experienced in different orders will likely not produce identical hedonic reports. It is then important to include questions that can account for these effects (e.g. 'Did you experience any significant life events since you last answered this survey, such as a substantial increase or decrease in income?'). Regard-

²²See also Kahneman et al. (1997, p. 376), who justify the intuitive appeal of differentiating the two concepts of decision utility and experienced utility with the help of a thought experiment, but not with evidence supported by an actual lab experiment.

²³Note also that Carter and McBride (2013) acknowledge that the S-shape of both decision utility and experienced utility should be understood as one of the various possible shapes observed in a heterogeneous population (p. 14).

ing *Time Neutrality*, a way to control for this principle would be to add questions asking whether the individual has experienced emotions between two events that made her, in her own judgement, *weight* these two experiences differently (and for what reason). This, however, requires that the subject is *conscious* of these emotions and has the ability to articulate them when asked to do so. With respect to the distinction between moment utility and remembered utility, and the necessity to account for remembered utility in hedonic measurement, the 'Day Reconstruction Method' (Kahneman et al. 2004) is, in fact, already based on a form of remembered utility. This method avoids the influence of strong emotions that might bias the evaluation of past experiences while relying on participants' 'fresh' memories – where the time elapsed between the experience and its recollection is short enough to ensure accurate reporting. Perhaps the most significant obstacle for the experienced utility programme is the limited research available to support a meaningful distinction between experienced utility and decision utility. It is also possible that such a discrepancy would vary across subjects of study (health, consumption, etc.) and across domains (certainty, uncertainty, time, social behaviour, etc.). By pursuing these and other research directions, for those who wish to keep the flame of hedonic measurement alive, and perhaps even reignite it, there is still potential for it to flourish.

A Glossary of Experienced Utility Measurement

Decision utility is the weight of a decision inferred from choice, which is in turn used to explain choice. For any given alternative (e.g. a consumption good or health state), an individual has an assigned numerical value (either positive or negative) that represents her decision utility. Formally, let $x = (x_1, \dots, x_n)$ be the vector that corresponds to a consumption bundle, where x_1 is one consumption good, x_2 another consumption good, and so on. Let $u : X \mapsto \mathbb{R}$ be a utility function. If $u(x_1) = 4$, then the numerical value of 4 is the individual's decision utility of choosing x_1 . If $u(x_2) = 3$, then the numerical value of 3 is the individual's decision utility of choosing x_2 , and so on. This numerical value has, however, no psychological meaning in terms of hedonic state.

Remark 1. Like in standard microeconomic theory, the utility function $u : X \mapsto \mathbb{R}$ is a way of assigning a number to realisable alternatives such that more preferred alternatives are assigned a larger numerical value than less preferred alternatives. However, the numerical value is here only relevant to allow for an ordinal ranking of decision utilities. It does not express the *psychological intensity* of the alternative chosen – contrary to experienced utility defined below.

Experienced utility is the hedonic state experienced in choosing or doing something. For any given alternative (e.g. a consumption good or health state), an individual has an assigned hedonic state expressed in a numerical value, which describes her psychological intensity. Her experienced utility is high if it pleases her and low if it bothers her. Formally, let X be the set of alternatives and $u : X \mapsto \Psi$ a utility function, where $\Psi = \{-10, \dots, 10\}$ is the set of hedonic states (-10 for the least pleasant feeling, 10 for the most pleasant feeling). Assume $u(x_1) = 8$, then the numerical value of 8 represents the experienced utility of choosing x_1 . If alternatives are of similar nature (e.g. two similar consumption goods or health states), then cardinality applies (Axiom 4, Section 3.4). That is, if $u(x_1) = 6$ and $u(x_2) = -3$ it means that x_1 feels exactly three times better for the individual than x_2 .

Moment (or instant) utility is an attribute of experience formulated into a hedonic value, which is experienced at the present moment. It is the valence (good or bad) and the intensity (mild to extreme) of current affective or hedonic experience. Typically, the enjoyment an individual derives from consuming a bundle is of a given intensity, which depends on her personal evaluation that she can report on a hedonic scale (e.g. -10 for the lowest hedonic state, 10 for the highest). The set of moment utility (or hedonic states) is denoted by $\Psi = \{-10, \dots, 10\}$.

Remark 2. As Kahneman et al. (1997, p. 398) put it, the set of moment utility Ψ should include the neutral value 0. This is because negative feelings should be distinguished from positive feelings and to allow for cardinal measurement of moment utility on a ratio scale (Axiom 10, Section 3.10).

An episode is a connected time interval described by its temporal coordinates. 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 $f : [b, e] \mapsto X$, for $B \leq b$ and $e \leq E$.

Remark 3. All time intervals are assumed left-closed and right-open because the union of episodes should not include two slice times of different episodes (see below).

A **temporally extended outcome (TEO)** is a group of one or more temporally finite disjoint episodes. For example, the consumption of x_1 and x_2 represents *two* episodes. A TEO is then simply the union of two (or more) separated 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, $f : [b, e[\cup [b', e'[\mapsto X$ is one TEO, $f : [b, e[\cup [b', e'[\cup [b'', e''[\mapsto X$ is another TEO, and so on. We can denote the general definition of a TEO by $f : 2^{[B, E[} \mapsto X$, where $2^{[B, E[}$ is the set of all possible collections of subintervals in $[B, E[$.

A **utility profile of a TEO (or simply utility profile)** is a function that assigns a level of moment (or instant) utility to each time point. Informally, we can interpret it as an extensive definition of moment (or instant) 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 $u : 2^{[B, E[} \mapsto \Psi$, with $[B, E[$ the set of slices in time.

Remark 4.1. In order to keep the standard notation ' $u(x)$ ', I however consider the summation of *experienced utility* (and not of utility profiles) to be the informational basis of total utility. This is far from absurd, since we only have to index experienced utility with time to have an equivalent notion with utility profile (although both mathematical objects are different). That is, we can denote a utility profile by $u(x_i)$, where $i = \{0, \dots, n\}$ is the index of time. I judge this simplification to be useful because it avoids technical details that are irrelevant to the methodological discussion proposed in this paper.

Remark 4.2. Kahneman et al. (1997, p. 398) precisely distinguish a *dated utility profile* from a *neutral utility profile*. The former defines the general concept of utility profile. The latter allows for a technical transformation, so that some specific level of instant utility experienced at a given slice of time yields the same amount of instant utility at another slice of time, *independent of when it occurs in history* (Axiom 5, Section 3.5).

Total utility is the addition of all utility profiles of an episode or TEO under the assumption that Axioms 1, 2, 5 and 6 of utility integration hold (Section 3). 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 point of view, total utility is nothing more than an objective function that a benevolent social planner aims to maximise. With the simplified notation I propose, total utility can be written as $W(x) = \int_0^n u(x_i) di$.

Remembered utility is an individual's own global retrospective evaluation of a past experience, either represented in an episode or a TEO. What the individual remembers (e.g. consuming a bundle or a given health state) is a memory of a past experience.

The evaluation she has about this past experience (either positive or negative) is her remembered utility of that experience. Formally, let X be the set of alternatives and $u^r : X \mapsto \Psi$ a remembered utility function, where $\Psi = \{-10, \dots, 10\}$ is the set of hedonic states. If the social planner observes (through the individual's self-report) that $u^r(x_1) = 8$, then the numerical value 8 represents the remembered utility of reflecting on her past experience of x_1 . If the social planner observes (through her self-report) that $u^r(x_2) = 1$, then the numerical value 1 represents the remembered utility of reflecting on her past experience of x_2 . We can denote remembered utility by $u^r(x_i)$, where the superscript r stands for 'remembered' and where the subscript $i = \{0, \dots, n\}$ stands for the time at which the individual thinks about her past experience.

Predicted (or anticipated) utility is a belief about future experienced utility. For example, how an individual thinks she will feel after consuming the two bundles x_1 and x_2 is her predicted utility, also quantified in terms of hedonic states. Formally, the representation of predicted utility is exactly the same as that of remembered utility, except that since the evaluation is not about *past* but *future* events, we can denote $u^p(x_i)$ for 'predicted'.

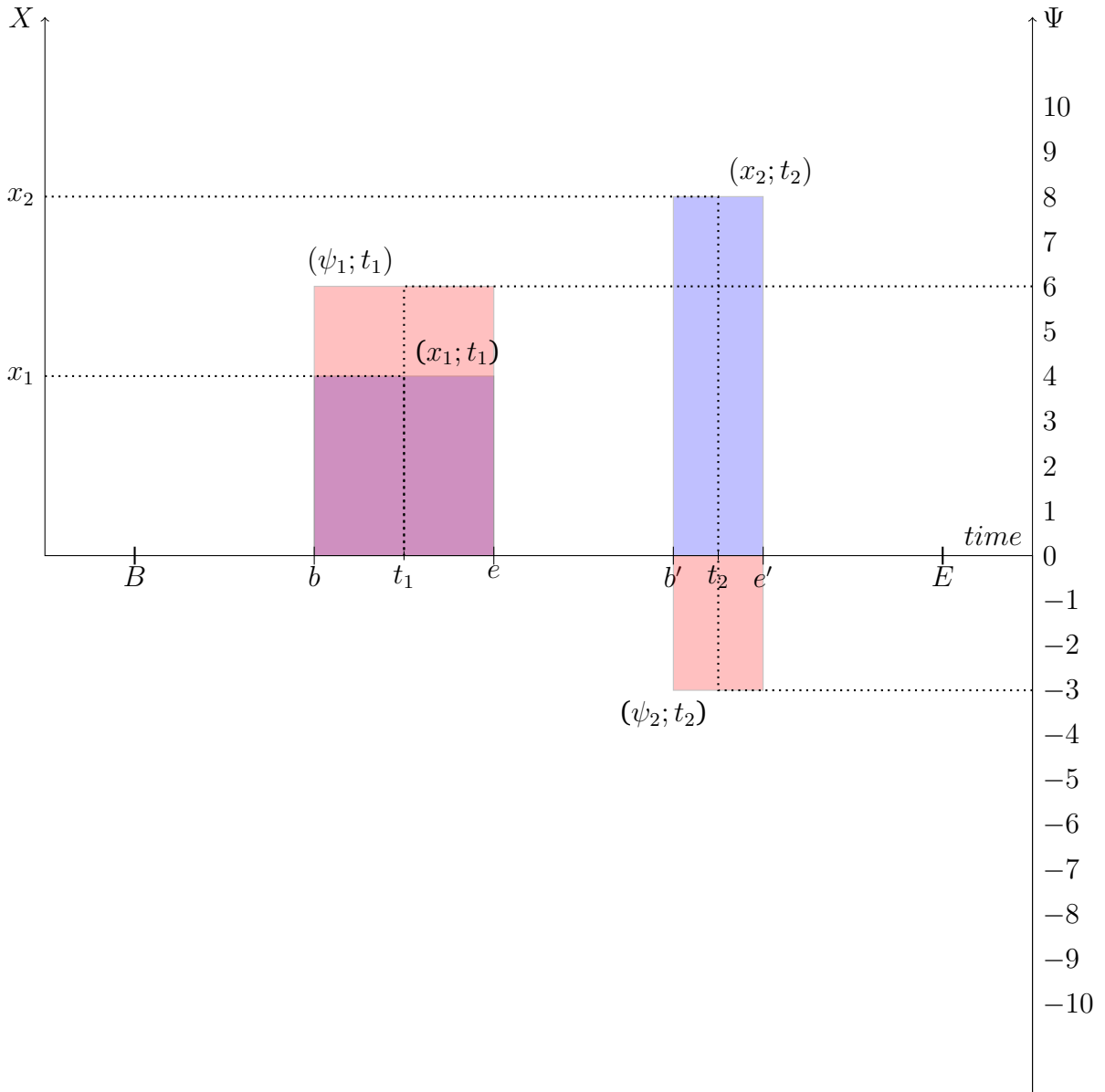
Figure 2 below provides a visual representation of the relation between time (N), outcome (X) and hedonic state (Ψ). 'Time' and 'hedonic state' are quantitative variables, while 'outcome' is a qualitative variable (which means that it does not have a numerical value).

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 $\{x_1, x_2\} \in X$.

The y -axis on the left represents outcomes (a qualitative variable), 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. A utility profile is a function $u : 2^{[B, E[} \mapsto \Psi$. In the present illustration, we have two utility profiles: $f : [b, e[\mapsto \Psi$ and $f : [b', e'[\mapsto \Psi$. Visually, a utility profile is represented by the red area, where $\{\psi_1, \psi_2\} \in \Psi$. For the sake of illustration, let x_1 give the individual a hedonic feeling of 6, while x_2 gives her a hedonic feeling of -3.

Figure 2: Graphical representation of experienced utility measurement



On the assumption that Axiom 5 (*Separability*, Section 3.5) and Axiom 6 (*Time Neutrality*, Section 3.6) hold, 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, $W(x) = \int_0^n u(x_i) di$. Since there are here only two experienced outcomes at two different slices of time, we have $W(x) = u(x_1) + u(x_2)$. The goal of the social planner is to maximise $W(x)$.

Remark 5. Again, representing total utility in terms of utility profiles would required writing $W(n) = \int_B^E u(2^{[B, E]}) dn$. This notation is avoided for two reasons. First, and as previously said, the notation $u(x_i)$ simplifies matters. That is, I simply consider that x is an element included in the two nested sets X and $[B, E]$. To make things even simpler, I use the set of time N instead of $[B, E]$, where i is the index which captures each time slice. Second, Ψ actually depends on X , as in the definition of experienced utility. But the relationship between N , X and Ψ is quite peculiar. 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 Axiom 1 (*Inclusiveness*, Section 3.2), 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 . This psychological phenomenon is, however, 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 $\Psi_i = f(X_i, X_{i'}), \forall i' \in 2^{[B, E]} \neq i$.

Remark 6. The graph provides a visual representation of the theoretical discrepancy between decision utility and experienced utility. However, since the set of outcomes X is a qualitative variable, the distance between $(x_1; t_1)$ and $(\psi_1; t_1)$, and the distance between $(x_2; t_2)$ and $(\psi_2; t_2)$ are meaningless. I say ‘theoretical’ because the empirical studies of Kahneman et al. only show a discrepancy between predicted utility and experienced utility (Kahneman and Snell 1990, 1992) and between remembered utility and experienced utility (Kahneman et al. 1993; Fredrickson and Kahneman 1993; Redelmeier and Kahneman 1996; Schreiber and Kahneman 2000). But whether decision utility and experienced utility are fundamentally distinct is yet another question (see Section 4).

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