# Back to Aristotle?
# Explorations of Objective Happiness

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**Abstract**

This paper provides an analytical assessment of measuring experienced utility: a research program that leading expert Daniel Kahneman recently stated to have abandoned. My analysis follows four steps. First, I propose a literature review of twenty years of experienced utility measurement. Second, I consider several philosophical issues that Benthamian hedonism may be a problem for public policy. Third, I provide a philosophical discussion of all the axioms of experienced utility measurement by arguing that many of them suffer from important theoretical issues. Finally, I show that maximising individuals' moment utilities is based on a misconception of happiness that economists and policymakers have good reason to stay aware from. The bottom line is if economists and policymakers seek to improve their understanding on measuring objective happiness, Aristotle's eudaimonism may provide a more convincing account of objective happiness that palliates some of the issues of Bentham's hedonistic reductionism.

**Keywords.** *eudaimonism — experienced utility — happiness measurement — hedonism — pain/pleasure — public policy*

**JEL codes.** B41, D60, D90, I31

# 0   Introduction

*'Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do, as well as to determine what we shall do.'*

<div align="right">Bentham (1780 [2007], p. 23)</div>

*'Now such a thing happiness, above all else, is held to be; for this we choose always for itself and never for the sake of something else, but honour, pleasure, reason, and every virtue we choose indeed for themselves (for if nothing resulted from them we should still choose each of them), but we choose them also for the sake of happiness, judging that through them we shall be happy. Happiness, on the other hand, no one chooses for the sake of these, nor, in general, for anything other than itself.'*

<div align="right">Aristotle (-350 [2009], p. 10)</div>

The essence of the present paper can be resumed in the confrontation of these two different conceptions of happiness endorsed by Bentham, on the one hand, and Aristotle, on the other hand. Due to the many methodological and theoretical issues of measuring experiences of pain and pleasure, should we end up (once for all) with the research program of measuring experienced utility and focus instead on other meaningful factors of what constitutes 'objective' happiness? The main argument advanced in this article is that we should, for several reasons that lead me to show that experienced utility measurement is nothing but a dead end.

Measuring happiness through the hedonic interpretation Bentham (1780 [2007]) gave to it has been the subject matter of (approximatively) twenty years of research by Daniel Kahneman and his colleagues (henceforth 'Kahneman et al.'). The bulk of this research program was to concretise a utilitarian dream left unrealised 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)

However, despite all the efforts engaged by Kahneman et al. to concretise Edgeworth's 'hedonimeter' (to be reviewed in Section 1), experienced utility measurement is currently at its lowest profile. Perhaps the main reason for this is that such research program was abandoned by leading expert Daniel Kahneman himself. In a recent interview given to *Hareetz* (an Israeli online newspaper), the author explicitly declared that he does not believe anymore in the research program he undergone for twenty years. In Daniel Kahneman's own words,

> '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)[1]

The 'new' Daniel Kahneman (henceforth Kahneman-2018) recognises that he might have missed the point of what objective happiness truly is in giving *moment* utilities (what is experienced here and now) too much importance. Instead, what may fundamentally matter is not the *experienced* value of a decision but its *remembered* value: what individuals remember of their experiences. Yet maximising moment utilities for public policy was the whole point of Kahneman et al., particularly in Kahneman (1999, 2000). So what happened after twenty years of experienced utility measurement that Daniel Kahneman himself led to abandon the research program he undergone for all these years?

In this paper, I do not provide a historical analysis of measuring experienced utility, which is a gap already fulfilled by Read (2007). Instead, my aim is to provide an analytical assessment about what is philosophically problematic with the whole theory of experienced utility measurement. Specifically, my aim is to (i) provide a literature review of the program of Kahneman et al. (from the beginning until its 'end'), (ii) consider several philosophical issues that Benthamian hedonism may be a problem for public policy, (iii) philosophically discuss all the axioms of experienced utility measurement, and ultimately (iv) explain that maximising individuals' moment utilities is based on a misconception of happiness that economists and policymakers have good reason to stay away from.

Because of all the methodological and theoretical issues of measuring experienced utility discussed throughout this article, it is argued that those issues give economists and policymakers reason for endorsing alternative measures of objective happiness *that are not directly related to the seek of pleasure*. Pleasure is undoubtedly a good thing. Yet perhaps the biggest mistake was to consider it, as Bentham (1780 [2007]) did, as what *constitutes* goodness (and more straightforwardly, the ultimate end of everything). The point is that after Kahneman-2018's own acknowledgement that maximising moment utility may not be what matters to the good life, a complete and up-to-date assessment of experienced utility measurement is needed. Do we have good reason to continue with Benthamian hedonistic reductionism as the ethical benchmark for public policy, and if not, what alternative direction can we propose to the program of objective happiness measurement?

Among the various conceptions of happiness, there is yet another one closely related to Kahneman-2018's statement in which pleasure is not what constitutes happiness but is either a *component,* a *process* or a *by-product* of it. Such conception is found in Aristotle's (-350 [2009]) *Nichomachian Ethics,* where happiness is also presented as the ultimate goal of life but where — in contrast with Benthamian hedonism — *happiness is not defined as the pursue of pleasure*. In Aristotle's (-350 [2009]) ethics, happiness is defined by the function of man: what she can successfully accomplish (p. 11). According to Aristotle, if happiness is a human quality then it needs to be located in the 'activity of soul which follows or implies reason' (p. 11). In his terms, happiness is about possessing the exercice of thinking about one's condition.

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[1]Full journal article is available at https://www.haaretz.com/israel-news/.premium.MAGAZINE-why-nobel-prize-winner-daniel-kahneman-gave-up-on-happiness-1.6528513.

So how can the ethics of Aristotle enlighten us on the way objective happiness should be measured? The answer is by extending Kahneman-2018's reconsideration of objective happiness, which is to be broadened by integrating other components than what is experienced here and now. Those components may be the seek of human flourishing such as social relationships and overall life satisfaction (e.g. being in good health and having access to decent living conditions). It also requires to give importance to what individuals remember of their past experience, even if those experiences do not maximise pleasure. In this conception of objective happiness, pleasure may come as a by-product of exercising a 'virtuous' life *but pleasure is not what ultimately matters to the good life*.

The bottom line is if economists and policymakers are willing to find a proper measure of objective happiness, they have perhaps good interest in looking for alternative normative approaches that do not make of pleasure maximisation their ultimate goal. A normative approach which is already well aligned with Aristotle's conception of the good is actually the capability approach (Sen 1985; Nussbaum and Sen 1993; Nussbaum 2000). Such normative approach is given brief consideration in conclusion.

The rest of the article is organised as follows. Section 1 provides a literature review of measuring experienced utility by the program of Kahneman et al.[2] Section 2 discusses several reasons that Benthamian hedonism may be problematic for public policy. Section 3 philosophically discusses each of the ten axioms of the theory of experienced utility, which permits its measurement. Section 4 reconsiders the content of experienced utility measurement, i.e. what matters may not be *moment* utility but *remembered* utility. I then conclude in Section 5 with a brief appraisal of Aristotle's eudaimonism, which may provide a richer conception of objective happiness measurement than Bentham's hedonistic reductionism.

# 1 Measuring Experienced Utility: A Literature Review

The discrepancy between 'decision utility' and 'experienced utility' was initially suggested by March (1978), who made the case that decision value and experience value typically do not converge for ordinary decision makers. *Decision* utility is the weight of an outcome in a decision, as in any model of decision-making. *Experienced* utility is the hedonic quality as in Bentham's (1780 [2007]) usage. That is, it is the experience in term of happiness, which is not necessarily related to one's observed choice. Since decision utility is inferred from observed choices, and since observed choices are sometimes subject to cognitive biases, the idea is that individuals may not always choose the outcome that makes them better off.

The conceptual appeal of experienced utility is to consider it as a more reliable proxy of well-being than decision utility and to use such normative criterion for public pol-

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[2]Awareness should be given that my aim is not to provide a *general* literature review of happiness measurement. The reader can find enough material in Frey and Stutzer's (2002) state of the art, in Layard's (2011) enthusiastic defence of making happiness the central criterion for public policy, and in Read's (2007) insightful history of the concept of experienced utility 'from Jeremy Bentham to Daniel Kahneman'. See also Angner (2013) for an assessment of the possibility of measuring a mental state account of well-being defined in terms of happiness.

icy. The main advantage of the experienced utility criterion is that it is independent of the choices individuals make, and hence can be used to evaluate which choices increase well-being and which choices decrease it. The separation between decision utility and experienced utility was already a matter of discussion in Kahneman and Tversky (1984, pp. 349-350) and became the central interest of the research program of Kahneman et al. concerned in evaluating the process of individuals when they endure experiences of *pain* and *pleasure*.

The main interest of this research program was to understand the connection and gap between what individuals *experience* in real time — i.e. the way they actually lead their life — and what they *remember* of those experiences — i.e. the narrative they represent themselves about the way they lead their life. Tenants of the experienced utility criterion for normative assessments argue that policy recommendation can be based on the evaluation of *total utility*: the collection of utility profiles which follows certain normative rules (that are explained below). According to the experienced utility criterion, a policy is judged to be better than another if it maximises the level of total utility. Its central ethical rule can then be formulated in the following premise.

**Ethical premise.** *An individual's state of affairs is better than another if it has more level of total utility than another.* Formally, let $x = (x_1, ..., x_n) \subseteq X$ be a realisable set of an individual's states of affairs (e.g. a consumption bundle, health states, sips of tea, etc.) and $X$ be the set of outcomes. I denote by $i = \{0, ...n\}$ the index of time for each element of the vector $x$. For example, $x_1$ is one sip of tea at time 1, $x_2$ another sip of tea at time 2, and so on. $W(x)$ is an individual welfare function of the form,

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

where $u(x_i)$ is the individual's utility profile of $x$ at time $i$ and $\int$ the integral of all utility profiles, which simply allows to have the total utility of the individual.[3] The experienced utility criterion is satisfied under the condition that,

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

Since 1990, the development of the experienced utility criterion can be resumed in three main lines: (i) theoretical distinctions between several kinds of utilities (*decision utility, experienced utility, predicted utility, moment utility, remembered utility* and *total utility*), (ii) accumulation of empirical evidence about the way individuals perceive and remember experiences of pain and pleasure, and (iii) methodological improvements of measuring the aggregation of moment utilities. The individual contributions are the following.[4]

## 1.1 Individual Contributions

Kahneman and Snell (1990) provide empirical evidence of generally poor performance in the task of predicting utility. They introduce the concept of *predicted utility*, defined as

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

[4]If the reader is already well aware of this literature, she may safely skip to Section 2.

the belief one has about future experienced utility. The authors argue that if individuals fail to anticipate the effect of the outcome of a choice on their future preferences and hedonic states, decision utility and experienced utility should be treated differently.

Kahneman and Varey (1991) discuss the status of choice as the sole measure of utility and argue that deriving utilities from preferences is questionable. They suggest a distinction of experienced utility in three separate factors: the experience *as it happens*, the experience of *remembering it* and the experience of *anticipating it*.[5] They consider two important determinants of experienced utility: processes of *adaptation* and processes of *comparative judgement*. According to the authors, one important implication of adaptation is that it allows to make interpersonal comparisons of utilities when two individuals who are fully adapted to different levels of stimulation can be said to be matched in their absence of response to their states.

Also, Kahneman and Varey (1991) advance that if their responses to stimuli differ in the same direction from their respective adaptation levels, those can be matched in signs, if not in magnitude (p. 138). According to the authors, comparative judgements are more salient when individuals identify a reference person or group similar to themselves. They then advance that comparative judgements also allow for interpersonal comparisons of utilities when a group of similar individuals (e.g. poor or riches) see a change in their initial endowment. The authors argue that the history of prior experiences and the context to which the relevant object, state, or event is to be compared are likely to affect experienced utility, and that any treatment of interpersonal comparisons of utilities should give importance to these two factors.

Kahneman and Snell (1992) address the following question: 'do decision makers accurately predict their future hedonic experiences?' The empirical answer they provide is negative. In a series of recurrent experiments corresponding to eight consecutive days, subjects were asked to consume their favorite ice cream while listening to the same piece of rock music. After each episode, subjects had to rate how much they liked the ice cream and the music. At the end of the first session, they had to predict the ratings they would make on the following day and on the final day of experiment. The authors find a correlation between actual and predicted changes in liking close to zero. In sum, subjects poorly predicted their future hedonic experiences. Although Kahneman and Snell (1992) give full awareness that their results are insufficient to claim that people have trouble in predicting their future tastes, they argue to be sufficient in order to indicate failures in such tasks.

Varey and Kahneman (1992) address another important question: 'do people correctly incorporate their hedonic beliefs into their decisions?' The authors propose 'utility integration' as a normative standard, which takes '*the sum of the hedonic values associated with the separate moments as the measure of the experienced utility (or disutility) of the series*' (p. 170 — their emphasis).

In their view, utility integration should satisfy three conditions: *monotonicity* (or

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[5]This actually corresponds to Jevon's (1905) enumeration of three distinct ways in which pleasure or pain are caused. See also Loewenstein (1987) who study the value that individuals attribute on waiting periods in which to enjoy or to suffer anticipation of future hedonic events.

dominance), the rule according to which adding pain to a series should strictly increase global disutility; *non-discrimination*: two moment-pain experiences of equivalent magnitudes should be considered equally unpleasant contributions to the series; *additivity*: the difference between the global disutility of an unpleasant experience at $i$ and the one of an unpleasant experience at $i + 1$ is simply the disutility of the extra unpleasant experience. In their experiments, subjects have to endure painful experiences such as carrying a suitcase, sitting in a vibrating room or standing in an uncomfortable position. Their experiments show that most of the subjects violate utility integration. One of their important findings is that adding pain to a series can produce a lower global evaluation, which is not in accord with monotonicity.

Kahneman et al. (1993) show that actions that are based on memories of experiences which have systematic biases relative to contemporaneous evaluations of experiences may strongly support an interpretation of mistake. In their experiment, subjects have their hand submerged into cold water. There are two settings: one shorter duration (60 seconds) at 14°C and one in which an extra duration time is added (+30 seconds), where the temperature is slightly increased to 15°C. The empirical results showed (again) that subjects violated temporal monotonicity — the rule according to which adding moments of pain to the end of an episode makes it worse, and that adding moments of pleasure makes it better.[6]

Fredrickson and Kahneman (1993) show identical results with snapshots, where people were exposed to sixteen short plotless film clips, half pleasant (e.g. views of coral reef) and half unpleasant (e.g. an amputation). Schreiber and Kahneman (2000) provide further empirical support for such result with aversive sounds of varying loudness and duration, so as Redelmeier, Katz, and Kahneman (2003) who in a randomised trial assign to half of the patients an added short interval to the end of their colonoscopy.

Kahneman (1994) summarises three important points known from empirical research: (i) people are myopic in their decisions, (ii) they may incorrectly predict their future tastes and (iii) they make erroneous choices by fallible memory and incorrect evaluation of past experiences. Due to these observations, the author argues for an enriched definition of rationality with what he calls the 'substantive' criterion of experienced utility: a criterion that evaluates the outcomes of decisions *independently from (or external to) the system of preferences*. This constitutes an important departure from standard welfare economics, which is based on the satisfaction of individuals' *preferences* in order to evaluate their states of affairs.

Kahneman (1994) then introduces two empirical generalisations known as (i) the *peak-end rule*: global evaluations of experiences are accurately predicted by the mean between the most unpleasant feeling in the episode and the one recorded at the end of the episode; (ii) *duration neglect*: the duration of an unpleasant episode has no significant effect to retrospective evaluations of experiences. These two conclusions particularly

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[6]Note however that Varey and Kahneman (1992) only define monotonicity in terms of pain, while the definition of monotonicity in terms of pain *and* pleasure is taken for granted in Kahneman et al. (1993). However, one may argue that monotonicity cannot account for *both* painful and pleasurable experiences because their remembered perception can be interpreted differently by the subjects. Empirical evidence of the peak-end rule (see below) in terms of *pleasure* (and not pain) is actually scarce (Do, Rupert, and Wolford 2008), if not non-existent (Kemp, Burt, and Furneaux 2008; Mah and Bernstein 2019).

originate from an experiment of Redelmeier and Kahneman (1996) about the intensity of pain experienced by patients undergoing colonoscopy.

Kahneman, Wakker, and Sarin (1997) in their seminal 'back-to-Bentham' approach propose a formal normative theory of what they call the *total experienced utility of temporally extended outcomes*: a sequence of life experiences that can include anything related to the sensation of pleasure and pain. The authors aim at measuring what they call 'temporally extended outcomes' (TEOs) with the normative concept of 'total utility': an aggregation of temporal profiles of utility which is experienced instantly by individuals.

They first provide empirical evidence that the system in which normal individuals form and store evaluations of situations is not designed to optimise experienced utility. Then, they propose a normative theory from the concept of 'total utility'. 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 policymaker could eventually maximise the sum of the total utility of each individual into an objective function.

Kahneman (1999) explores the concept of objective happiness, an attempt to specify what an external observer would need to know in order to determine how happy an individual is at a given period, and the rules for using that knowledge. According to Kahneman (1999), the highest level of evaluating well-being is grounded on information about *instant* (or moment) utility. The author argues for a 'bottom-up' construction of individuals' global evaluations of well-being by distinguishing two notions of happiness: *subjective happiness*, based on self-stated 'how happy are you' reports and *objective happiness*, derived from a record of instant utility over the relevant period.

The author states that remembered utilities and total utility of episodes differ just as subjective and objective happiness: the former gives an approximate evaluation of one's well-being, while the latter gives a more precise valuation of happiness. Although objective happiness is naturally determined by subjective self-reports, the idea is that the aggregation of instant utility is governed by a logical rule that is *external* to the subject, i.e. a rule stated by the social planner, just like in Kahneman, Wakker, and Sarin (1997).

From Kahneman's (1999) viewpoint, only *objective* happiness is normatively relevant. This has major implications for public policy. As the author claims, 'policies that improve the frequencies of good experiences and reduce the incidences of bad ones should be pursued even if people do not describe themselves as happier or more satisfied' (p. 15). He explicitly argues that the goal of policy should be to increase measures of *objective* happiness, not measures of satisfaction or *subjective* happiness.

Kahneman (2000) presents an overview of the experienced utility criterion and of the relation between the pleasure and pain of moments and the utility of more extended episodes. The author argues that experienced utility is better measured by moment-based methods — that assess the experience of the *present* — rather than by the memory-based approach — which takes the subject's retrospective evaluation of *past* episodes (remembered utility) as valid data. He then develops his concept of 'objective happiness' that he already introduced in Kahneman (1999).

The author argues that the general distinction between decision utility and experienced utility has major implication to normative assessments in public policy. Taking typical questions of cost-benefit analysis — e.g. 'Does the presence of trees in a city street affect the mood of pedestrians?', 'What are the well-being consequences of inflation, unemployment, or unreliable health insurance?' (p. 204) — Kahneman (2000) argues that in addition to standard methods of willingness to pay/willingess to accept and elicitation of public opinion, there is a substantial interest in measuring the experienced utility associated with public goods.

Kahneman et al. (2004) introduce the Day Reconstruction Method (DRM): an alternative measure of subjective-well being that they argue to palliate the issues of previous sampling methods of experienced utility. Before the DRM was the privileged measure of subjective well-being, measuring experienced utility was possible with Experience Sampling Methodology (ESM) (Larson and Csikszentmihalyi 1983). Respondents in ESM studies are asked, with the help of a palmtop computer they carry along the day and which beeps at random times, to record where they are, what they are doing, and how they feel several times throughout the day.

The aim is to collect the most accurate data possible by targeting multiple and immediate reports from people in their typical environments. According to Kahneman et al. (2004), the disadvantage of the ESM is that experience sampling is expensive, involves high levels of participant burden, and provides little information about uncommon or brief events, which are rarely sampled. Instead, they argue that the advantages of the DRM are that it imposes less respondent burden, does not disrupt normal activities, and provides an assessment of contiguous episodes over a full day, rather than a sampling of moments (p. 1777).

The DRM consists in asking respondents to first revive memories of the previous day by constructing a diary consisting of a sequence of episodes: 'Think of your day as a continuous series of scenes or episodes in a film'; 'Give each episode a brief name that will help you remember it (e.g. commuting to work, at lunch with your colleague, etc.)'. Then, respondents are asked to describe each episode by answering questions about the situation and about the feelings that they experienced, as in experience sampling.

Kahneman and Sugden (2005) aim to explore the implications of basing economic policy evaluation on experienced utility. The authors discuss the problem of contingent valuation when based on the standard method of willingness to pay and willingness to accept. One central concern they discuss is to evaluate states of affairs on stated preferences, while stated preferences might be subject to cognitive biases. For example, when it is asked to individuals to think about what it would be like to be in some continuing state (e.g. living in California or being paraplegic), what they actually think about is what it *would be like to move to* that state, not what it *is like to be* in that state.

This heuristic refers to the 'transition heuristic': the failure of taking into account adaptation. But if people do not anticipate adaptation, the authors argue that responses to stated preference questions may reflect systematically bias forecasts of experienced utility. A second bias they mention is the 'focusing illusion': 'nothing in life is as impor-

tant as you think it is when you're thinking about it' (Schkade and Kahneman 1998). For example, when we are thinking about a paraplegic person, we are thinking about that person *thinking she is a paraplegic*. But empirical evidence showed no significative decrease in subjective well-being for paraplegic individuals, simply because they tend to forget being paraplegic in the long run (Brickman, Coates, and Janoff-Bulman 1978).

The point is that people may overestimate the effect of a particular state of affairs because they attribute too much attention to this state of affair. As a consequence, the authors argue that this phenomenon may ultimately bias subjective reports. Like Kahneman et al. (2004), Kahneman and Sugden (2005) defend the DRM (well-being measured in terms of moment-based utilities) as a better alternative than anticipated utility and overall satisfaction measures. They argue the DRM to be used to estimate the effects on happiness of many kinds of goods that are currently subject of contingent valuation, such as landscapes, recreation sites and states of health.[7]

Kahneman and Krueger (2006) discuss how individuals' responses to subjective well-being questions vary with their circumstances and other factors. Like in the previous works, they argue for a necessary distinction between different conceptions of utility rather than a single one. The novelty proposed in this paper is the 'U-index' defined as 'a misery index of sorts, which is the proportion of time that people spend in an unpleasant state' (p. 4). According to the authors, the U-index avoids the difficulty of giving a cardinal representation of utilities for making interpersonal comparison because it actually provides an *ordinal measure at the level of feelings*. The U-index (for 'unpleasant' or 'undesirable') is constructed as follows.

The authors first classify an episode as unpleasant if the most intense feeling reported for that episode is a negative one. In other words, if the highest rating on any of the negative affect dimensions is strictly greater than the maximum of rating of the positive affect dimensions, then such episode is a negative one. In doing so, it does not matter whether two individuals who are differently sensitive to emotional states use, say, the 2 to 4 portion of the 0 to 6 intensity scale of unpleasant states (individual 1) and the full range of the scale (individual 2). As the authors put it, as long as both individuals 'employ the same personal interpretation of scales to report the intensity of positive and negative emotions, the determination of which emotion was strongest is unaffected (ignoring ties)' (p. 19).

According to the authors, this method has three main advantages. First, it only requires one salient negative emotion for an episode to be unpleasant. Since individuals mostly endure a positive predominant emotional state in an episode, one 'extreme' negative emotion provides a significative and contrasting occurrence. Second, selecting a negative feeling as more intense to a positive feeling is likely to be a deliberate choice because negative feelings of this sort are relatively rare (at least for individuals living in rich and developed countries). Third, the correlation of the intensity among various

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[7]The two authors however conclude with diverging opinions regarding the future of experienced utility for normative assessments. While Kahneman is enthusiastic, Sugden is more skeptical, arguing that the aim of public policy is rather to promote institutional arrangement so that individuals can purchase goods and services that they are willing to pay for, even if preferences fail to meet conventional consistency conditions, and even if preference-satisfaction conflicts with well-being. For a critical review of Sugden's (2018) normative approach, see Mitrouchev (2019).

positive emotions across episodes (e.g. 'being happy' and 'enjoying oneself') is higher than the correlation among negative emotions (e.g. 'being depressed' and 'feeling angry'). According to the authors, this also provides significant and contrasting salience on how the subject experiences the entire episode.

## 1.2 The End of Experienced Utility Measurement?

Since the end of the 2000s, the experienced utility criterion made no more significant empirical and theoretical improvements. Other contributions either provide literature reviews which document errors of hedonic forecasting (Kahneman and Thaler 2006; Dolan and Kahneman 2008), discuss its practical issues (Loewenstein and Ubel 2008), provide empirical tests of the peak-end rule (Do, Rupert, and Wolford 2008; Kemp, Burt, and Furneaux 2008; Mah and Bernstein 2019), provide empirical tests of the fundamental distinction between decision utility and experienced utility (Carter and McBride 2013; Akay, Bargain, and Jara 2017), are made for the public reader (Kahneman 2011 [Part V]), or focus on particular epistemic issues about measuring health states (Hausman 2015; Oliver 2017).

With what has been said so far, we have enough material to discuss the methodological and theoretical issues of the experienced utility criterion. The next section underlines several problematic principles of grounding public policy on Benthamian hedonism. Section 3 discusses the theory of experienced utility measurement. Section 4 then reconsiders the content of experienced utility measurement (*remembered* utility instead of *moment* utility).

# 2 Why Hedonism May Be a Problem for Public Policy

Evaluating individuals' level of happiness with the experienced utility criterion invokes a conception of the good life, but quite a peculiar one: it is a good thing to maximise individuals' *moment* (or instant) utilities. The underlying theory of well-being on which this criterion is grounded is a particular form of hedonism considered to be equivalent with Benthamian utilitarianism. But this ethical theory may appear to be 'narrow' in the sense that it excludes a lot of human considerations about what makes the good life.

First, Benthamian utilitarianism is in fact only a particular form of hedonism, according to which the virtue of life is to *maximise pleasure* and to *minimise pain*. But the roots of hedonism can be traced back to the Cyreanic school, where no pleasure/pain calculus was at the time a matter of concern. Also, although Epicurus (B.C. [1994]) — known as being a forerunner of hedonism — proposed several prudential rules for reaching *ataraxia* (the absence of mind troubles), he certainly did not refer to a rational calculus of pain and pleasure in the same way than Bentham (1780 [2007]).

Second, when other values such as freedom, fairness, compassion, equality and rights are involved, it is well acknowledged that hedonic value is of no use to assess individuals' states of affairs. For example, Sen (1991, p. 25) argues that it is important to take into account in the concept of preference-satisfaction that individuals have 'the freedom to lead the life [they] would choose to lead' by bringing counterfuctual choices (what they

*would have chosen*) into the evaluation.

Third, in an empirical study Smith et al. (2006) found that colostomy patients reported similar levels of happiness to people who did not have colostomies. However, colostomy patients also expressed a willingness to give up 15% of their remaining life span if it could be lived without colostomy. This indicates that those patients placed a high value on having their former health restored, which indicates in return that important human values such as being in good health are neglected within the experienced utility approach.

Fourth, we can refer to Nozick's (1974) 'pleasure machine' thought experiment, which consists in asking whether we would prefer to be connected to a machine that would maximise our experienced utility rather than living the real life. Nozick (1974) provides three arguments why it is not desirable to do so. First, we want to *do* certain things, not just have the experience of doing them. Second, (in relation to the first point), this is because we want to be a certain kind of person and not 'an indeterminate blob floating in a tank' (p. 43). Third, plugging into an experience machine limits us to man-made reality, where there is no contact with a 'deep reality'.

Although intuitively appealing, the overall criticism that experienced utility is 'too narrow' to capture what makes the good life is actually the easiest and perhaps the less relevant one. In fact, it is important to note that tenants of the experienced utility criterion for normative assessments fully acknowledge this normative criterion to be only relevant to *particular* circumstances, and that Benthamian hedonism — the ethical theory on which this normative criterion is grounded — should not be taken at face value.[8]

Their argument is that hedonism is a *component* of what constitutes the good life. In this sense, it is not in conflict with other values such as freedom or fairness. They claim that the evaluation of hedonic states is surely not adapted to every circumstances, but its usefulness is certainly *not empty* regarding some situations where 'a separate value judgment designates experienced utility as a relevant criterion for evaluating outcomes' (Kahneman, Wakker, and Sarin 1997, p. 377). The intuition behind this argument implicitly holds under two conditions, which, if satisfied, make experienced utility a good guide to well-being in *some* circumstances.

- *Condition 1*. There exist cases in which the evaluation of states of affairs refer to hedonic states (such as the selection of an ice cream flavour) and not other things.

- *Condition 2*. Those cases are intuitively known (at least approximatively).

I shall seriously consider these two conditions in turn.

## 2.1   Assessment of Condition 1

There is potentially a consequent number of public policies which can be concerned with the promotion of happiness. But the issue may not be that hedonic maximisation does not apply for many cases in life. Instead, if we think that public policy is not concerned

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[8]See Varey and Kahneman (1992, p. 169), Kahneman (1994, p. 21), Kahneman, Wakker and Sarin (1997, p. 377) and Kahneman and Sugden (2005, p. 176).

about happiness defined in terms of intensities of pleasure but in other terms (e.g. overall satisfaction of one's life or democratic participation), then the experienced utility criterion may be a restrictive normative criterion for public policy.

My present argument basically says that the scope of what matters to individuals *in life* and what public policy can do about making individuals' life better — i.e. the scope of *public policy* — are not necessarily equivalent. In other words, even if the set of what matters to individuals in life largely includes happiness defined in terms of maximisation of pleasure and minimisation of pain, it does not mean that public policy is (or can be) particularly concerned with this social dimension.[9]

An illustration is given in the following diagram with the hypothetical representation of three sets: *happiness* and *freedom* (belonging to the superset of values) and *public policy* (belonging to the superset of the practical dimension of life, as in Aristotelian terms).

Figure 1: Hypothetical representation of 'happiness', 'freedom' and 'public policy' sets
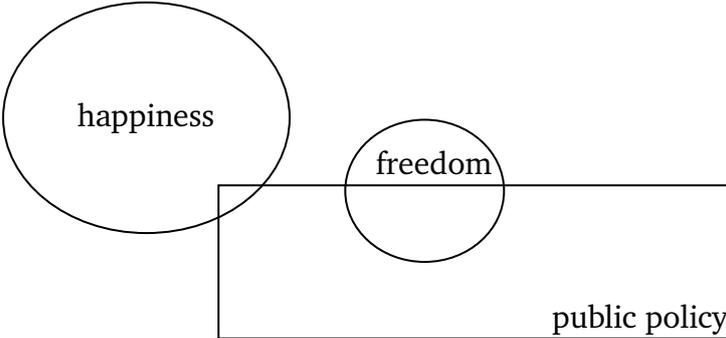


Imagine, for the sake of argument, that we live in a world where happiness matters more than freedom (i.e. where the set of happiness is bigger than the set of freedom).[10] If the intersection between happiness and public policy is smaller than the one between freedom and public policy — i.e. the domains of life in which the policymaker can actually do something about individuals' states of affairs — we might have reason to doubt about the extensive scope of the experienced utility criterion for public policy.

As Kahneman and Sugden (2005) put it,

> 'even if one accepts experienced utility as a measure of well-being, one may ask whether it is a government's job to create well-being for its citizens.' (p. 177)

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[9]Some authors usually take for granted the utilitarian ethical judgement that the goal of any public policy ought to maximise individuals' well-being (Loewenstein and Ubel 2008, p. 1804; Dalton and Ghosal 2011, p. 565). But compared to any other approach in political philosophy, this utilitarian view is far from being self-evident.

[10]For simplicity, I assume in the above diagram that the intersection between happiness and freedom is empty. But happiness has surely something to do with freedom, depending on what we actually mean by 'happiness'. For an empirical test of the correlation between happiness and freedom in 38 mainly developed nations at the beginning of the 1990s, see Veenhoven (2000).

How big the intersection between 'happiness' and 'public policy' is can be either determined by empirical evidence (how many public policies actually aim at maximising individuals' experienced utility?) or, I think more interestingly, by a philosophical assessment (what is public policy merely about?). In fact, whether a particular domain of policy is to be categorised as either more 'happiness-relevant' or more 'freedom-relevant' is not that clear.

Consider for example the 401(k) default option policy, which aims at increasing the number of employees' enrolment so that employees increase the total amount of saving for their retirement (Madrian and Shea 2001; Thaler and Benartzi 2004; Bernheim, Fradkin, and Popov 2015). Does enhancing employees' saving yield to more *happiness* or more *freedom*, considering that they will enjoy a larger amount of money when they will be retired? How about the time-selves employees who save at each period? Is the policy more relevant regarding the anticipated happiness it produces or regarding the anticipated freedom it produces?

The experiences of Kahneman et al. reviewed in Section 1 are designed in situations where patients undergo colonoscopies, sit in a vibrating room, stand in an uncomfortable position, hold their hand into cold water, eat an ice-cream while listening to a piece of rock music, etc. Whether these experiments have something in common with the range of public policy so that it can be claimed that they are relevant to the latter is up to debate.

In fact, public policy seems rather to be about promoting *indirect* factors of happiness such as giving people more freedom to participate in the democratic life, more opportunity to engage in the free exchange of goods, services, and labor, and more freedom in one's private life (e.g. to practice one's religion, to travel, or to get married) (Frey and Stutzer 2002, p. 423). In short, it is important to question whether the experienced utility criterion accommodates well with the range of what public policy is actually concerned with.

## 2.2   Assessment of Condition 2

In response to the statement of Kahneman, Wakker, and Sarin (1997) that 'a separate value judgment designates experienced utility as a relevant criterion for evaluating outcomes' (p. 377), one may object, as Fumagalli (2013), that 'the issue is precisely when this is the case, and by means of what criteria we are supposed to identify these situations' (p. 341).

Although this seems a relevant point, Fumagalli's (2013) scepticism would merely have to apply for every other normative criterion, i.e. not only a normative criterion which is concerned with happiness but also one concerned with other values such as freedom or fairness. Otherwise, it would be presumptuous to argue that we have a better intuitive perception of e.g. freedom and fairness rather than happiness. Thus instead of asking the question of when the specific circumstances of using one normative criterion over another are met, the issue seems to be whether those circumstances are scarce or abundant (*cf. condition 1*). Except arguing that decisions are never controlled by hedonic predictions — which is an extreme view that perhaps only few theories of ethics would hold — Fumagalli's (2013) objection is not to be taken at face value since every

ethical representation of what makes the good life (at least formulated into a normative criterion) is necessarily *partial*.

That is, except having a normative criterion that can entail many different values of what matters to individuals (such criterion would have to be based on an ethical theory that entails those different values), it seems that partial representations of what makes individuals better off are perfectly fine. I let the reader be the own judge of the two conditions here discussed, which (to me) are not the most concerning points one can make about the experienced utility criterion. More concerning, I believe, are the following theoretical issues.

# 3   Axioms of Utility Integration Are Debatable[11]

The construction of the temporal integral of moment utilities relies on six assumptions about subjects' ratings of instant utility (Kahneman 2000) and on four additional assumptions about a social planner who has a knowledge of the scale (Kahneman, Wakker, and Sarin 1997). Axioms 1, 2, 3 and 4 impose requirements on the measure of moment utility. They are epistemic judgements made for the practical usefulness of measuring total utility. Axioms 5 and 6 are normative rules which specify how total utility is constructed from moment utilities. They are ethical judgements made for summing moment utilities into total utility (or into an individual welfare function). Axioms 7, 8, 9 and 10 are technical assumptions about the transformation of utility profiles. In the present section, I 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 in bounding the welfare-relevant domain. The informational basis of the experienced utility criterion is moment utility (what is experienced here and now). Note that moment utility also includes the affective consequences of prior events (e.g. adaptation, fatigue) and future events (e.g. fear, hope). This is an important characteristic for understanding (and perhaps also criticising) Axiom 5 (separability) below. Disputing the informational basis of the welfare-relevant domain (here moment utility) would lead us back to Section 2, so I move on.

## 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 basically says that the valence and intensity of a stubbed toe can be compared with the ones of a humiliating

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[11]A useful glossary of the experienced utility criterion is provided in Appendix A, which resumes the technical concepts involved in its theoretical construction. I can recommend the reader to have a look at Appendix A before reading this section, which discusses the theory of the experienced utility criterion.

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.

This axiom can be disturbing to some because it requires to accept that different psychological perceptions (e.g. a stubbed toe and a humiliating rebuke) are categorised under a similar hedonic feeling. That is, one first needs to consider that a humiliating rebuke can be categorised as a (negative) hedonic feeling at all. In fact, whether both psychological phenomena of hedonic feeling (e.g. physical pain) and emotional feeling (e.g. emotional pain) are assumed to be commensurable is unclear in Kahneman, Wakker, and Sarin (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). However, 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 a colonoscopy procedure. Kahneman (2000) instead considers both psychological phenomena of hedonic *and* affective experiences to be commensurable, which is, after all, a natural extension of the experienced utility criterion since it ultimately aims at being applied to public policy.

Kahneman (2000) 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 the author refers to his discussion in Kahneman (1999) about the large body of empirical studies in psychology on how human sensory experience works. Discussing this literature is outside the scope of the present paper. What is relevant to my concern is the analogy Kahneman (1999) makes between the human sensory system and hedonic states.

The author acknowledges an important difficulty: 'it is more difficult — but not impossible — to compare the loudness of sounds that differ in pitch and in timbre than to compare sounds that share these attributes'. He then argues that 'the question of whether people can compare physical and emotional pain, or the trills of food and music is ultimately empirical' (p. 197). As I have no doubt that empirical studies can enlighten us on many psychological phenomena that are not fully understandable to humankind, and that the human sensory system is surely linked to our emotional responses, Kahneman's question seems also quite philosophical. Can empirical evidence actually tell us whether the sensation of eating chocolate while being sad provides meaningful comparison between the first and the second feeling?

I suspect many scholars to disagree with Kahneman's oversimplification, according to which almost every psychological perception can fit into a 'good-bad' scale (to be discussed below). Further empirical and philosophical assessments could perhaps enlighten us on this point, which is a complex debate very much linked with 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 very familiar with the notion of a reference point, like in any reference-dependent model of decision-making, e.g. 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 of the normative theory of Kahneman, Wakker, and Sarin (1997) serves as the benchmark to distinguish positive from negative feelings.[12]

Some of course may argue that the existence of such neutral point is a strong assumption, since when asking an individual to evaluate her happiness, we in fact ask her to imagine an abstract state in which she evaluates her current mood from a zero point. But perhaps the main problem is that this neutral point may be changing. Typically, how can an individual who adapt to her life circumstances can evaluate a similar perception of pain and pleasure than before? Surely if she becomes rich to the point that she does not derive the same level of pleasure in eating tuna than before (because she can now afford caviar), it is hard to imagine that her hedonic level would not change according to her new circumstances.

Kahneman (1999, pp. 11-15) extensively discusses this point, recognising it to be difficult but not impossible to overcome. The main argument of Kahneman, Wakker, and Sarin (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 we succeed to isolate individuals in an experimental setting for a short enough 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 (e.g. as in the colonoscopy experiment of Redelmeier and Kahneman (1996)). The issue is that experienced utility measurement would then be quite restrictive if it cannot be applied to situations where these conditions are not satisfied.

Another point related to what has been said previously is that the 'bottom-up' construction of objective happiness (Kahneman 1999) requires that each moment can uniquely be characterised by a value on the 'good-bad' dimension. This technically requires the following two assumptions.

*Assumption 1.* The brain continuously constructs an affective or hedonic commentary on the current states of affairs — an assumption judged to be fairly supported by empirical evidence according to Kahneman (1999, 2000). In other words, any moment of time can be characterised by a particular value of the 'good-bad' dimension (positive, neutral or negative) but an evaluation cannot be both good and bad at the same time nor major manifestations of the 'good-bad' dimension can be dissociated.

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[12]Abstraction is made of any additional content associated with 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 similar S-shape than the experienced utility function of Kahneman, Wakker, and Sarin (1997). The authors found mixed evidence for loss aversion in experienced utility.

*Assumption 2.* It follows from *assumption 1* that a commentary is adequately summarised by a single value, judged to be a 'tolerable oversimplificaiton' by Kahneman (1999, p. 7).

Since *assumption 2* cannot be empirically supported, I here restrict my comment to *assumption 1*. To continue with the analogy between the normative theory of Kahneman, Wakker, and Sarin (1997) and prospect theory, note how *assumption 1* is very similar to the first psychological phase in prospect theory labelled as *editing/framing* (Tversky and Kahneman 1992, p. 299). In the editing/framing phase, the decision maker constructs a representation of the acts, contingencies, and outcomes that are relevant to the decision.

Tversky and Kahneman (1981) specify that 'the frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the *norms, habits, and personal characteristics* of the decision-maker' (p. 453 — my emphasis). One issue is that *assumption 1* also necessarily depends on personal and social characteristics of individuals, which can lead to very different perceptions of the good-bad scale among individuals.

Also, *assumption 1* obviously rules out any mental evaluation that goes beyond a 'good-bad' dimension. Unsurprisingly, the experienced utility criterion is then restricted to the evaluation of pain and pleasure in 'simple cases', e.g. a toothache, the taste of an ice cream flavour, the itch of a moskito bite, etc.[13]

## 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 interpersonal comparisons of utility assumption that is subject to a long controversy in welfare economics. Because of the huge background on this historical controversy I obviously restrict my discussion to the arguments put forward by Kahneman et al.[14]

Recall that Kahneman and Varey (1991) argue that *adaptation* is one important reason which 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.

The other reason they bring about is if individuals' responses to stimuli differ in the same direction from their respective adaptation levels, those can be matched in signs, if not in magnitude. The main argument advanced by Kahneman, Wakker, and Sarin

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[13]The empirical support for the possibility of fitting various kinds of human sensation on a good/bad dimension is vast in psychology and is consequently outside the scope of the present article. I refer the reader to Kahneman (1999, pp. 7-9), who reviews the literature on this area of research, and who is enthusiastic about using the good-bad dimension for many situations — e.g. for the experiences of a straining runner and of a spectator watching a tragedy.

[14]See Fleurbaey and Hammond (2004) and Baujard (2017) for syntheses of this historical controversy.

(1997) is that the functions that relate subjective intensity to physical variables are qualitatively similar for different individuals. This refers to what has been said previously about the non-impossibility of individuals to perceive the loudness of a sound similarly when it is of different pitch and timbre.

Because the cardinal measurement of deviations in sign or in magnitude may not perfectly reflect adequate perception of feelings between individuals, it may explain why Kahneman, Wakker, and Sarin (1997) restrict cardinality between individuals in *one same situation* (e.g. a colonoscopy) but not in two different situations (e.g. a colonoscopy and carrying a heavy suit case).

I however suspect many scholars to find the assumption of interpersonal comparisons of utilities unsatisfying, even for individuals experiencing the exact same situation (e.g. a colonoscopy). The simple reason is that although the empirical arguments provided by Kahneman (2000) that the sign and intensity of current hedonic and affective experience is not essentially different from the standard psychophysical tasks of reporting colour or smell, many scholars would still believe that individuals may have incommensurable perceptions of pains, and some can react about the exact same pain in a very different manner than another. As Kahneman, Wakker, and Sarin (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 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 tenants and adversaries of interpersonal comparisons of utilities would then be a matter of degree in terms of how far can we accept — biologically and sociologically speaking — individuals to perceive things similarly. This is a complex debate, which would require a large amount of studies before we can reach consistent knowledge of how individuals' perception differ in terms of pain and in terms of pleasure. As it may appear quite convincing that physical pain is perceived globally similarly among most individuals, it seems obvious that anything related to pleasure (which is at the end what the experienced utility criterion is designed for) is perceived differently among individuals.[15]

## 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*

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[15]A friend anaesthetist of mine told me a story he had at the emergency department about two patients, one Italian and one Vietnamese, which appeared to have two similar head injury diagnosis after they where taken care of by the medical staff. The Italian patient had a mild case and was screaming, while the Vietnamese patient had a severe case and was calm and silent. The medical staff was obviously not impressed by the behaviour of the Italian patient, that they are used to handle. Instead of judging the severity of patients' case by a subjective report based on a 0 to 10 pain-scale, they are accustomed to rely on symptoms that patients are asked to declare by answering several questions such as 'do you have nausea?', 'do you feel a contraction at the level of your temples?', etc. Eventually, the Italian patient appeared to be in so much pain that he was taken care of first by the medical staff. Whether he was actually more in pain than the Vietnamese patient (and if it is so, in which magnitude) or whether he was simply overreacting, remain mysteries.

*elements that are preceded and followed it.*

This axiom is perhaps the most important of the experienced utility criterion. Without it, the concept of total utility can simply not result from the summation of moment utilities, as total utility does not preserve the order in which moment utilities are experienced. Indeed, this axiom is needed to sum 'at will' all moment utilities of an episode of a TEO. Philosophically speaking, it is perhaps also the most contestable.

The axiom basically says that the sum of the experiences of playing a football game and having a beer is not affected by the order in which these two events are experienced. While it may appear obvious that having a beer after a football game is more enjoyable than the other way round, Kahneman, Wakker and Sarin (1997, p. 391) and Kahneman (2000, p. 192) reply to this kind of objection by emphasising that the episodes of a TEO that are to be evaluated are not *outcomes (or events)*, but *moment utilities associated with outcomes (or events)*. What does the distinction between outcomes and moment utilities associated with outcomes change the deal?

Recall that under Axiom 1 (inclusiveness), *all* the effects of the order of outcomes (or events) are already incorporated into moment utility. This means that when all moment utilities are summed, the social planner should not worry about the order in which those moment utilities are experienced because the information related to past and future events is already contained in the individual's moment utilities.

The issue is that by incorporating all previous and anticipated information in moment utility, one has specifically good reason to think 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 physical events can be rearranged at will in time but once they are associated with a psychological affect, subjective experiences associated with events necessarily change.

As an illustration, consider the following two scenarios. Anticipating the enjoyment of having a beer after his football game (incorporation of information about anticipated utility), Jules attributes 6 hedonic state to the football game and 7 hedonic state to the beer he is now enjoying as a reward after decent effort (incorporation of information about past utility). *Scenario 1* therefore yields to a total utility of 13 hedonic states. Consider now a second scenario. Anticipating the episode of playing a football game while enjoying his beer, assume Jules attributes 5 hedonic state to the beer and -3 hedonic state to the unpleasant feeling of running on the pitch with a non-empty stomach. *Scenario 2* therefore yields to a total utility of 2 hedonic states.

Table 1: Hypothetical evaluation of hedonic scenarios

|  | $u(football)$ | $u(beer)$ | total utility |
|---|---|---|---|
| *scenario* 1: football then beer | 6 | 7 | 13 |
| *scenario 2*: beer then football | -3 | 5 | 2 |

If $13 \neq 2$, how can the order of these two episodes not affect the value of Jules' total utility? The counter-intuitive aspect of the *separability* axiom requires to discuss some of its underlying implicit assumptions. To 'appreciate 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). This argument is however a bit fuzzy in the sense that it does not clearly specify what is at stake. Several points are worth being discussed.

First, this thought experiment makes it quite disturbing to perceive the relevance of the social planner's role in evaluating the individual's total utility. Those moment utilities experienced by the individual must matter to *the individual*, not to an external observer. But if the difference in total utility ultimately matters to the individual (and not the social planner), the difference between the value of the individual welfare function (or total utility) of *scenario 1'* and the one of *scenario 2'* should have reflected enough information to observe a salient magnitude between both individual welfare functions, just before the individual died.

As Kahneman (2000) seems to acknowledge it, as long as *scenario 1'* provides more total utility than *scenario 2'*, the first should be preferred to the second. This is true even if the difference in magnitude between the two total utilities is extremely small. Shall the order of moment utilities slightly disrupt the value of total utility, recall that the ethical premise of experienced utility states that the aim of the social planner is to maximise one's total utility (Section 1). Under such maximisation principle, it would then be sufficient to hold that the order does matter.

Second, and in relation with the first point, it is not that clear what the introduction of death (or amnesia) brings more to the argument if the evaluation of total utility of the individual is relevant *before* he dies (or get amnesic). Imagine you go to the restaurant. There is one scenario in which the order of the course goes normally, starting with the starter and ending with the desert. There is another scenario where the waiter brings you the desert at the beginning and the starter at the end.

What does you getting hit by a car when you get out of the restaurant brings up more to the evaluation of your concatenation of episodes at the restaurant from the social planner's viewpoint? The way I understand it, separability is relevant when the evaluation of one's total utility is made *after* the individual gets amnesic. For example, assume the lottery winner receives 500$, gets amnesic, then receives 10 000$. Would his total util-

ity changed, had he received 10 000$, got amnesic, then received 500$? Presumably not.

For the sake of better practical appeal (it is rather uncommon that people get amnesic from one moment to another), let us take back the football-beer example. Assume 'football game' and 'beer' are not experienced at the same day but at two separate days (or even at two separate weeks). In this case, it seems reasonable to hold that the order in which moment utilities are experienced does not affect total utility, simply because the distance in time between these two experiences is 'big enough' so that these experiences can be considered to be independent one from another.

Hence, the separability axiom seems to be reasonable under the condition that the distance between two temporally finite disjoint episodes/events is sufficiently big so that the subjective evaluation of one moment utility associated to an event does not affect the subjective evaluation of the other moment utility associated to another event. In other terms, the higher the distance in time between two episodes is, the more plausible it is to have two equal total utilities for both scenarios. There is however no imposed condition on the distance between two finite disjoint episodes in the definition of a TEO to construct total utility (see Appendix A). If the present argument is judged to be relevant, *time-distance* may then be a required axiom to be added.

## 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.*

From a philosophical point of view (which this axiom clearly takes), 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 remind ourselves that total utility is always assessed *after* the moment at which the outcome is experienced. The idea is if the social planner takes a 'neutral' stance in summing all utility profiles, there is no apparent reason that he attributes more weight to one time at which one experience is evaluated by the individual instead of another.

To understand why Kahneman, Wakker, and Sarin (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).

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 classic argument in the literature of 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).

A quick objection we can first make to this axiom is that attributing a 'neutral' value to time is far from being self-evident. Indeed, individuals may simply like to attribute different weightings of time during the day because they have reasons to do so. For example, an individual who wakes up every morning to go to work may rationally think that his hedonic state of -2 does not have the same weight of his hedonic state of 7 when he goes back home. This is because the time associated with the negative feeling of making something unpleasant may not be perceived equivalently with the time associated with the positive feeling of playing with his cat after he gets back from work. The individual values the second activity much more than the former, and accordingly, cares less about the time of the day at which he makes something unpleasant.

He may also have the opposite reasoning, which is also consistent with time weighting. Consider that the pain he experiences by waking up every morning affects him more than the enjoyment of playing with his cat when he goes back home. This individual may have a negative remembered utility about his past TEO. Even if his total utility is positive, he may provide good reason not to want to repeat this TEO because he weights pain-time more than pleasure-time, to the point that he has a negative retrospective value of that TEO.[16]

This example may be receivable without further argumentation because it compares a pleasurable experience with a painful experience. No doubt individuals may value time differently in a TEO where both pain *and* pleasure are experienced, but how about in a TEO where either pain *or* pleasure is experienced? What I have to briefly discuss now is, *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).[17]

To understand what is at stake, note that the example above says that the individual values more to play with his cat when he gets back from work 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 (1984) 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 (1984) 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 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

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[16]This thought experiment implies that remembered utility has normative significance, which is the matter of discussion in Section 4.

[17]By rationality, I mean here 'what someone has reason to do'.

> 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 first point in mind, we can provide some reasons to question time neutrality in the construction of total utility, and Parfit would perfectly agree with it. In the colonoscopy experiment 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 experiment to be more painful. Now the main point is what if the individual does not have reason to do so, but simply has a desire for it?

Parfit (1984) answers this argument with another thought experiment of 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 in the future, except on Tuesday, where he does not care at all about the pain (or pleasure) he endures by then. To stick with only one 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 (1984) 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, asking what would be the difference in principle with an individual who cares equally for everything that will happen to him within a year, but once a full year has passed, discounts by half the rest of his future. That is to say, this individual would rather choose e.g. 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 the ones which 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 shall the individual have no reason about having this kind of preference, there is no point in considering each of her moment utilities extended in time as being non-neutral.

Second, if one agrees with Parfit (1984), one may need to justify this reason on 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 rather 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 desire ('I simply desire so but I cannot tell you why').

This second point is naturally a bit more complex because it gets quite philosophical. For practical purpose and for the respect of individuals' free will, do we need to provide reasons *why* individuals are irrational or not? In order to preserve their autonomy, we should obviously weight time at their will if such data is available. As economists are

mostly concerned with cases where such data is unavailable, a philosophical assessment of this kind of ethical dilemma is perhaps needed.[18]

For lack of further philosophical assessment of time neutrality and of empirical knowledge about what individuals' preferences are, what we can nonetheless say is that discriminating between the values of different times in one period is no more demanding in terms of ethical judgements compared to the fact of not discriminating. I suspect Kahneman, Wakker, and Sarin (1997) and Kahneman (2000) to assume time neutrality not only for practical appeal (such assumption avoids them to invoke arbitrary criteria in order to discriminate between different times in one period) but also for conforming to the social planner assumption of standard welfare economics, who only aims at maximising individual well-being 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 complex philosophical assessments, as briefly discussed.

Consider now the last four axioms of experienced utility measurement. The external observer (or social planner) in the normative theory of Kahneman, Wakker, and Sarin (1997) has a knowledge about the use of the scale (because he is omnipotent). His task is to make comparative judgements about utility profiles. Those judgements must satisfy the following axioms in order to determine an equivalent relation between the original utility scale and duration.

## 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), so I move on.

## 3.8 AXIOM 8 (Monotonicity in Instant Utility)

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

## 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.*[19]

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[18]For an extensive philosophical discussion of time neutrality, see Parfit (1984, pp. 170-177) and Brink (2011).

[19]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, Wakker, and Sarin 1997, p. 391). For the formalisation and proof of this theorem, see Kahneman, Wakker and Sarin (1997, pp. 400-402). The present section is bound to discuss the axioms of experienced utility, as they provide the necessary and relevant information about their theoretical issues. For further details about the technical construction of the experienced utility criterion, I refer the reader to Kahneman, Wakker and Sarin (1997, pp. 390-403) or to Appendix A (without the theorems).

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 that is 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 in the measure of instant utility. This basically refers to what has been said in 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, Wakker, and Sarin (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.

I have already discussed the properties of the original scale (Axiom 2 and 3) and the possibility of making interpersonal comparisons of utilities with cardinal measurement (Axiom 4). We can then move on to the last major theoretical issue of the experienced utility criterion (that it exclusively takes moment utility as its ethical content).

## 4   Moment Utility *versus* Remembered Utility

As mentioned in Introduction, the researcher who has perhaps contributed the most to the experienced utility research program — Daniel Kahneman — explicitly said to have abandoned such program because he might have not understand what happiness is about. 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 mistakes because they failed to accurately remember the moment utilities experienced during the episodes, which made them preferred 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. a prejudice against one's well-being).

The issue is that, as Kahneman-2018 acknowledges it, the logical rule of utility integration may not decently represent individuals' long term happiness. In fact, if we think that what matters is not happiness as 'living in the moment' but happiness as a durable mental state, then we may have better interest in defining happiness in terms of *remembered utility* rather than in terms of *experienced utility*.

Kahneman-2018 is sympathetic with the idea that what matters is not the utility experienced at the moment (as in Benthamian utilitarianism) but the *memory* individuals have about 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 which is enjoyed at the present moment, memory is a durable mental state, which stays in one's mind for a long 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 to 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 life. This point echoes with one of the objections Kahneman and Sugden (2005) early stated towards the experienced utility criterion:

> '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)

The point is, if the logical rule of utility integration is considered to be unwarranted (given the way individuals represent the experience of their life taken as a whole), then the ethical premise of experienced utility falls apart. Considering that moment utility may not have more normative value than remembered utility, what are the implications for happiness measurement?

## 4.1 Remembered Utility Matters

First, we may need to reformulate experienced utility measurement with axioms that would not give normative value to *moment* utility but to *remembered* utility. 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)), the second one should prevail if most subjects hold the memory that it is less painful than the first one, *even if they actually experienced more total pain during the second experiment*. As an example, consider the following case.

Figure 2: Real-time recordings from two patients undergoing a colonoscopy.
*Source:* Redelmeier and Kahneman (1996).
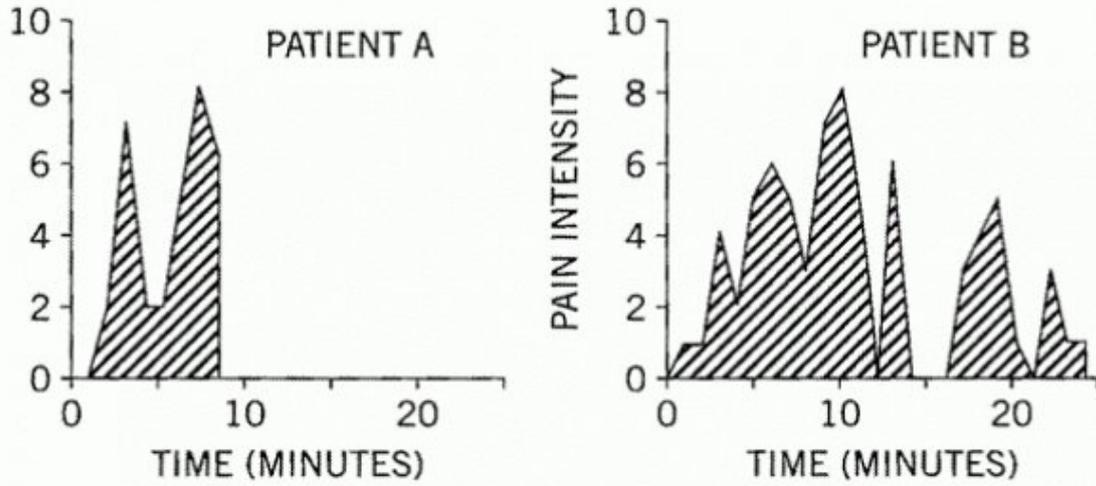


The figure above displays the intensity of pain ($y$-axis) recorded each minute ($x$-axis) by two patients undergoing colonoscopy. Using my notations, the intensity of pain is measured by $\Psi = \{0, ..., 10\}$ and the outcome $X$ (colonoscopy) associated with time $N = \{0, ..., 25\}$ is measured by the vector $x = \{x_1, ..., x_{25}\}$. Patient A experienced the short procedure (8 min) and Patient B experienced the long procedure (24 min).

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 unpleasant*). It is however clear that the total utility of the experiment with the extra pain is more unpleasant in terms of total utility than the short experiment.

Imagine, as in the experiment of hands submerged in cold water of Kahneman et al. (1993) that we, as policymakers, have to choose for a patient C who has undergone both types of colonoscopies one of the two colonoscopy to repeat. 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 addition the three colonoscopy episodes in order to have two TEOs (temporally extended outcome) 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,

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

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

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

where $m \in N$ represents the extra added pain (which equals to 16 min 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,

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

where $u^r(x_i)$ is the remembered utility of the patient at time $i$. The possibility of considering remembered utility as being more valuable than moment utility was actually 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, 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 thoughts: the one which would say that any acting based on a false belief is necessarily an irrational behaviour (Kahneman et al.'s viewpoint), or the other which would say that the individual's explicit verbal statement is not irrational in the sense that his belief about having less pain in the long experiment is *true to him*. 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 give normative value to remembered utility.

It appears that the example above also suggests a paradox regarding the theoretical construction of the experienced utility criterion. Recall that according to Nozick's (1974) argument (Section 2), it is not absurd to assume that tenants of the experienced utility criterion would say that what matters is not the individual's *true* beliefs about what he experiences, but what he *thinks he experiences*.

Shall the individual's brain be constantly manipulated by a benevolent scientist whose purpose is to maximise the individual's level of dopamine and to stimulate more regions in the brain where dopamine is active, it does not matter whether the individual's beliefs about experiencing this virtual world is false. In the same way, why should the individual's verbal statement in the real world not be taken as a false belief, which is, in the same logic, normatively relevant to the social planner?

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 of 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?

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. That is,

**Ethical premise (bis).** *An individual's state of affairs is better than another if it has less remembered disutility than another.* Formally, let $x = (x_1, ..., x_n) \subseteq X$ be a realisable set of an individual's states of affairs (e.g. a consumption bundle, health states, sips of tea, etc.) and $X$ be the set of outcomes. I denote by $i = \{0, ...n\}$ 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,

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

where $-u^r(x_i)$ is the individual's remembered disutility experienced at time $i = \{0, ..., n\}$ and $\int$ the integral of all utility profiles, which simply 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,

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

## 4.2 Back to Decision Utility?

Second, if decision utility is mostly driven by remembered utility of a past episode — i.e. decision utility is an expression of an individual's preference for repeating one event over another — we are simply back to *decision utility* as the relevant normative criterion for normative analysis. In fact, that decision utility diverges from experienced utility is — strictly speaking — more a theoretical assumption rather than an observation supported by empirical evidence.[20]

Subjects in Kahneman et al.'s experiments are judged to make mistakes because of either retrospective judgement about their past experience, which showed that decision utility does not maximise experienced utility, or because of failure to predict their future (or anticipated) utility. That is, they make a mistake because of *fallible memory* and incorrect evaluation of *past experiences* or because of *wrong anticipation*.

But if this observation is not at hand (like in many circumstances where public policy applies), we need a counterfactual: what they 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 empirical evidence about the effect of a new policy implementation), how can we seriously assume that individuals' decision utility does not actually reflect their well-being? When observing an individual who has the choice between $x$ and $y$ and chooses $x$ over $y$, we have simply no empirical evidence to claim that she would have been better off with $y$ over $x$ *at the time*

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[20]See Kahneman, Wakker and Sarin (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 (and not empirical data).

*we are observing this*.

There is actually empirical evidence which disputes the common assumption that decision utility is fundamentally different than 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' choice), and the experienced utility function that is theoretically assumed in the normative theory of Kahneman, Wakker, and Sarin (1997).

Their empirical result can essentially be resumed in two lines: experienced utility is S-shaped (like the value function of prospect theory) when using the 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 lead them to suggest that decision utility and experienced utility are fundamentally related, although they are conceptually different.[21]

The empirical test of Akay, Bargain, and Jara (2017) in their paper named by the provoking 'Back to Bentham, Should We?' is even more concerning. Comparing British households' observed preferences with their reported subjective 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 subjective well-being.

Eventually, Daniel Kahneman's journey in measuring experienced utility might end up to a useful wisdom for researchers interested in improving the methodology of subjective well-being measurement: the verbal statements at the end of each experience that violates monotonicity may in fact be the ones which can be considered to be normatively relevant. Does Kahneman-2018's acknowledgement about utility integration being a dubious normative standard yields to dispute the fundamental grounds on which the heuristics-and-biases program is based on: that individuals who deviate from the norms of rational choice make *mistakes*?

According to Kahneman, Wakker and Sarin (1997, pp. 377, 395) and Kahneman (1999, p. 20), empirical evidence showed that individuals already have the ability to maximise the utility they store in their memory (i.e. individuals maximise their remembered utility). When this empirical evidence is combined with the ethical stance that remembered utility may actually be what matters (like Kahneman-2018 states), we are simply back to *decision utility* (and thus observed choice) as the proper normative criterion for public policy.

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[21]Note that Carter and McBride (2013) naturally 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).

# 5   Conclusion

In the present article, my aim is to provide an up-to-date assessment of the whole program of experienced utility measurement after the reconsideration of Kahneman-2018. My analysis follows four steps. I first provide a literature review of the program of Kahneman et al. I then consider several issues of Benthamian hedonism for public policy. Then, I provide a philosophical discussion of all the axioms of experienced utility measurement. Eventually, I aim to persuade my reader that measuring experienced utility is based on a misconception of happiness that economists and policymakers have good reason to stay away from. The highlight of the paper is that all the methodological and theoretical issues discussed throughout my analysis provide economists and policymakers strong support for endorsing alternative measures of happiness that do not aim at maximising pleasure, but which are grounded on perhaps better objective conceptions of what makes the good life.

As an illustration of what those alternative measures might be, consider Kahneman-2018's new distinction of two concepts of happiness: (i) the feeling of enjoyment an individual has at the moment, which is related to the experiences she has at the moment (*moment utility*), and (ii) the feeling related to social yardsticks such as achieving goals and meeting expectations, which is based on comparisons with other people (*life satisfaction*). In Kahneman-2018's new terms, objective happiness is more about life satisfaction in terms of social life, i.e. the relationship with the company of others (partner, friends, family and colleagues) rather than the maximisation of pleasurable moments.

It seems not absurd to consider that Kahneman-2018 has switched from Benthamian hedonism to *Aristotelian eudomonism*. In contrast with hedonism (in greek, *hedone* for pleasure), eudaimonism (in greek, *eudaimonia* for happiness) does not put the satisfaction of pleasure at its central ethical principle. It instead considers a broader perspective of what makes the good life, typically friendship and the participation in civil or political life (Aristotle -350 [2009]). In other words, according to Bentham pleasure is identical with happiness (and the goal of life is to produce the greatest happiness for the greatest number), while according to Aristotle pleasure is not identical with happiness but can be either a component, a process or a by-product of it.[22]

The main issue of experienced utility measurement seems to be that utility integration invokes a conception of objective happiness that is paradoxically based on an extremely *subjective* informational basis of happiness (i.e. moment utility). Recall that under Axiom 1 (Section 3.1), only hedonic states are normatively relevant, and nothing else. But considering Kahneman-2018's statement that what matters is life satisfaction rather than moment utility, economists and policymakers may want to promote measures of happiness that do not depend on individuals' subjective perception. Instead, they may want to promote 'authentic' objective features about what makes the good life such as health

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[22]See Nussbaum (2007) for a philosophical comparison between the ethics of Aristotle and Bentham. Nussbaum particularly studies the case of J.S. Mill, who according to the author aims at combining Benthamian and Aristotelian conceptions of happiness. The thesis of the author is that 'despite Mill's unfortunate lack of clarity about how he is combining the two conceptions, he really does have a more or less coherent idea of how to combine them, giving richness of life and complexity of activity a place they do not have in Bentham, but giving pleasure and the absence of pain and depression a role that Aristotle never sufficiently maps out' (p. 172).

or friendship (as in Aristotelian terms). By 'authentic' I mean that the content of such objective measure would not be a subjective feeling that is up to strong variations among individuals. On the contrary, it would be something stable on which individuals could perhaps more consensually agree about, e.g. the opportunity to live a life where basic human needs such as health, education and friendship are fulfilled.

Thus the capability approach (Sen 1985; Nussbaum and Sen 1993; Nussbaum 2000) is perhaps the best way to take this (already taken) route. Capability is defined as what people are capable of achieving based on the opportunities and living conditions afforded then. In this normative approach, what makes the good life is not merely defined in terms of a subjective perception like in the experienced utility criterion, but in terms of essential human needs. Ten 'central human functional capabilities' are offered by Nussbaum (2000): life; bodily health; bodily integrity; senses, imagination and thought; emotions; practical reason; affiliation; other species; play; control over one's environment (pp. 78-80). Notice that all these criteria of what makes the good life are actually *opportunities* to do something, e.g. to live a normal life, to access to appropriate level of housing, etc. These criteria are potentially far more likely to reach a consensus about what makes the good life among all living populations than subjective rankings in terms of pain and pleasure. The reason is that subjective rankings in terms of pain and pleasure are likely to be more sensitive to personal/social norms and personal/social comparisons. Consequently, human capabilities perhaps represent more appealing characteristics of what *objective* happiness actually is.

In his *Nicomachean Ethics*, Aristotle (-350 [2009]) defined happiness as the activity chosen for its own sake by a morally serious and virtuous person. According to the philosopher, happiness is a harmonious psychological state in which the individual lives a virtuous life that includes not only the seek of pleasure, but more importantly an excellent trait of character such as being 'fair', 'wise' and 'honest'.[23] But in order to realise this psychological state, one should have access to resources that actually gives her opportunity to achieve this state of mind. The bottom line is if experienced utility measurement is flawed, policymakers and economists may seriously consider eudaimonistic conceptions of happiness that perhaps better capture what objective happiness actually is. I then suggest a new slogan for researchers interested in dropping off the last vestiges of the experienced utility criterion for happiness measurement (in memory of Samuelson): 'Back to Aristotle? Exploration of Objective Happiness'.

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[23]Virtue ethics (often presented as neo-Aristotelian ethics) is considered to be one among the three main theories of ethics alongside deontologism and consequentialism. The concept of 'virtue' is extremely rich. For obvious reason it cannot be explained here. For a comprehensive review, see Hursthouse (2016).

# A  Glossary of The Experienced Utility Criterion

**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. 'drinking your tea' or 'reading this paper', you have an assigned numerical value (either positive or negative) that represents your decision utility. Formally, let $X = \{x, y\}$ be the set of alternatives, where $x = (x_1, ..., x_n)$ is the vector that corresponds to the activity of drinking your tea. For example, $x_1$ is 'one sip of tea', $x_2$ is 'another sip of tea', and so on. Let also $y = (y_1, ..., y_n)$ be the vector that corresponds to the activity of reading this paper, e.g. $y_1$ is 'reading one piece of this paper', $y_2$ is 'reading another piece of this paper', and so on. Let $u : X \longmapsto \mathbb{R}$ be a utility function. If $u(x) = 4$ then the numerical value of 4 is your decision utility of choosing $x$. If $u(y) = 3$, then the numerical value of 3 is your decision utility of choosing $y$. Because this numerical value has no psychological meaning in terms of hedonic state, we will here only account for the set $X$, not $\mathbb{R}$.

Remark 1. Like in standard microeconomics, the utility function $u : X \longmapsto \mathbb{R}$ is a way of assigning a number to realisable alternatives such that more preferred alternatives get assigned a larger numerical value than less preferred alternatives. But 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 doing (or choosing) something. For any given alternative, e.g. 'drinking your tea' or 'reading this paper', you have an assigned hedonic state (expressed in a numerical value), which describes your psychological intensity. Your experienced utility is high if it pleases you or low if it bothers you. Formally, let $X$ be the set of alternatives and $u : X \longmapsto \Psi$ a utility function, where $\Psi = \{-10, ..., 10\}$ is the set of hedonic states (-10 for the less pleasant feeling, 10 for the most pleasant feeling). Assume $u(x) = 8$, then the numerical value of 8 represents the experienced utility of choosing $x$. If alternatives are of similar nature, e.g. 'one sip of tea' and 'another sip of tea', then cardinality applies (Axiom 4 [Section 3.4]). That is, let $x_1$ be 'one sip of tea' and $x_2$ be 'another sip of tea'. If $u(x_1) = 6$ and $u(x_2) = -3$, then the first sip of tea has exactly 9 more hedonic intensity than the other sip of tea.

**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. For example, the enjoyment (or suffering) you are having in reading this paper right now is of a given intensity, which only depends on your personal evaluation (e.g. you really like it, like it, are being indifferent, do not like it, do not like it at all, etc.). Moment utility is measured by asking subjects to evaluate their happiness on a hedonic scale (e.g. -10 the lowest hedonic state, 10 the highest). The set of moment utility (or hedonic states) is denoted by $\Psi = \{-10, ..., 10\}$.

Remark 2. As Kahneman, Wakker and Sarin (1997, p. 398) put it, the set of moment utility $\Psi$ 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, from the time you started reading this paper until the time you are currently reading this, one episode has passed. 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 $f : [b, e[\longmapsto X$, 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 twos 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, from the time you started reading this paper until the time you reached the previous definition and now this other definition, *two* episodes have passed. A TEO is 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, $f : [b, e[\cup[b', e'[\longmapsto X$ is one TEO, $f : [b, e[\cup[b', e'[\cup[b'', e''[\longmapsto X$ is another TEO, and so on. We can denote the general definition of a TEO by $f : 2^{[B,E[} \longmapsto X$, 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 which 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, thus allowing moment utility to fit in any temporality (either a time slice, an episode or a TEO). For example, the enjoyment (or suffering) you are having in reading this paper (in a given intensity) can be represented at time 1, time 2, etc. Formally, a utility profile is a function $u : 2^{[B,E[} \longmapsto \Psi$, with $[B, E[$ the set of slices in time.

Remark 4.1. In order to keep the standard notation '$u(x)$' in the text, 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 obviously different). That is, we can denote a utility profile by $u(x_i)$, where $i = \{0, ..., n\}$ is the index of time. I judge this simplification to be useful in order to avoid entering into technical details that are not fundamentally important to the global discussion of this paper.

Remark 4.2. Kahneman, Wakker and Sarin (1997, p. 398) actually 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 happens 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, from the time you started reading this paper until the time you are currently reading this, you had two sips of your tea. The addition of the two utility profiles 'first sip of tea' and

'second sip of tea' is described by the total utility of the time interval in which you made 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 social choice point of view, total utility is nothing more than an objective function a benevolent social planner aims at maximising. With the simplified notation I propose, total utility can be denoted as $W(x) = \int_0^n u(x_i)dx$.

**Remembered utility** is an individual's own global retrospective evaluation of a past experience, either represented in an episode or a TEO. For example, what you previously read of this paper is a memory of a past experience. The evaluation you have about this past experience (either positive or negative) is your remembered utility of that experience. Formally, let $X$ be the set of alternatives and $u^r : X \longmapsto \Psi$ a remembered utility function, where $\Psi = \{-10, ..., 10\}$ is the set of hedonic states (which represents the hedonic -10 to 10 scale). If we empirically observe (through your verbal statement) that $u^r(x) = 8$, then the numeral value 8 represents the remembered utility of thinking about the past experience of $x$. If we empirically observe (through your verbal statement) that $u^r(y) = 1$, then the numeral value 1 represents the remembered utility of thinking about the past experience of $y$. We can denote remembered utility by $u^r(x_i)$, where the superscript $r$ stands for 'remembered' and where the subscript $i = \{0, ..., n\}$ stands for the time at which the individual thinks of her past experience.

**Predicted (or anticipated) utility** is a belief about future experienced utility. For example, the activity you are thinking of doing after you will be done reading this paper is your predicted utility, also quantified in terms of hedonic states. Formally, the representation of predicted utility is exactly the same as remembered utility, except that since evaluation are not about *past* but *future* events, we can denote $u^p(x_i)$ for 'predicted'.

The following graph provides a visual representation of the relation between time ($N$), outcomes ($X$) and hedonic states ($\Psi$). 'Time' and 'hedonic states' are quantitative variables, while 'outcomes' is a qualitative variable (meaning it does not have a numerical value).

Figure 3: Graphical representation of experienced utility measurement
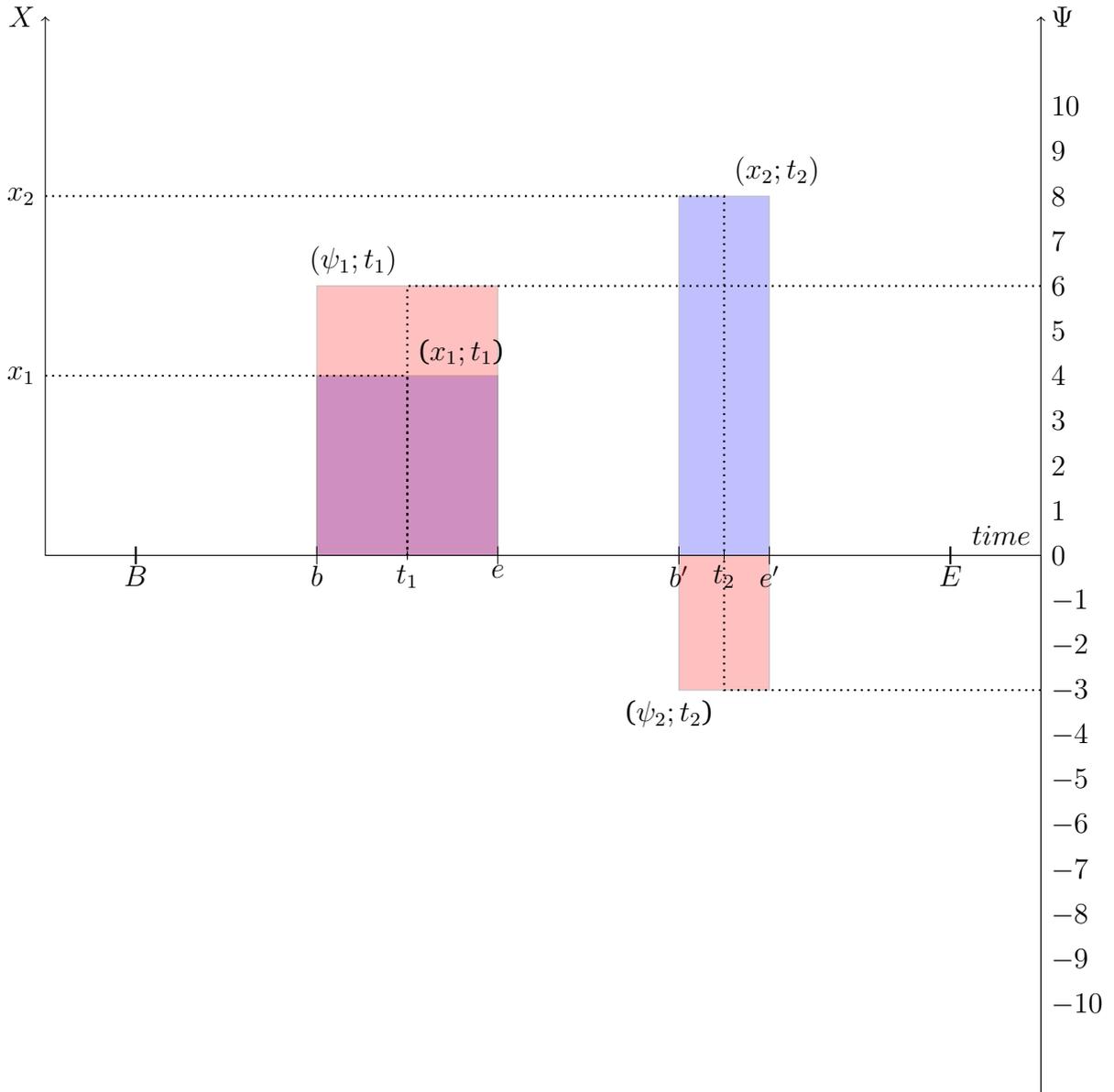
The $x$-axis represents the time variable $N$, to which each slice of time or interval belongs to. The time interval $[B, E[$ contains all time points relevant to the analysis, e.g. the evaluation of your evening. The intervals $[b, e[$ and $[b', e'[$ contained in $[B, E[$ are two distinct episodes, 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), where $x_1$ and $x_2$ are two outcomes, e.g. 'first sip of tea' and 'second sip of tea'.

The $y$-axis on the right represents the hedonic scale $\Psi = \{-10, ..., 10\}$. The highest the value, the more enjoyable the experience is and conversely. The experience of one or several outcomes (e.g. drinking one or several sips of tea) is represented by a utility profile. A utility profile is a function $u : 2^{[B,E[} \longmapsto \Psi$. In the present illustration we have two utility profiles: $f : [b, e[ \longmapsto \Psi$ and $f : [b', e'[ \longmapsto \Psi$. Visually, a utility profile is repre-

sented by the red area, where $\{\psi_1, \psi_2\} \in \Psi$. For the sake of illustration, the outcome $x_1$ gives you a hedonic feeling of 6 (because the tea is warm), while the outcome $x_2$ gives you a hedonic feeling of -3 (because the tea is now cold).

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 into a total utility function of the form $f : [b, e[ \cup [b', e'[ \longmapsto \Psi$, or with the simplified notation I suggest, $W(x) = \int_0^n u(x_i)dx$. 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 have required to write $W(n) = \int_B^E u(2^{[B,E[})dx$. This notation is avoided for two reasons. First, and as previously said, the notation $u(x_i)$ simplifies things. That is, I simply consider in the text that $x$ is an element included in the two nested sets $X$ and $[B, E[$. To make things even simpler, I use in the text the set of time $N$ instead of $[B, E[$, where $i$ is the index which captures each time slice. Second, $\Psi$ actually depends on $X$, as in the definition of experienced utility. But the relationship between $N$, $X$ and $\Psi$ is quite peculiar. As Kahneman, Wakker and Sarin (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 3.1]), not only a moment utility includes the present hedonic feeling $\psi_i$ 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 are already included in $\psi_i$. This psychological phenomenon is however hard to represent graphically. It cannot be represented in a three-dimensional graph because the relation between variables $N$, $X$ and $\Psi$ is not a one-to-one mapping. That is to say, one element of $X$ at time $i$ maps to one element of $\Psi$ at time $i$, but one element of $\Psi$ at time $i$ maps to several elements of $X$ at different times, e.g. $i - 1$ and $i + 1$. Mathematically, it would also require to specify the particular relation between $X$ and $\Psi$. Since $\psi_i$ not only depends 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. But 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 (Section 4.2).

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