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# INTRODUCTION

*"Happiness is like the penny candy of our youth: we got a lot more for our money back when we had no money".*—Mignon McLaughlin

*"Precisely the least, the softest, lightest, a lizard's rustling, a breath, a flash, a moment – a little makes the way of the best happiness".*—Nietzsche

Imagine how you would feel if you got the chance to travel the world, sleep in Palaces, and taste the finest bottles of Château d'Yquem. Visions of fulfilment may come to mind, and you would probably predict feeling quite content of having had the opportunity to experience the best that life has to offer. But can one really die happy after seeing Venice or does awesomeness has a price? According to what Gilbert termed the *experience-stretching hypothesis*, outstanding experiences may lower people's satisfaction with more mundane joys (Gilbert, 2006; Parducci, 1995). For instance, the memory of an amazing trip in the Caribbean might decrease the enjoyment of one's current vacation to the local beach—even if that trip took place years ago and was followed by numerous less exciting vacations. Likewise, gourmet food, fancy wines, and, in general, important financial and material comfort might actually mitigate the delight one experiences in response to simple, everyday pleasures, such as pizzas, cold beers, and sunny days.

Of course, outstanding pleasurable experiences color life and are inarguably part and parcel of our happiness. Yet, the experience-stretching hypothesis suggests that they might come at the hidden cost of impairing the enjoyment of simple daily living. This side effect could be particularly important for

people's well-being in the long run as previous studies have shown that the frequency of positive affect matters more for happiness than its intensity (Diener, Sandvic, & Pavot, 1991). Consequently, the experience-stretching hypothesis could potentially offer a solution to one of the most puzzling findings uncovered by well-being research: that objective life circumstances explain little of the variance in happiness (Lyubomirsky, 2008; Lyubomirsky, Sheldon, & Schkade, 2005). For instance, income appears to exert a surprisingly modest impact on happiness (see e.g., Aknin, Norton, & Dunn, 2009b; Diener, Sandvik, Seidlitz, & Diener, 1993).

The roots of the experience-stretching hypothesis can be found in Helson's (1964) adaptation level theory according to which people's judgments of current levels of stimulation depend upon whether this stimulation exceeds or falls short of the level of stimulation to which their previous history has accustomed them. For example, the perceived quality of a given dinner will be influenced by the usual quality of past dinners. Over the years, Helson's model has largely been discussed and enriched on the theoretical ground to take into account the effect of various parameters such as time (e.g., a series of fancy dinners experienced last year might not have the same impact as one experienced last week) and particularly extreme experiences on hedonic adaptation (Frederick & Loewenstein, 1999).

Despite its important implications for people's well-being and the large number of theoretical articles addressing the issue of adaptation (see Diener, Lucas, & Scollon, 2006b; Frederick & Loewenstein, 1999 for reviews), the proposition that having awesome experiences might undercut enjoyment for simpler pleasures has curiously only been investigated by a handful of empirical studies—some of which suffer from significant limitations. In addition to this lack of empirical support, legions of questions remain unanswered. For example:

1. Through which mechanisms do past outstanding experiences reduce enjoyment?
2. Is this effect limited to actual past experiences or do anticipated events can have the same deleterious effect?
3. Do personal dispositions and traits moderate this phenomenon?

The purpose of this dissertation is to test the experience-stretching hypothesis empirically as well as to address the fundamental underlying mechanisms and border conditions surrounding this notion. More specifically, our goal lies in delineating **whether, how, and for whom** awesome life experiences shape the extent to which individuals enjoy diverse pleasures in the present.

This research will crucially involve the concept of savoring—a form of emotion regulation used to prolong and enhance positive emotional experiences (Bryant, 1989; Bryant & Veroff, 2007; Quoidbach, 2009). Indeed, we propose that outstanding pleasures diminish enjoyment for simpler ones because they diminish people's motivation to savor, that is, to consciously try to make the best out of their simple positive experiences.

We further suggest that anticipated amazing future experiences might have the same deleterious effect on savoring as actual past experiences. In other words, one need not actually visit the pyramids of Egypt or be a frequent customer of 3-star restaurants for his or her savoring ability to be impaired—simply knowing that these peak experiences are readily available may increase the tendency to take the small pleasures of daily life for granted.

In addition to testing these propositions, we will investigate what component of an outstanding experience lead to a decrease in the motivation to savor. More specifically, we will address the question whether people adapt to actual situations (e.g., having a big house) or to the self-perception derived from these situations (e.g., identifying oneself as a big house owner).

Finally, we will examine whether the extent to which one's ability to savor is affected by great experiences could be modulate by personality variables such as depositional happiness.

## Structure of the present dissertation

This dissertation will be structured as follows:

The first section will introduce the reader to the main concepts addressed in this work and present the theoretical background from which the experience-stretching hypothesis draws from.

Chapter 1 will be dedicated to the central notions of happiness, positive emotions, and savoring. We will present the different conceptions of happiness, review the fast growing literature showing the importance of positive emotion for human flourishing, and introduce the idea that positive emotions can be prolonged and enhanced through a form of emotion regulation termed *savoring*.

In Chapter 2, we will discuss the general idea that emotional reactions to life events are only transitory: Individuals tend to adapt quickly to the source of their emotional experiences, especially the positive ones—a phenomenon labelled *hedonic adaptation*. We will then see that one of the causes of hedonic adaptation lies in the experience-stretching hypothesis. After discussing the knows and unknowns of this hypothesis, we will consider the adaptive function of hedonic adaption. Finally, we will introduce the idea that adaptation could occur not only to past experiences but to anticipated future experiences as well.

Building on these theoretical considerations, we will then put together a model of experience-stretching and derive specific hypotheses to test each of its components (Chapter 3).

The practical section of this dissertation will be composed of a series of published or soon to be submitted articles that can be split into two different types:

- Preliminary articles that verify two important assumptions on which relies our model of experience-stretching (Chapters 4 and 5).
- Core articles that directly investigate whether, how, and for whom outstanding experiences diminish enjoyment of simpler ones (Chapters 6 to 8).

Our model of experience-stretching suggests that great experiences diminish the motivation to savor, which in turn explains why they fail to deliver happiness in the long run. However, this hypothesis supposes that savoring does importantly matter for happiness, an idea that has so far received relatively little empirical support. Therefore, in Chapter 4 we will test this first assumption by investigating whether and how savoring promotes happiness.

A second important assumption on which the present work relies is the idea that not only can we adapt to past experiences but that pre-adaptation to future events can also occur. In other words, past and future personal experiences might both influence the present self in a similar fashion. Chapter 5 will present a study that test this general assumption by examining how people's personality (or present self) relates to their representation of both past and future selves.

Getting to the core of our dissertation, Chapters 6 will provide an initial test of the experience-stretching hypothesis by investigating how actual and anticipated wealth can impair savoring and, in turn, diminish happiness.

Moving beyond the proxy of wealth to actual experiences, Chapter 7 will directly test the deleterious effect of great travel history (or expectations) on enjoyment for simpler vacation destinations. In addition, we will address the question of the underlying cognitive mechanisms of experience-stretching,

that is, whether the comparison process that reduces the motivation to savor is based on semantic or episodic information.

Our last empirical chapter will present a study that suggests that individual differences might modulate the extent to which individuals are prone to experience-stretching (Chapter 8)

Lastly, Chapter 9 will be dedicated to the general discussion. After summarizing and putting our findings in perspective, we will discuss the implications, limitations, and future directions of our research.

# Chapter 1

# HAPPINESS, POSITIVE EMOTIONS, AND SAVORING

From Aristotle and Epicurus to present-day philosophers, politicians, poets, and self-help books' authors, the secret to happiness has always been a subject of tremendous interest. Along with this popular enthusiasm, the last 20 years have also witnessed an explosion of scientific research on happiness (or well being, as it has been typically referred in the literature[1]), with thousands of citations per year (Ryan & Deci, 2001)[2]. Far from being only an American cultural obsession—the pursuit of happiness is part and parcel of the Declaration of Independence—, happiness seems to be the "ultimate life goal" in a wide variety of nations and cultures (Diener, 2000). Numerous studies have also shown that the personal quest for happiness is not a superficial and selfish bourgeois concern: By becoming happier, not only can people improve crucial aspects of their own existence (e.g., health, relationships, and performance; see Lyubomirsky, King, & Diener, 2005 for a review), but also society as a whole (e.g., Fowler & Christakis, 2008; Veenhoven, 1988; Williams & Shiaw, 1999).

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[1] Following most previous literature on the topic, note that in the present work the terms *happiness* and *well-being* are used interchangeably.

[2] The scientific study of happiness has developed in part as a reaction to the overwhelming emphasis in psychology on negative states. Until the late 90's, psychological articles examining negative states outnumbered those examining positive states by a ratio of 17 to 1 (Myers & Diener, 1995).

In this chapter, we will first briefly introduce the notion of happiness. After selecting a working definition of the concept, we will review the evidence that shows the importance of subjective well-being at both individual and societal levels. Moving from general happiness to one of its key components, we will then present research on positive emotion and the broaden-and-built theory. Finally, we will address the regulation of positive emotion and review the main strategies that people use to savor—or dampen—their positive emotional experiences.

## 1. Happiness

The definition of happiness has been a central concern for thinkers from Antiquity to the present day. More than two thousand years ago, Aristotle already notoriously distinguished between two form of happiness: ήδονη (hédonê = "pleasure") and ευδαιμονία (eudaimonia = "good spirit"). According to the hedonic perspective—defended by famous philosophers such as Epicurus (342–270 BCE), Erasmus (1466–1536), and Jeremy Bentham (1748–1832)—a person should maximize pleasure and minimize pain in order to be happy. In contrast, the eudemonic perspective—held by figures such as Aristotle (384–322 BCE), John Stuart Mill (1806–1873), and Bertrand Russell (1872–1970)—states that real happiness come from a life lived to its fullest potential, in accordance with some internal virtue and values such as knowledge, friendship, and ethics (Kashdan, Biswas-Diener, & King, 2008).

Drawing on this distinction, contemporary modern well-being research has fallen into two conceptual traditions: subjective (or "hedonic") well-being (SWB; Diener, Suh, Lucas, & Smith, 1999), which focuses on how individuals feel about their life, and psychological (or "eudemonic") well-being (PWB; Ryff, 1989), which focuses on living a life in full accordance with one's potential (Ryan & Deci, 2001). SWB is operationalized as including three

components: 1) the presence of positive emotional experiences, 2) the absence of negative emotional experiences, and 3) a cognitive evaluation of satisfaction with one's overall life. Thus, people are characterized as high in SWB if they frequently experience positive emotions, rarely feel negative emotions, and are highly satisfied with their life. From this perspective, happiness has to be judged from the individual's own perspective. In contrast, PWB focuses on more existential concerns, and the way an individual interacts with the world. Although PWB can be operationalized in various ways, depending on which aspects of life are the focus of theoretical interest (Kashdan, et al., 2008), people are usually characterized as high in PWB if they have elevated levels of self-acceptance, autonomy, purpose in life, positive social relationships, environmental mastery, and personal growth (Ryff & Keyes, 1995). According to this perspective happiness could be measured objectively with indicators—somehow tainted of Western moral judgments—of what a "life well-lived" is. To take an extreme example, individuals who feel happy from helping old ladies crossing the streets and individuals who derive happiness from torturing kittens are both considered happy according to the SWB perspective, whereas the later would not be according to the PWB perspective.

Numerous studies have empirically dissociated PWB and SWB (see Ryan & Deci, 2001 for a review). For example, although related SWB and PWB are associated with different socio-demographics and personality patterns (Keyes, Shmotkin, & Ryff, 2002), and have different neural correlates (Urry et al., 2004). However, as pointed out by Kashdan, et al. (2008) in a recent review, results from a range of studies also suggest that hedonic and eudaimonic processes can work in tandem. For example, priming positive emotions can enhance the sense of meaning in life under certain circumstances (King, Hicks, Krull, & Del Gaiso, 2006), while a strong purpose in life can limit the consequences of extreme negative emotions (Heisel & Flett, 2004).

Although there is definitively much to learn from the PWB literature, the present work will adopt the SWB perspective as a conceptual framework to study happiness. Our reasons are as follows. First and most importantly, the very large majority of existing research on happiness have been focusing on SWB (Ryan & Deci, 2001). This is particularly true with regard to studies on hedonic adaptation. Taking a similar approach will therefore allow us to directly discuss and integrate our findings within the dominant theoretical framework. Second, the idea that happiness is something better or greater than SWB connotes a potential elitism, that the Good Life is an experience reserved for individuals who have attained some transcendence from everyday life (Kashdan, et al., 2008). Lastly, by measuring positive and negative experiences of daily living, SWB researchers indirectly tap people's goal achievement, social relationships, and other aspects of human psychology that have traditionally been associated with PWB. Feeling good is more often linked to meaningful and prosocial behaviors rather than selfish and antisocial ones (e.g., Dunn, Aknin, & Norton, 2008; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006).

As briefly mentioned in the introduction section, we postulate that one of the reasons why outstanding life experiences fail to increase SWB is because they lower people's motivation to savor simpler positive experiences, diminishing the frequency and intensity of the positive emotions they experience in the long run. Indeed, as we have just seen, positives emotions are one of the three components of SWB. But the fact that positive emotions "feel good" is actually only one of the reasons they are so important to SWB. In the next section we will present evidence that shows that positive emotions are also absolutely essential to happiness because of their indirect effect on the two other components of SWB: low negative emotions and cognitive life satisfaction.

## 2. Positive emotion

Positive emotions such as joy, gratitude, and pride have long been a puzzle to scientists. From an evolutionary point of view they don't seem to have the same survival value as negative emotions such as fear or anger. Whereas negative emotions elicit specific actions to run or attack, which must surely have helped our Pleistocene ancestors survive many dangers, what is the survival value of feeling joy or contentment?

According to the very influential *broaden and built theory* (Fredrickson, 1998, 2001), unlike negative emotions, which momentary narrow people's repertoires of thoughts and actions in order to promote ancestrally adaptive behaviors (e.g., fear, anger, and disgust are linked with the tendency to escape, attack, and avoid, respectively), positive emotions momentary *broaden* people's repertoires of thoughts and actions. Indeed, survival is typically not at issue in circumstances that give rise to positive emotions and quick, decisive actions are often not required. By signalling that the environment is safe, that "everything is alright", positive emotions have an antagonist and complementary effect to negative emotions: They allow individuals to discard evolutionary-tested automatic behavioral scripts and to pursue novel, creative paths of thought and action (Fredrickson, 1998). A key, incidental outcome of these broadened mindsets is that, as individuals discover new ideas and actions, they *build* new personal resources. For example, by sparking the urge to explore, interest can lead individual to learn new skills. Likewise, by sparking the desire to socialize, joy can lead individuals to meet new people and increase their social network.

Concretely, the effects of positive emotions have been shown to affect people's cognitions, behaviors, social relationships, as well as mental and physical health (see Lyubomirsky, King, et al., 2005; Quoidbach, 2009 for reviews)

### *2.1. Positive emotions and cognition*

Pioneered by Alice Isen in the early 1980's, research on the effects of positive emotion on cognition globally suggests that positive affect broaden the scope of cognition by 1) promoting unusual cognitive associations, 2) widening cognitive categories people create and use, 3) bolstering creative thinking (Isen, 1999)—effects potentially linked to increases in brain dopamine levels (Ashby, Isen, & Turken, 1999).

For example, relative to individuals in a neutral mood, people in a positive emotional state have been shown to give more unusual and flexible responses in word-association tasks (Isen, Johnson, Mertz, & Robinson, 1985). Numerous studies have also shown that experiencing positive emotions leads people to use more inclusive categories (e.g., saying more frequently that "elevators" and "camels" belong to the same category of "vehicles"; Isen & Daubman, 1984), to process information in a more holistic manner (Fredrickson & Branigan, 2005), and to increase creative thinking in problem solving tasks such as Duncker's (1945) candle task (Isen, Daubman, & Nowicki, 1987).

Given the effects of positive emotion on cognition, it is not entirely surprising to learn that frequent positive affect have been shown to have a causal positive influence on people's personal resources. Relative to individuals with less happy traits, people high in dispositional positive affect have been found to be more flexible and more creative. They usually display better leadership and negotiation skills, are more efficient in their work, and earn more money (see Lyubomirsky, King, et al., 2005 for a review).

### *2.2. Positive emotions and behavior*

With regard to behavior, research shows that positive emotions increase the tendency to engage in new and diversified activities. Joy leads people to play and interact, whereas interest increases the motivation to explore the environment (Frijda & Mesquita, 1994). For example, adults experiencing

positive affect have been found to seek more variety, relative to those in a neutral control condition, when choosing among different consumer products (Kahn & Isen, 1993). Likewise, Cunningham (1988b) found that a positive mood induction led participants to report increased intention to engage in various social, physical, and leisure activities. Research on children also showed that interest eliciting objects lead to longer and more diversified playing episodes (Renninger, 1992).

Positive emotions have also been shown to foster pro-social behaviors. People experiencing positive affect are more likely to initiate conversation with others (Cunningham, 1988a) and to engage in cooperative and helping behaviors (Isen, 1999).

### *2.3. Positive emotions and social relationships*

Probably because they predispose individuals to more flexible mindsets and frequent pro-social behaviors, positive emotions have important consequences for social relationships. Numerous studies have documented an association between dispositional positive affect and the size of one's social network, as well as overall social support (see Lyubomirsky, King, et al., 2005 for a review). Trait positive affect has also been shown to predict marriage and marriage satisfaction. In an influential study, Harker & Keltner (2001) showed that, even when controlling for physical attractiveness, women who displayed more positive emotion in their yearbook pictures (around the age of 20-years old), were more likely to be married by age 27, less likely to have remained single into middle adulthood, and more likely to have a satisfying marriage 30 years later.

In the workplace, employees with high dispositional positive affect have been found to receive more emotional and tangible assistance from both co-workers and supervisors (Staw et al., 1994). As for job performance, positive emotions are often the cause rather than the consequence of occupational success (Boehm & Lyubomirsky, 2008). For example, in a longitudinal study

following last year college students, Burger & Caldwell (2000) found that trait positive affect measured approximately four months before graduation positively predicted success at obtaining a job interviews once entering the job market. Those results were independent from personality.

### *2.4. Positive emotions and mental and physical health*

Positive affective experience has been described as an important component of mental health (Taylor & Brown, 1988). The absence of positive emotion is consensually held to be an important feature of depression (Clark, Watson, & Mineka, 1994) and happier individuals have fewer symptoms of psychopathology, such as depression, hypochondriasis, or schizophrenia (Diener & Seligman, 2002). People high in trait positive affect are less likely to suffer from social phobia or anxiety (Kashdan & Roberts, 2004), to consume drugs (Bogner, Corrigan, Mysiw, Clinchot, & Fugate, 2001), and to engage in delinquent activities (Windle, 2000).

One of the reasons positive emotions protect mental health may rely in their undoing effect: Positive affect seems to serve as a buffer against adverse psychological and physiological consequences of negative emotional states such as stress (Fredrickson, 1998; Tugade & Fredrickson, 2004). Experiences of positive affect in the midst of stressful circumstances may, for example, short-circuit the rumination spiral, preventing individuals to fall into clinical depression (Gross & Munoz, 1995). Positive affect has also been shown to offset the potentially damaging physiological concomitants of negative affect. Fredrickson and Levenson (1998) induced fear in participants before randomly assigning them to see one of four films designed to elicit contentment (relaxing waves breaking on a beach), amusement (puppies playing with flowers), sadness (a boy crying as he watches his father die), or no emotion (abstract colours). Measures of cardiovascular reactivity indicated that participants in the positive movie conditions had faster recovery to baseline than those in the sad or neutral condition. Likewise, positive

emotions have been shown to help people dissociate from psychological distress during bereavement (Keltner & Bonanno, 1997) and to account for the relationship between precrisis resilience and later development of depressive symptoms following September 11th terrorist attacks (Fredrickson, Tugade, Waugh, & Larkin, 2003).

In addition to mental health, strong evidence suggests that positive emotions are associated with physical health. Previous studies have found, among other positive outcomes, that positive affect is associated with increased survival, improved immune function, decreased symptoms and pain, and lower risk of diabetes and hypertension (Pressman & Cohen, 2005; Richman et al., 2005; Rosenkranz et al., 2003; Rozanski, Blumenthal, Davidson, Saab, & Kubzansky, 2005). For example, findings from the oft-cited "nun study" show that the positive emotional content (i.e., number of positive words) of autobiographies from 180 Catholic nuns sharing the exact same life conditions, composed when participants were in their early twenties was strongly related to longevity 60 years later (Danner, Snowdon, & Friesen, 2001). Likewise, in another recent longitudinal study, Davidson, Mostofsky, and Whang (2010) found that positive affect measured through the extent to which patient smiled and appeared able to enjoy some aspects of life during clinical interviews was associated with risk of on coronary heart disease. After controlling for age, sex, cardiovascular risk factors, and negative emotions, the researchers found that an increase of 1 point on the 5-point scale measuring the level of positive emotions (ranging from "none" to "extreme") translated into a 22% reduction of heart disease.

### *2.5. Conclusion*

Positive emotions feel good, and feelings like joy, pride, and gratitude can be valuable in and of themselves as an important component of SWB (i.e., high positive affect). Yet the broaden-and-build theory posits that natural selection sculpted our ancestors' positive emotions to be useful in more far-reaching

ways as well (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008).The theory and research reviewed here, suggests that by broadening people's cognitions and behaviors, strengthening social ties, and promoting mental and physical heath, positive emotions help individuals building important resources for the future. In turn, these resources positively shape people's judgment about their satisfaction with life. Note that a virtuous cycle unites personal resources and positive emotions: new resources create new occasions to experiences positive emotions, and so on. Moreover, by acting as a buffer against the deleterious effect of negative emotions, positive emotional states increase one's resilience. Thus, positive emotions are indirectly beneficial for the two other components of happiness as well, namely, life satisfaction and low negative affect (see Figure 1).

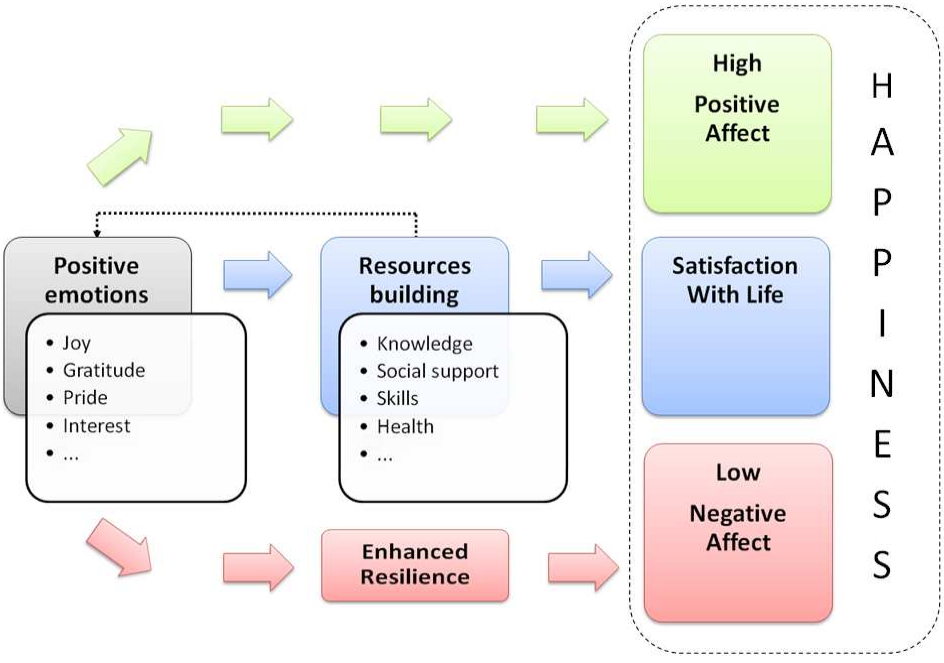


***Figure 1****. As a component of SWB, positive emotions contribute directly to happiness. However they also have an indirect effect on happiness via the construction of new resources essential to life satisfaction and through the enhancement of resilience to negative emotion.*

These indirect contributions to well-being have been tested in a recent field experiment. Fredrickson, Cohn, Coffey, Pek, and Finkel (2008) randomly-assigned working adults to begin a practice of loving-kindness meditation (a type of meditation designed to induce positive emotions) or to a wait-list control group. Results showed that the meditation practice produced increases over time in daily experiences of positive emotions, which in turn produced increases in a wide range of personal resources (e.g., increased mindfulness, purpose in life, social support, decreased illness symptoms...). In turn, these increments in personal resources predicted increased life satisfaction, independently from the direct effect of positive emotions.

It is easy to conclude form our brief review of the literature on positive emotions that they are of paramount importance for subjective well-being. No wonder, then, that the vast majority of research on happiness enhancing interventions exhorts us to cultivate, prolong, and increase them. But how can we make the best out of our positive emotions? What emotion regulation strategies do people use to that aim? Does everyone react the same way to positive emotional experiences? These points will be addressed in the next section.

## 3. Positive emotion regulation

Although emotions are very efficient systems, they are nevertheless very old devices. Whereas emotions were fully adjusted to life of our Pleistocene ancestors, they are not quite adapted to the life of modern human (Gross, 2007; Mikolajczak, 2009). For instance, getting nervous and angry in the traffic jams is totally useless. According to Gross & Thompson (2007), emotions become dysfunctional when they are of the wrong type, when they come at the wrong time, or when they occur at the wrong intensity level. In these cases, emotions must be regulated.

Emotional regulation refers to the behavioral, cognitive, and physiological—automated and controlled—processes through which people influence *which* emotions they have, *when* they have them, and *how* they experience or express these emotions (Gross, 1998, 2007). The ability to adequately regulate emotion is crucial for human beings (Cicchetti, Ackerman, & Izard, 1995; Thompson, 1991). Indeed, efficient regulation of negative emotion has been shown to play a key role in mental health (e.g., Gross & Levenson, 1997; Watkins & Brown, 2002), physical health (e.g., Suls, Wan, & Costa, 1995), social relationships (e.g., Lopes, Salovey, Côté, & Beers, 2005) and work performance (e.g., Grandey, 2003; Quoidbach & Hansenne, 2009), to name but the most common indicators of adjustment.

Previous research in the field of emotion regulation has focused to a very large extent on negative emotions. However, emerging research shows that people do engage in positive emotion regulation. A recent study in which participants were asked to report the frequency they regulated their emotions in daily life revealed that, although everyday emotion regulation predominantly involves the down-regulation of negative emotions, most individuals also attempt to regulate their positive emotion (Gross, Richards, & John, 2006). Positive emotions can be (1) down-regulated (e.g., when we try to decrease love for a colleague who is married), (2) maintained (e.g., when we engage in social sharing in order to prolong the effects of a positive event), and (3) up-regulated, such as when we try to enjoy a long planned vacation despite disappointing weather, food, and housing (Mikolajczak, 2009).

Major individual differences exist in the extent to which people respond to positive emotional experience. Many use strategies to enhance and sustain positive affective states—a process typically referred as *savoring* (Bryant, 1989, 2003; Bryant & Veroff, 2007). Somewhat counter-intuitively, however, it has also become clear that some people, for no apparent strategic motives, react in ways that are likely to reduce positive emotions—a process labelled *dampening* (Feldman, Joormann, & Johnson, 2008; Parrott, 1993).

Frequent savoring responses have been related to higher self-esteem (Larsen & Prizmic, 2004), happiness (Bryant, 2003) and resilience in the face of adversity (Tugade & Fredrickson, 2007). In contrast, frequent dampening responses have been tied to lower self-esteem (Feldman, et al., 2008; Wood, Heimpel, & Michela, 2003), depression (Bryant, 2003; Feldman, et al., 2008; Min'er & Dejun, 2001), and anxiety disorder (Eisner, Johnson, & Carver, 2009). These findings begin to stretch existing conceptualizations of emotion regulation to include efficient management of positive emotions as a key component of well-being.

How then can we make the best out of our positive emotions? What are the main regulation strategies that people use to maintain, increase, or decrease their positive emotional experience? And what are the reasons of their effectiveness?

In order to begin to address these questions and identify the main positive emotion regulation strategies, we reviewed the literature on positive emotion regulation over the last 30 years using PsycINFO. For each year between 1979 and 2009, we looked for original research articles in peer-reviewed journals that focused on positive emotion regulation. Searches were conducted employing "POSITIVE EMOTION", "POSITIVE AFFECT", or "POSITIVE MOOD" as search terms in the title, keywords, and abstract of the articles from the database, in combination with the terms "SAVOR*", "DAMPEN*", or, "EMOTION REGULATION". The abstracts of the 106 original hits were inspected to remove non-relevant articles, commentaries, letters, dissertation abstracts, books, and book chapters. Our analysis of the literature eventually yielded a total of 33 articles with some relevance regarding the strategies people can use to regulate their positive emotion. We then sorted these strategies and aggregate similar ones into eight broad categories: four savoring strategies (i.e., behavioral display of positive emotions, being present, capitalization, and positive mental time travel) and four dampening strategies (i.e., suppression, worrying, negative mental time travel, and fault finding). These strategies are detailed hereafter.

### *3.1. Savoring strategies*

*Behavioral display*

This strategy refers to the tendency to fully express positive emotions through non-verbal behaviors. Evidence for the efficiency of this strategy is provided by studies showing that the facial expression of emotion may play a causal role in the subjective experience of emotion (for reviews see Adelmann & Zajonc, 1989; McIntosh, 1996). For example, in a pioneer study on the topic, Strack, Martin, and Stepper (1988) found that subjects holding a pen in their mouth in ways that either inhibited or facilitated the muscles typically associated with smiling reported more intense amusement under facilitating conditions than under inhibiting conditions. Over the years, these findings have been replicated using various types of facial feedback and methods. For example, dropping 0.2 ml of water on the cheek near the lacrimal duct leads individuals to report increased levels of sadness (Mori & Mori, 2007), whereas lifting their cheeks upward with adhesive bandages increases feelings of happiness (Mori & Mori, 2009). Likewise, according to a recent pilot trial, inhibiting, through Botox injections, the expression of the facial frowning commonly associated with depression seems to help diminishing depressive symptoms (Finzi & Wasserman, 2006).

*Being present*

This strategy consists of the propensity to deliberately direct awareness and attention to the present pleasant experience. This strategy has been positively correlated with the intensity and the frequency of the feeling of happiness as well as negatively correlated with depression (Bryant, 2003). Moreover, mindfulness meditative practices, which emphasize the awareness of the present moment, are associated with numerous positive outcomes, such as enhanced subjective quality of life (Shapiro, Astin, Bishop, & Cordova, 2005; Surawy, Roberts, & Silver, 2005), lower stress (e.g., Brown & Ryan, 2003; Kabat-Zinn et al., 1992; Weinstein, Brown, & Ryan, in press), and better health

(for reviews see Grossman, Niemann, Schmidt, & Walach, 2004; Kabat-Zinn, 1990).

*Capitalizing*

This strategy refers to the inclination to communicate and celebrate positive events with other people (Langston, 1994). Studies have shown that capitalizing is associated with increased daily positive affect and well-being, over and above the impact of the positive event itself and other daily events (Gable, Reis, Impett, & Asher, 2004; Langston, 1994). The wider the net of sharing, the greater the benefits reaped (Gable, et al., 2004). Moreover, the reciprocal stimulation of interactants during social sharing of emotions (both positive and negative) has been shown to favor empathy, foster emotional communion, and strengthen social bonds (Rimé, 2007). Indeed, when others respond in an active and constructive manner, relationship benefits associated with capitalization processes include satisfaction, intimacy, commitment, trust, liking, closeness, and stability (Gable & Reis, 2010).

*Positive Mental Time Travel (Positive MTT)*

This strategy refers to the tendency to engage in vivid positive reminiscence or anticipation of positive events – two abilities that are very closely related (see e.g., D'Argembeau & Van der Linden, 2004; Suddendorf & Corballis, 2007). Indeed, both cross-sectional and experimental studies have shown that reminiscing about positive events predicts happiness (Bryant, Smart, & King, 2005; Havighurst & Glasser, 1972; Lyubomirsky, Sousa, & Dickerhoof, 2006). Anticipating future positive events has also been found to be related to numerous positive outcome, such as subjective well-being and social network size (MacLeod & Conway, 2005), and fewer depressive symptoms (e.g., MacLeod & Salaminiou, 2001). In a recent experimental study, Quoidbach, Wood, and Hansenne (2009) showed that participants who engaged daily in positive anticipation of future personal events, using vivid cognitive imagery, reported a significant increase in happiness over 15 days.

### *3.2. Dampening strategies*

*Suppression*

This strategy refers to the tendency to repress or hide positive emotion on account of shyness, sense of modesty, or fear. Gross and Levenson (1997) showed that the expressive suppression of positive emotions bears physiological costs (i.e., increased sympathetic activation of the cardiovascular system) and leads to a decrease in the subjective enjoyment of a positive experience. Note that the suppression of negative emotions also bears a physiological cost but does not lead to a decrease in the corresponding subjective negative experience. Gross and John (2003) further showed that the tendency to suppress both negative and positive emotions alike is associated with less trait positive affectivity and more trait negative affectivity, poorer social support, more depression, and lower life satisfaction and psychological well-being. In addition, a recent experimental study confirmed that inhibition of facial expression can reduce emotional experience and that this effect is not dependent on experimental demand, lay theories about connections between expression and experience, or the distraction involved in inhibiting one's expressions (Davis, Senghas, & Ochsner, 2009).

*Distraction*

This strategy refers to the propensity to engage in activities and thoughts related to one's current concerns. The propensity to experience lapses of attention has been associated with negative consequences in terms of long-term affective well-being (Carriere, Cheyne, & Smilek, 2008). Moreover, whether during a positive or a negative event, the tendency to worry consistently has the same deleterious effects: it increases anxious and depressive affects (Borkovec, Alcaine, & Behar, 2004) and is associated with increased cardiovascular, neuroendocrine and neurovisceral activity (Brosschot, Gerin, & Thayer, 2006).

*Negative Mental Time travel (Negative MTT)*

This strategy encompasses negative reminiscence such as reflecting on the causes of a positive event with an emphasis on external attribution (e.g., "I got an 'A' because the exam was really easy") and negative anticipations of its future consequences (e.g., "My streak of luck is going to end soon, I'd better be careful", "These positive feelings won't last"). Negative MTT has been associated with lower self-esteem, greater rumination, and more severe depressive symptoms (Feldman, et al., 2008). Moreover, the assignment of external attributions to personal success have been extensively found to be associated with depression (see Sweeney, Anderson, & Bailey, 1986 for a meta-analysis on the topic).

*Fault finding*

This strategy refers to the tendency to focus on what could have been better and to pay attention to the negative elements of otherwise positive situations. Aside from "pure" negative thinking which is known to be a central characteristic of depression (see e.g., Teasdale, 1983), the simple desire to maximize situations has been found to negatively correlate with happiness, optimism, self-esteem, and life satisfaction (Polman, in press; Schwartz et al., 2002). Finding fault with the current situation, or wanting more than what one actually has is detrimental to happiness (Larsen & McKibban, 2008).

## 4. Summary

While understanding the underpinnings of distress has long been the main focus of psychology, recent years have witnessed an impressive explosion of research on happiness and human flourishing.

Although different conceptions of happiness exist, the dominant model in the scientific literature is the one of subjective well-being, which posits that happiness is a combination of low negative affect, high positive affect, and a general sense of life satisfaction.

Among these components, positive emotions seem to play a particularly preponderant role in SWB. Indeed, the broaden-and-build theory suggests that by broadening people's cognitions and behaviors, strengthening social ties, and promoting mental and physical heath, positive emotions help individuals building lasting resources. These resources, in turn, not only increase the likelihood of experiencing future positive emotions, but also foster resilience to negative ones and enhance life satisfaction.

While positive emotions are crucial to well-being, research also shows that people do not experience them passively. Although emotion regulation predominantly involves the down-regulation of negative emotions, most individuals also attempt to regulate their positive emotions on a daily basis. Moreover, robust individual differences seem to exist in people's proclivity to savor or to dampen their positive emotional experiences. The behavioral and cognitive strategies they use to that end can be classified into eight broad categories. Savoring strategies typically encompass displaying positive emotions nonverbally, staying present in the moment, thinking about the event before and afterward, and telling others. Conversely, dampening strategies usually include suppressing one's positive emotional expression, being distracted, anticipating negative consequences, and focusing on negative details.

In sum, chapter 1 highlighted the importance of cultivating positive emotions and experiences in achieving happiness. This is not, however, an easy task. Among the most pervasive human traits is the tendency to take for granted good things that are constant in one's life. Chapter 2 will be dedicated to our inclination to grow accustomed to emotional experiences over time—a phenomenon that researchers have coined *hedonic adaptation*.

# Chapter 2

# HEDONIC ADAPTATION AND THE EXPERIENCE-STRETCHING HYPOTHESIS

*"Man is a pliant animal, a being who gets accustomed to anything."*—Fyodor Dostoyevsky

*"The advantage of a bad memory is that one enjoys several times the same good things for the first time."*—Friedrich Nietzsche

The thrill of victory and the agony of defeat decline with time. So do the excitement of driving a new sport car, the sadness after a failed romance, the pride over a job promotion, and the distress of a painful diagnosis (Frederick & Loewenstein, 1999). This phenomenon, known as *hedonic adaptation*, has generated considerable attention lately among both psychologists and economists (e.g., Diener, Lucas, & Scollon, 2006; Easterlin, 2006; Frederick & Loewenstein, 1999; Kahneman & Thaler, 2006; Lucas, 2007a; Lyubomirsky, Sheldon, & Schkade, 2005; Wilson & Gilbert, 2007). It has been invoked to explain the relatively strong temporal stability of well-being (e.g., Costa, McCrae, & Zonderman, 1987) and why people tend to "recover" from both positive and negative life events (e.g., Suh, Diener, & Fujita, 1996), even though they are particularly bad at foreseeing its effect (i.e., immune neglect; Gilbert, et al., 1998).

In this chapter, we will first introduce the construct of hedonic adaptation. After providing an overview of empirical evidence that supports hedonic adaption, especially to positive events, we will briefly present the mechanisms through which adaptation can occur as well as its potential adaptive functions. We will then further develop the experience-stretching hypothesis, which is

one of the proposed mechanisms of hedonic adaptation. Given that, the experience-stretching hypothesis has never been properly tested, we will review the theoretical work and indirect empirical evidence that support it as well as the questions that remain unanswered. Lastly, we will introduce the intriguing notion of "feedforward", that is, that pre-adaptation could occur for anticipated future events.

## 1. The What, How, and Why of Hedonic Adaptation

### *1.1. Hedonic Adaptation and the Hedonic Treadmill*

Hedonic adaptation refers to the phenomenon by which repeated or constant exposure to a stimulus reduces the emotional impact of that same stimulus (Brickman & Campbell, 1971; Frederick & Loewenstein, 1999). Indeed, a large body of evidence shows that, although most life events (from new cars and break-ups to marriage and imprisonment) may cause temporary increases in happiness or sadness, people rapidly adjust, and the effect of these events on their well-being quickly diminishes or even entirely disappears. For example, in an influential study, Brickman, Coates, and Janoff-Bulman (1978) showed that recent lottery winners were no happier than controls one year after winning and, furthermore, that recent victims of paralysis were not as unhappy as one would expect (see also Dijkers, 1997). Similarly, Feinman (1978) found that people who were blind did not differ in happiness from those who were able to see. Even more surprising are findings on the quality of life of patients who suffer from Locked-In Syndrome (LIS): a state of almost complete immobility and loss of verbal communication. While, healthy individuals and medical professionals sometimes assume that the quality of life of LIS patients is so poor that it is not worth living, studies show that those patients report a quality of life often comparable to age-matched healthy controls (e.g., Laureys et al., 2005; Lulé et al., 2009). In addition to cross-sectional data, longitudinal studies that tracked changes in happiness over time provide evidence for the theory of hedonic adaptation. For instance,

Silver (1982) found that individuals who suffered from spinal cord injuries adapted surprisingly well to their tragic accident during the course of the next two months. Likewise, Suh, Diener, and Fujita (1996) found that good and bad life events were related to happiness but only if they occurred in the past two months (no relationship was found for more distant events).

Hedonic adaptation may explain why the effects of objective life circumstances, such as income (Aknin, Norton, & Dunn, 2009a), health (Okun & George, 1984), years of education (Diener, 1984), and physical attractiveness (Diener, Wolsic, & Fujita, 1995) on psychological well-being are often found to be small. In fact, several authors have suggested that no matter how hard people try to get happier by changing their circumstances (e.g., getting new cars, houses, jobs, partners...) they will eventually return to their baseline happiness—largely determined by a genetic set point (Lykken & Tellegen, 1996). This idea is known as the *hedonic treadmill* (Brickman & Campbell, 1971) which compares the pursuit of happiness to a person on a treadmill, continuously running... but staying in the same place.

However, it should be mentioned that recent empirical work has challenged the classic hedonic treadmill model and suggested some adjustment to the theory (for a review, see Diener, Lucas, & Scollon, 2006). First, individuals' set points are not hedonically neutral: Most people around the globe tend to be happy most of the time (Biswas-Diener, Vittersø, & Diener, 2005; Diener & Diener, 1996). Second, a single person may have multiple happiness set points: Different components of well-being such as positive affect, negative affect, and life satisfaction can move in different directions(Diener, Lucas, & Scollon, 2006a). Third, individuals differ in their adaptation to events. Although on average adaptation occurs, some people stay happily married till death do they part, for example, while the joys of marriage fade away only after a few weeks for others (Lucas, Clark, Georgellis, & Diener, 2003). Fourth, and perhaps most important, people do not adapt to everything. For example, a large longitudinal study on German residents followed for more than 15

years showed that very negative experiences such as unemployment (Lucas, Clark, Georgellis, & Diener, 2004), divorce (Lucas, 2005), and widowhood (Lucas, Clark, Georgellis, & Diener, 2003) led to decreases in well-being from which participants, on average, never fully recovered.

Notwithstanding these restrictions, the hedonic treadmill model has received robust empirical support (see Fredrick & Loewenstein, 1999, for a review), especially in the positive domain on which this dissertation focuses. Whereas there are some negative events people never recover from, research suggests that adaptation to positive events is fairly rapid and usually complete. For example, in a study that followed high-level managers for five years to track their job satisfaction before and after a voluntary job change, Boswell, Boudreau, & Tichy (2005) found that participants experienced increased satisfaction immediately after the change but that this boost vanished within a year. Similarly, Boehm & Lyubomirsky (2008) showed that providing positive feedback on personality strengths everyday for two weeks increased participants' level of positive emotions at first but that the effect of these compliments dissipated in a near-linear fashion within the course of the study.

### *1.2. How do we adapt?*

Different processes can underlie hedonic adaptation. At the lowest level, hedonic adaptation can occur via rather automatic physiological or neurochemical processes. For example, disgust one might experience from the smell of a garbage bin might fade away as their olfactory receptors get saturated. Likewise, changes in the brain can occur to oppose persistent extreme emotions (Solomon & Corbit, 1974). For instance, neurophysiological alterations in specific systems of the central nervous system that regulate the capacity to experience pleasure can be found for individuals continually exposed to high-level cocaine (Gawin, 1991). At the highest level, hedonic adaptation can involve conscious cognitive changes in interests, values, goals, attention, appraisal, or behaviors. For example, one might develop new

interests—playing poker instead of tennis—that can help reducing distress after a disabling accident. Similarly, one might re-appraise an emotional situation to diminish its impact such when people interpret a tragedy as "a learning experience" (see e.g., Janoff-Bulman & Wortman, 1977).

At a more conceptual level, Lyubormirsky (in press) proposed in her model of Hedonic Adaptation to Positive and Negative Events (HAPNE), two independent paths through which people adapt to positive life events (see Figure 2). The first route—depicted on the red background—is through declines in the number or frequency of experienced emotions. That is, the series of positive episodes that follow a positive event will become less and less frequent over time and may even cease altogether. For example, one may experience many positive episodes after going on an exciting vacation trip with friends (e.g., picture nights, private jokes, nice suntan, etc.). However, those occasions to experience positive emotions will become less and less numerous over time, reducing the emotional impact of the vacation trip on one's happiness. The second route—depicted on the blue background—is the very focus of the present dissertation: the experience-stretching hypothesis (Gilbert, 2006). Whether or not one continues to experience positive episodes following a positive event (e.g., losing weight might lastingly bring about frequent positive episodes in a person's social life), as time goes by, these positive episodes can become the person's new norm or standard, and therefore will be taken for granted. To keep the same example, a person who just lost a lot of weight and gets a compliment on her look for the first time might be particularly happy. However, when these positive feedbacks become parts of her daily life, they are less likely to trigger strong emotional reactions.

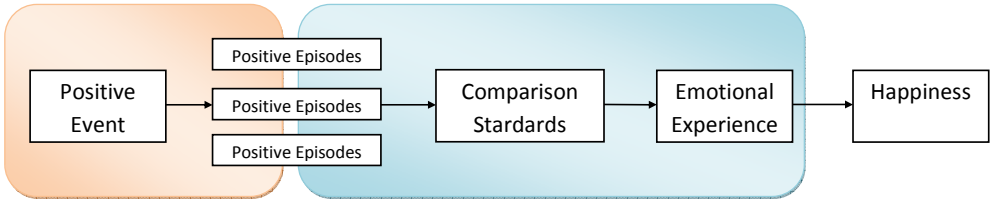


***Figure 2**. A positive event bring about several positive episodes, that further lead to positive emotional experiences essential for happiness. Hedonic adaptation can occur via two mechanisms. First, positive episodes can become less frequent over time (red path). Second, positive episodes can fail to deliver as much positive emotion as they should because they raise comparison standards; future positives episodes are taken for granted and less likely to bring happiness (blue path).*

### *1.3. Functions of Hedonic Adaptation*

Similarly to other type of adaptation processes (e.g., visual adaptation to light and darkness), hedonic adaptation is believed to serve two important functions: 1) it protects us from strong external stimuli and 2) it enhances our perception, enabling us to detect important features of the environment (Frederick & Loewenstein, 1999).

Although, emotions facilitate adaptation by improving the detection of threatening stimuli, preparing the organism for specific behavioral responses, enhancing memory for significant events, assisting and accelerating decision-making processes, and guiding social interactions (for a review, see Mikolajczak, Quoidbach, Kotsou, & Nélis, 2009), persistent strong negative emotional states (e.g., anger or stress) can have important damaging consequences for mental (e.g., Gross & Munoz, 1995; Mikolajczak, Menil, & Luminet, 2007) and physical health (e.g., Blumenthal et al., 2005; Lehrer, Isenberg, & Hochron, 1993; Spiegel & Giese-Davis, 2003; Thurin & Baumann, 2003). Conversely, too much happiness can drive people away from tasks that required immediate attention and lead them to make poor decisions (Baron,

1987; Forgas, 2000; Oishi, Diener, & Lucas, 2007). Therefore, hedonic adaptation may help to protect us from the long-term deleterious effects of emotions.

Hedonic adaptation may also serve a perception-enhancing function, increasing people's sensitivity to changes they can make to improve their objective life circumstances. Imagine for instance a man sentenced to 10 years in a prison with $4m^2$ and $5m^2$ cells. The first months of his incarceration, he is desperate and will probably have little motivation to try to get the bigger cell—what difference does a square meter make when one just got deprived of 10 years of freedom? However, two years later, when the convict has adapted, the difference in cell size once judged as insignificant, becomes salient. The additional square meter now represents an important improvement for his quality of life and he would probably be motivated to invest a great deal of energy and resources to acquire the bigger cell. This phenomenon is illustrated in Figure 3 and 4 using the Prospect theory value function framework (Kahneman & Tversky, 1979).

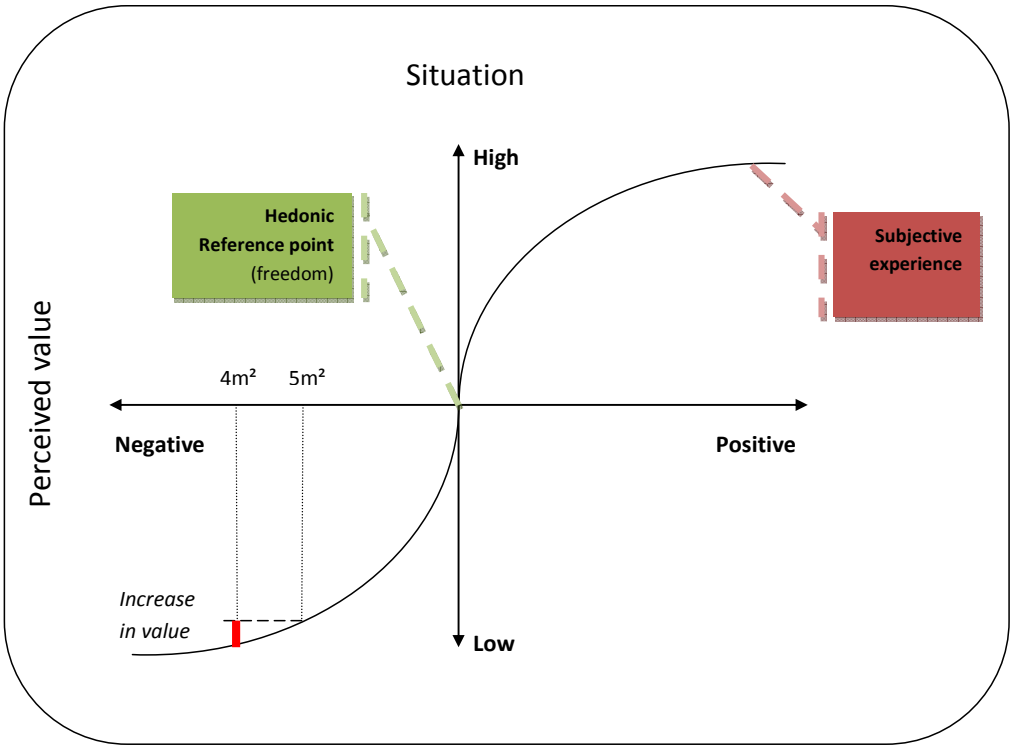


***Figure 3**. At early stages of his incarceration, the prisoner's neutral hedonic reference point is freedom. Even if they differ in terms of objective positivity, the two situations ($4m^2$ and $5m^2$) are both subjectively experienced as highly negative. A switch from a small cell to a bigger one will be perceived as having little value. The prisoner will probably not be motivated to strive to get the bigger cell.*

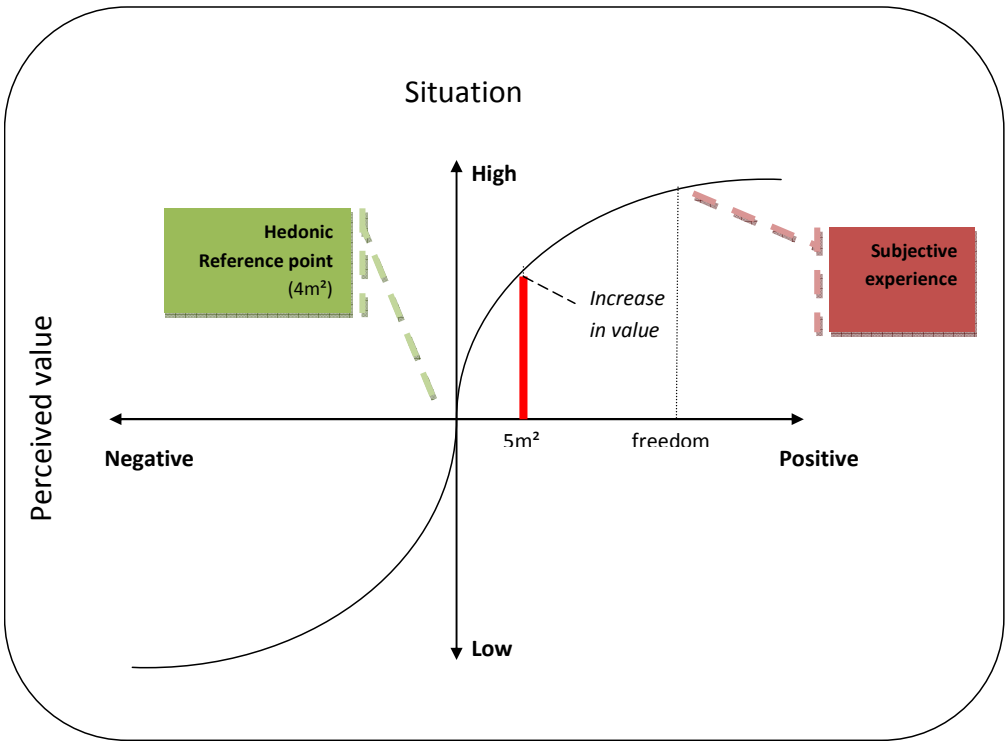


***Figure 4.*** *As time and adaptation go by, the 4m² cell has become the neutral hedonic reference point. Even if the objective distance between the 4m² and 5m² cells on the positivity of situations axis has not changed, the subjective emotional impact of a bigger cell has grown drastically. The 5m² cell is now perceived as highly valuable, which will enhance the prisoner's motivation to get it.*

These figures illustrate how hedonic adaptation can be adaptive. Without adaptation, the prisoner would live in misery for 10 years in a 4m² cell and would only be motivated to obtain things he cannot have (i.e., freedom). However, hedonic adaptation allows him to redirect his motivation to changes that can be made to improve—even a little—his life circumstances. The same reflection can be applied to positive situations. Consider, for example, a young Ph.D. student with no publication. Publishing her first paper, even in a modest

journal, will most likely make her very happy, and the perceived value of this goal (and motivation to achieve it) might be quite high. In contrast, publishing a paper in a top-tier journal will be, of course, experienced as a stronger joy; yet the additional gain in happiness comparing to the small journal remains limited. Given that publishing in big journals implies a great deal of efforts and a low probability of success for little extra happiness, the first year grad student will most likely—and wisely—be motivated to direct her energy to the attainable goal (see figure 5).

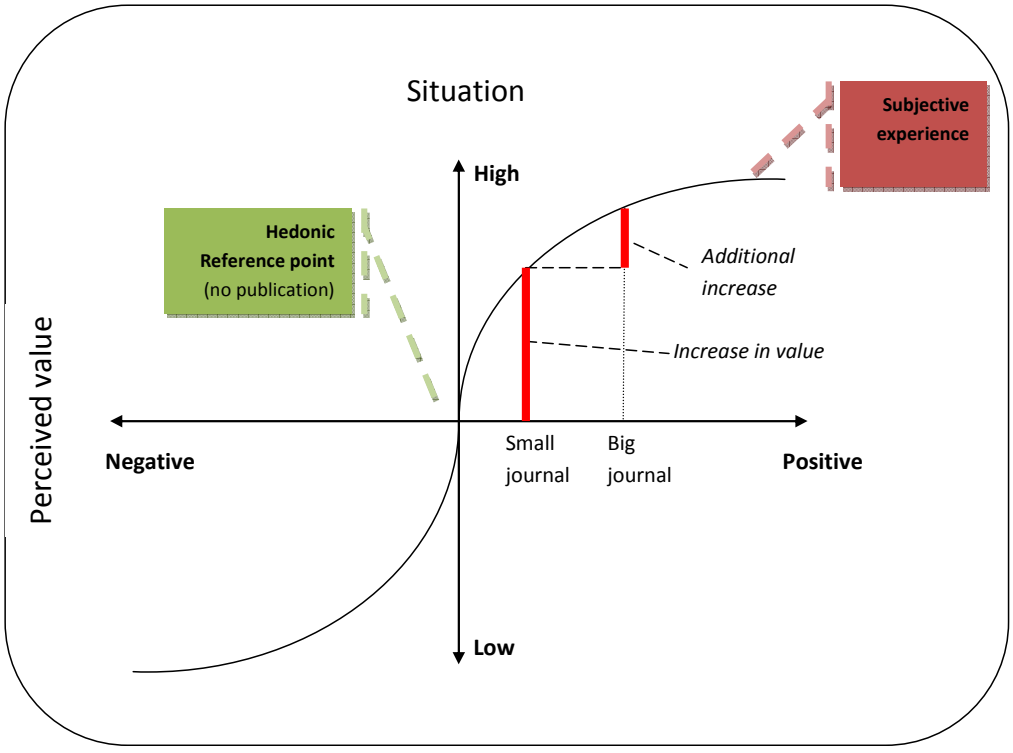


***Figure 5****. The "small journal" option has a better happiness/costs ratio and will most likely be chosen over the "big journal" option.*

However, as the joys of publishing in small journals fade away, the value and motivation to achieve higher goals increases (see figure 6). Hedonic adaptation can therefore be seen as the basis of an upward spiral towards continued improvement. To paraphrase the famous Alcoholic Anonymous' prayer, hedonic adaptation "grants us the serenity to accept the things we cannot change, the courage to change the things we can, and wisdom to know the difference".

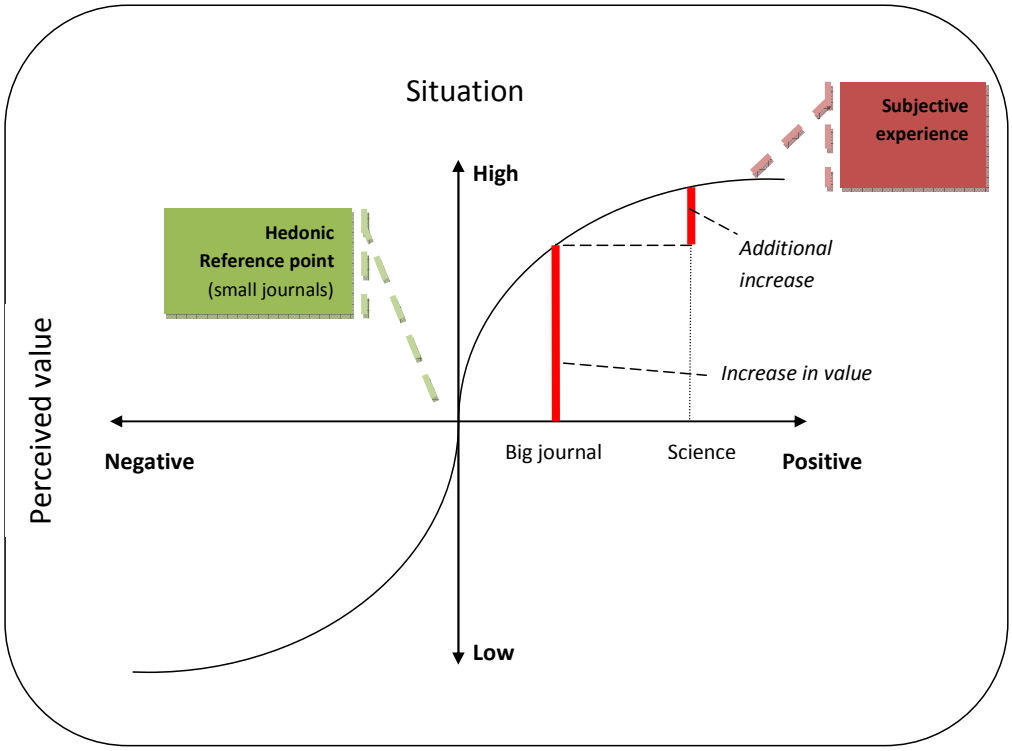


***Figure 6**. Given hedonic adaptation, the small journal option no longer brings happiness. Motivation to publish in big journals increases, while aiming at Science remains too costly for the extra value it provides.*

## 2. The Experience-Stretching Hypothesis

As previously mentioned, one of the two mechanisms through which people adapt to their positive circumstances is what Gilbert (2006) termed the experience-stretching hypothesis, that is, the proposition that having outstanding experiences undercuts enjoyment for simpler pleasures.

The roots of this hypothesis can be found in Helson's (1964) adaptation level theory according to which people's judgments of current levels of stimulation depend upon whether this stimulation exceeds or falls short of the level of stimulation to which their previous history has accustomed them. For example, the perceived brightness of a room depends on the current level of dilation of the pupil (i.e., the adaptation level), which in turn depends on previous exposure to light. A room will appear darker after exposure to the bright summer sun than it will after exposure to obscurity. Helson suggested that similar processes govern all judgments such as judgments of life satisfaction.

The transposition of adaptation level theory to the question of happiness was defined in more depth by Parducci (1968, 1995), who made mathematical predictions about the ways in which previous emotional stimuli could influence judgments. He posited that judgment of a new hedonic stimulus is jointly determined by two factors: the position and the frequency of that stimulus within one's judgmental context. Imagine, for example, that a waiter has been making 0€, 20€, 20€, 19€, and 18€ in tips a day over the last week. According to the range principle, getting a tip of 18€ the next day will be experienced as a positive event because it is above the mid-point of the stimulus range (10€). However, according the frequency principle, making 18€ will be experienced as negative because it is bellow the mode of the distribution (20€). Thus people's judgment should be crucially influenced by extreme experiences (which affect the end-point of the range) and by typical

ones (which affect the mode). The average of these two values reflects the adaptation level against which new stimuli are compared.

Over the years, the adaptation level theory has been considerably extended by many theorists to incorporate various parameters into the equation, such the rate of change in conditions (Carver & Scheier, 1990; Hsee, Abelson, & Salovey, 1991) and the time elapsed (e.g., stimuli experienced last year might not have the same impact as ones experienced last week; see Frederick & Loewenstein, 1999; Hardie, Johnson, & Fader, 1993; Ryder & Heal, 1973).

An interesting variant of the adaptation level model is Kahneman's (1999) concept of "satisfaction treadmill" or "aspiration treadmill", according to which individuals' life satisfaction is determined by the gap between their aspiration and what they achieved. Because a rise in life circumstance is followed by an increase in aspirations, self-evaluations individuals make about their subjective happiness remain constant even when their objective happiness improves. For example, someone who moves into a nicer neighbourhood gets a boost in his *objective* well-being, but the fact that he now compares his new home to higher standards (e.g., neighbours who also have bigger houses) makes his aspirations rise about the ideal house, so that his *subjective* well-being remains the same. This is true even though the new house might be objectively more pleasant to live in. Consequently, as their incomes increase, people are induced to seek continuous and ever more intense pleasures in order to maintain the same level of satisfaction (Kahneman, 1999).

Both experimental and correlational studies provide support for the fact that relative standards can influence happiness judgments. Smith, Diener, & Wedell (1989) found that students' satisfaction with hypothetical course grades and wages followed the range frequency principles of Parducci's theory. Subjects were asked to examine a set of events within a given distribution of events that supposedly had happened to them. Participants had to consider one event

at a time within the distribution and to indicate how satisfied they would be with it given all the other events they had supposedly experienced. Depending on the experimental condition, the distribution was either negatively or positively skewed. Results showed that satisfaction ratings were higher for the negatively skewed distribution compared to the positively skewed distribution. Likewise, Dermer, Cohen, Jacobsen, & Anderson (1979) found that participants who wrote about hedonically negative events occurring at the turn of the 19th century expressed greater levels of life satisfaction, whereas they reported lower levels when they had to depict the "old days" in very positive terms. Finally, similar contrast anchor effects were obtained by Strack, Schwarz, & Gschneidinger (1985) who found that, if they were viewed as distant from one's present life, recalling past positive events led participant to report less life satisfaction.

The most consistent comparison standards effects have been found in the domain of income and personal satisfaction. Even after controlling for one's absolute level of income, previous levels of income and the income of similar others predict current job satisfaction (Clark & Oswald, 1996) and income satisfaction (van Praag & Frijters, 1999). In addition, income satisfaction have been found to be negatively related to the prevailing market wage for that occupation (Capelli & Sherer, 1988) and associated with the skew and range of income in one's community (Hagerty, 2000). Clark (2003) found that unemployed individuals who lived in an area of high unemployment were more satisfied than unemployed people living in areas of low unemployment. Surprisingly, unemployed people were also more satisfied if their spouses were also unemployed despite the fact that this situation was objectively worst (because they have a less secure household income). Lastly, in an emblematic study, Brickman, Coates, and Janoff-Bulman (1978) compared major lottery winners and control individuals as regard their current happiness and their enjoyment with different mundane pleasures (e.g., talking with a friend, watching television, hearing a funny joke…). Their results show

that lottery winners were not happier than controls and reported significantly less enjoyment for the list of simple everyday joys.

In sum, there is strong theoretical and empirical support to the notion that our comparison standards—whether intra or inter-personal—influence how happy we feel with a given situation. What remains unknown, however, is *why.*

### *Experience-stretching vs. Language-squishing*

A long-standing debate has plagued hedonic adaption research for decades: Is adaptation "real" or just a matter of scale relabeling (i.e., giving a different label to the same perception). Indeed, in most previous research on hedonic adaptation, answers to questions about well-being inherently confound participants' "true" happiness with their semantic conventions, reference groups, anchors effects, and other factors that influence their interpretation of the response scale (Frederick & Loewenstein, 1999). This distinction as been coined by Gilbert (2006) "*experience-stretching* vs. *language-squishing*." As an illustration, consider for example a person who is rating his happiness with a vacation to the Belgian North Sea both before and after having experienced an amazing trip to Italy. The experience-stretching hypothesis postulates that when the North Sea is all he knows, this individual may experience a very high level of positive emotion and rate it as a perfect 10 on a happiness scale. After the outstanding vacation in Italy, however, he only enjoys the North Sea moderately and gives it a 6 (see Figure 7). But, according to the language-squishing hypothesis, the different ratings may simply reflect changes in one's interpretation and use of the scale. In this case, the Belgian vacation would still *feel* as pleasant, but the label "perfect" (i.e., the 10) is now used to describe Italy (see Figure 8).

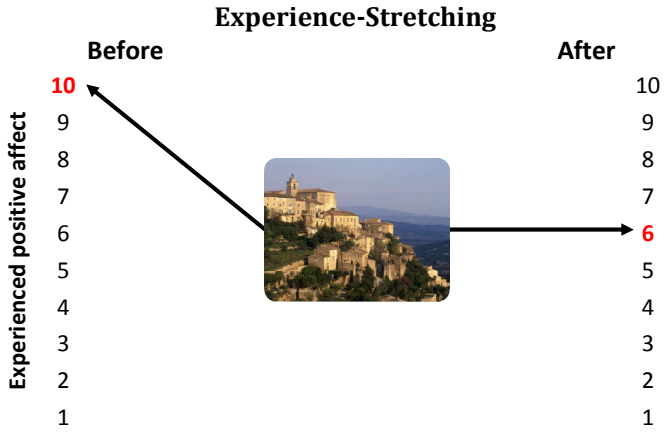


***Figure 7.*** *After having experienced something better, an event that was experienced as perfect brings less pleasure.*

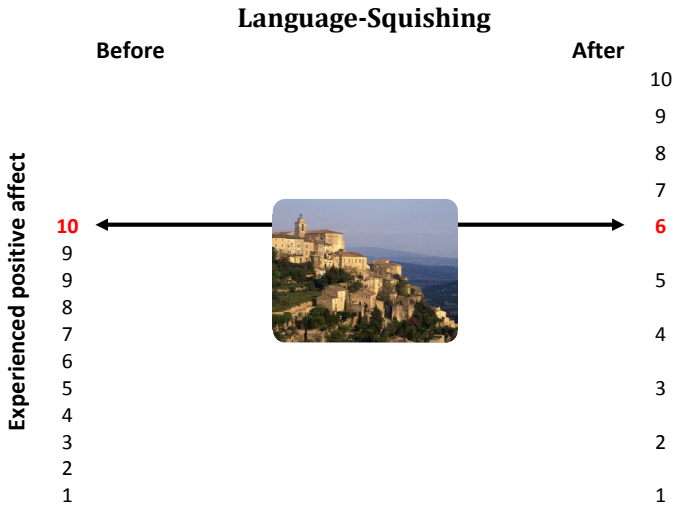


***Figure 8****. After having experienced something better, an event that was labeled as perfect in the past brings the same amount of pleasure but is described as less intense.*

Several studies have attempted to delineate the effect of experience-stretching from language-squishing by supplementing verbal responses with physiological measures that should be immune to scale norming. However, not all studies have found similar results between such objective measures and self-reports (for a review, see Frederick & Loewenstein, 1999). For example, Zisook, Shuchter, and Lyons (1987) observed important decrease in tearfulness in individuals who just lost their spouse over the course of the following year. However, there was no significant diminution in self-reported depression. Moreover, although sporadic support exists with regards to the fact that one's actual emotional experience—as opposed to the scale labels—may be changed by his or her comparison standards, nothing is know about the underlying mechanisms driving this effect.

*How does comparison alter the quality of an emotional experience?*

As we mentioned earlier, multiple mechanisms are presumed to underlie hedonic adaptation, from physiological (e.g., endocrine or brain changes) to cognitive (e.g., attention, appraisals) and behavioral (e.g., avoiding particular situations or seeking solace from friends) processes. However, it is has been disputed whether hedonic adaptation is a passive and automatic phenomenon (i.e., the person eventually adjusts to a positive situation without "doing" anything), or the result of active regulation strategies such as when one intentionally dampens their positive experiences (see Lyubomirsky, in press).

Notwithstanding the potential role of automatic physiological mechanism, we propose in the present work that the processes that lead individuals' experience to stretch after outstanding events are largely active and controlled. In particular, we postulate that the raise in comparison standards that follows such events impairs people's motivation to savor future mundane positive events. Indeed, the effects of comparison standards have been found to extend beyond satisfaction judgments, and can actually influence behavior.

For example, women's decisions to seek paid employment depend on the financial situation of significant others to which they compare to (e.g., their sister), independently of their actual household income (Neumark & Postlewaite, 1998). Recall that savoring can be considered a cognitive form of emotion regulation used to maintain and extend positive emotional experiences (Bryant, 1989, 2003), which most individuals attempt to engage on a daily basis (Gross, et al., 2006). If extraordinary positive experiences diminish individuals' motivation to up-regulate their positive experiences, the emotional benefit they reap from them will be less frequent and less intense.

Although there are dispositional differences in people's proclivity to savor positive experiences and emotions (e.g., Wood, et al., 2003), we argue that these differences are largely situational. The motivation to savor is highly dependent on the perceived value of a given situation. For example, price manipulations have been consistently shown to affect people's enjoyment of a given product. For instance, Plassmann, O'Doherty, Shiv, and Rangel (2008) showed that while they tasted wines that, contrary to reality, they believed to be different and sold at different prices, participants reported increased flavor pleasantness as well as blood-oxygen-level-dependent activity in medial orbitofrontal cortex—an area that is widely thought to encode for experienced pleasantness—if they believed the wine was worth $45 rather than $5. Likewise rareness has been shown to increase savoring. In a recent study, Kurtz (2008), manipulated the temporal distance to make college graduation seem more or less close at hand. Twice a week over the course of 2 weeks, college students were told to write about their college life, with graduation being framed as either very close or very far off. Results show that thinking about graduation as being impending led to a significant increase in college students' savoring-related behaviours and subjective well-being.

Given that savoring increases and prolong positive affect, the impairment of the motivation to savor that follows great experiences would in turn result in a decrease in happiness that cannot be accounted for by scale relabeling. It

would therefore provide direct evidence for the experience-stretching hypothesis. This hypothetical model of experience-stretching is depicted in Figure 9.

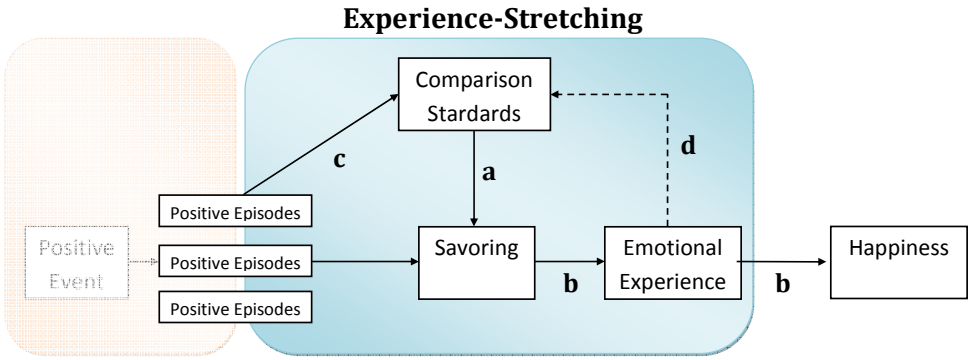


***Figure 9***. *Hypothesized model of experience-stretching.*

The examination of the "a" and "b" path, that is whether high comparison standards that outstanding experiences set impair savoring, which in turn decreases happiness, represents the core of the present work.

In addition, we aim at investigating one important related and previously unanswered question: What do individuals compare their present experience to? In other words, what are the comparison standards composed of? ("c"-path).

Lastly, we will also attempt to address the question of individual differences in the extent to which outstanding emotional experience lead to an increase in comparison standards ("d"-path).

*What are comparison standards composed of? ("c"-path)*

Decades of research in psychology have shown that human judgment is comparative in nature. Whenever we perceive, process, or evaluate information, it seems that we do it in comparison to a specific context, norm, or standard. From the mere perception of the size (e.g., Brown, 1953; Coren & Enns, 1993; Helson, 1964) and the weight of an object (Brown, 1953) to complex social stimuli such as judging the "goodness" of a person (Herr, 1986), the importance of a given social issue (Sherman, Ahlm, Berman, & Lynn, 1978), or even our own competence (Morse & Gergen, 1970), most—if all—of our judgments depend on whether the pertinent context consists of a set of high or low comparison standards. The tendency to engage in comparisons seems to be so deeply rooted in the way we process information that even subliminal stimuli that are not consciously perceived are compared to a salient standard (Dehaene et al., 1998).

But what do we automatically compare our positive experiences to? As recently pointed out by Lyubomirsky (in press), a question that is yet unresolved in the hedonic adaption literature concerns whether the stimulus to which one adapts must be an actual situation (e.g., the situation of driving a particular car, having a particular job, or drinking a specific type of wine) or a more abstract, decontextualized category of situations (e.g., identifying oneself as a luxury car driver, a young urban professional, or a wine connoisseur).

From a more cognitive psychology perspective, this distinction could result in two—though non-mutually exclusive—hypotheses with regard to the different sources of comparison standards. The first one would be that comparisons rely on episodic autobiographical knowledge: People compare their current experience with specific memories of similar past experiences, which informs their judgment on the value of the situation they are presently encountering. The second hypothesis is that the underpinnings of comparison are mainly based on semantic autobiographical knowledge. That is, individuals judge the quality of a given experience based on how they see

themselves regarding the type of experience under consideration. From that perspective, actual past experiences one had should only matter to the extent that they shape self-perceptions. The present work aims at investigating what constitute individuals' comparisons standards within the framework of adaptation to positive events by testing both of these hypotheses. Moreover, as we will further develop in the next section of this chapter, we will investigate whether anticipated future events can have the same deleterious effects as actual past events.

### *Inter-individual variability ("d"-path)*

While the large majority of people have an inclination to grow accustomed to positive experiences over time (Brickman & Campbell, 1971; Brickman, et al., 1978; Lyubomirsky, in press), recent empirical work on hedonic adaptation has shown that the speed and the extent to which people adapt can importantly vary among individuals (Diener, et al., 2006b). These individual differences in adaptation can easily be overlooked if only average trends are examined. For example, in a study examining adaptation to marriage, Lucas, et al. (2003) found that the apparent adaptation that is found when average trajectories are examined belies the considerable variability in how individuals react and adapt to marital transitions. Not everyone adapted back to his or her baseline level of life satisfaction. Instead, many people end up happier than they were before getting married, whereas a similar amount of individuals end up less happy than they started.

These findings are in line with the literature on individual differences in the propensity to drug addiction. Whereas some people tend to grow a tolerance for addictive drugs, the repeated use of drugs can produce incremental neuroadaptations, rendering specific neural systems increasingly and perhaps permanently, hypersensitive ('sensitized') for others (Robinson & Berridge, 1993).

The aforementioned studies suggest that adaptation might not the dominant response for everyone. Similarly to sensitization processes (see e.g., Groves & Thompson, 1973; Robinson & Berridge, 2001), some people appear to establish new baselines following positive events or stimuli. Although, the mechanisms underlying this variability are undoubtedly complex, random, or dependent on people's unique situations, there are reasons to believe that dispositional happiness could be intrinsically tied to the propensity to adapt to positive life circumstances. Liberman, Boehm, Lyubomirsky, & Ross (2009) found a relationship between trait levels of happiness and the tendency to treat memories of positive events as sources of enhanced or attenuated happiness. While participants high in dispositional happiness reported deriving joy from retrospectively thinking about their positive memories, participants low in dispositional happiness reported contrasting the present with these positive memories in ways that were detrimental for their enjoyment of the moment.

Although interesting, Liberman, et. al (2009)'s study was only based on self-report data and it remains unclear whether participants' sentiments about their memories actually reflects individual differences in the proneness towards experience-stretching. Clearly happier individuals might just have embraced more the positive rather than the negative items about the way they consider their memories. Therefore, a goal of the present dissertation is to examine how personal dispositions—specifically dispositional levels of happiness—could influence the extent to which one's experience stretches (i.e., one's comparison standards are altered) following outstanding positive experiences.

## 3. Adaptation to future events

Although hedonic adaptation is typically considered to be a function of past experiences, a few research suggest that it is theoretically possible for anticipated future experiences to promote adaptation to stimuli in the present—a process labelled "feedforward" (Frederick & Loewenstein, 1999). Indeed, recent research on mental time travel indicates that the ability to remember the past and the ability to project oneself into the future rely on a common set of processes by which past experiences are used to envision the future. This notion, also known as the "constructive episodic simulation hypothesis" (Schacter, Addis, & Buckner, 2008), has been supported by numerous evidences from various fields. First, developmental research suggests that episodic memory and episodic future thinking emerge approximately at the same time (around age of three to four; Atance & O'Neill, 2005a; Atance & O'Neill, 2005b; Busby & Suddendorf, 2005; Levine, 2004; Suddendorf & Busby, 2005). Second, patients with brain damages who are unable to recall their personal past typically have difficulties in imagining their future (Hassabis, Kumaran, Vann, & Maguire, 2007; Hassabis & Maguire, 2007; Klein, Loftus, & Kihlstrom, 2002; Tulving, 1985). Third, neuroimaging data suggest that common cerebral substrates might underlie past and future thinking (Addis, Wong, & Schacter, 2007; Botzung, Denkova, & Manning, 2008; D'Argembeau et al., in press; Okuda et al., 2003 ; Schacter, Addis, & Buckner, 2007; Szpunar, Watson, & McDermott, 2007). Finally, factors that influence the phenomenal characteristics associated with memories, such as personal dispositions and event features (e.g., valence, temporal distance...) yield similar effects on the phenomenal characteristics associated with projections (D'Argembeau & Van der Linden, 2004, 2006).

In addition, decades of longitudinal studies on income satisfaction conducted by van Praag and his colleagues also hint toward a potential feedforward phenomenon. These researchers showed that individuals' current satisfaction with their income depends not only on the norm set by their past income but

also on what they will earn in the future. The more participants would actually make several years later—identified by the researchers as a proxy for expected income—the less they were likely to be satisfied with a modest income in the present (see Van Praag, 2007).

## 4. Summary

Human beings are particularly prone to adapt to their life circumstances—especially the positive ones—, which may have unfortunate consequences for happiness. One of the mechanisms that explain this phenomenon of hedonic adaption relies in what Daniel Gilbert termed the Experience-Stretching Hypothesis: the notion that having outstanding experiences raise the threshold of what will be experienced as highly pleasurable in the future, thereby diminishing enjoyment of simpler pleasures.

Although appealing, this hypothesis has never been tested, partially due to methodological difficulties. Moreover, the mechanisms driving this effect remain largely unknown. In the present chapter, we proposed that experience-stretching occurs via a reduction in the motivation to savor mundane positive experiences. We further discussed the concept of comparative judgment and suggested two ways past experiences could impair people's motivation to savor: an experience-based comparison mainly relying on episodic autobiographical information and an identity-based comparison mainly relying on semantic autobiographical information. In addition, we raised the question of potential individual variability in the extent to which one's experience stretches after an outstanding experience. Finally, we suggested that adaptation might not only be a function of past experiences, but also of anticipated future experiences.

In the next chapter, we will formulate direct working hypothesis to test our model of experience-stretching empirically.

# Chapter 3

# OUTLINE OF THE PRESENT STUDIES

In the previous sections, we have presented the notion of experience-stretching: Outstanding experiences raise the threshold of what will be experienced as highly pleasurable in the future, thereby diminishing enjoyment of simpler pleasures. We have seen that such a phenomenon could explain why favourable life circumstances fail to deliver as much happiness as one might expect—a question ranking among the hottest topic of current psychological and economical research. However, as we have also seen, although intuitively appealing and solidly grounded on the theoretical level, the experience-stretching hypothesis has received only indirect empirical support. Moreover, nothing is known about the mechanisms underlying this phenomenon. The present research aims at filling this gap.

Throughout the first two chapters, we have built a model of experience-stretching according to which not only past but also future outstanding experiences could lower people's motivation to savor, that is, to up-regulate simpler positive experiences (see Figure 9, p. 49). In turn, we have argued that this impairment of savoring has detrimental consequences for happiness.

We chose to include savoring at the center of experience-stretching for several reasons. First, given the importance of emotion regulation processes for everyday experiences (Gross, et al., 2006), savoring could provide a straightforward explanation about how experience-stretching operates. Moreover, as a set of concrete strategies that people use to modulate enjoyment, savoring is independent form scale norming. Whereas answers to direct measures of well-being inherently confound participants' "true"

happiness with their semantic conventions, measures of emotion regulation are free from factors that influence the interpretation of the response scale.

In order to test this model, we will first present two studies that do not address the experience-stretching hypothesis directly but provide support to two theoretical assumptions on which our model relies: 1) that savoring is highly related to happiness, and 2) that memories of the past and anticipations of the future both relate in a similar fashion to the present self.

Specifically, Chapter 4 will present a recent paper showing the importance and the unique contribution of different savoring strategies for well-being. We will see that some positive emotion regulation strategies target emotional well-being, while others target cognitive well-being. As a result, we will show that the frequent use of multiple savoring strategies (rather than a few specific ones), is of particular importance for one's overall happiness.

Recall that we have hypothesized in the third section of Chapter 2, the existence of a feedforward phenomenon, that is, that anticipated future experiences could produce similar effects on savoring as actual past experiences. Chapter 5 will introduce a study that indirectly supports this assumption by showing that one's memories of the past and projections of the future are both similarly related to his or her current self (i.e., personality).

Building on these two studies, Chapters 6 presents a set of two studies that put our model of experience-stretching directly to the test. We will show that actual and anticipated wealth impair savoring, which, in turn, diminishes happiness.

Although compelling, the conclusions of Chapter 6 are limited by our reliance on money as a proxy for outstanding experiences. Yet, it is not certain that money is an accurate proxy: not everyone dedicates their wealth on gourmet dinners and amazing travels. The negative relationship between wealth and savoring found in Chapter 6 studies could be explained by other effects that

money can have on people such as increased stress (Gardner & Oswald, 2007) and exacerbated focus on performance (Vohs, Mead, & Goode, 2006, 2008).

Therefore, in Chapter 7, we present a series of studies showing the deleterious effect of past and future awesome experiences on savoring. Mediation analyses will confirm conclusions of Chapter 6, showing that money reduces savoring because of the outstanding experiences that money buys. These studies will also address the question of the comparison standards behind experience-stretching. As we have seen in Chapter 2, it is yet unresolved in the hedonic adaption literature whether the stimulus to which one adapts must be a specific situation or a broader decontextualized category of situations. We will see that our data suggest the later explanation.

Chapter 8 will explore the question of inter-individual variability in the propensity towards experience-stretching. We will see that dispositional happiness might play a key role in determining whether one adapts or, on the opposite, develops an exacerbated sensitivity in response to repeated exposure to positive experiences.

Finally, Chapter 9 will discuss the overall results of the above-mentioned studies in relation with previous literature. We will consider the theoretical and practical implications of our work as well as some of its limitations. We will also briefly present some ongoing follow-up studies and propose several perspectives for future work on experience-stretching

.

# Chapter 4

# POSITIVE EMOTION REGULATION AND WELL-BEING: COMPARING THE IMPACT OF EIGHT SAVORING AND DAMPENING STRATEGIES

Quoidbach, J., Berry, E.V., Hansenne, M., & Mikolajczak, M. (2010). *Personality and Individual Differences, 49*, 368–373

## Abstract

Although previous research has uncovered various ways people can savor or dampen their positive emotional experiences, the *unique* impact of each of these strategies on well-being remains unknown. The present study examines the relative impact of the main positive emotion regulation strategies on two components of well-being: positive affect (PA) and life satisfaction (LS). A total of 282 participants completed measures of PA, LS, overall happiness, and the savoring and dampening strategies they typically used. Results show that when experiencing positive events, focusing attention on the present moment and engaging in positive rumination promoted PA, whereas telling others promoted LS. In contrast, being distracted diminished PA, while focusing on negative details and engaging in negative rumination reduced LS. As the strategies targeted different components of well-being, our results further show that regulatory diversity (i.e., typically using various strategies rather than a few specific ones), was beneficial to overall happiness. Our findings suggest that there are several independent ways to make the best (or the worst) out of our positive emotions, and that the cultivation of multiple savoring strategies might be required to achieve lasting happiness.

## 1. Introduction

Is there an optimal approach to maximize our positive emotions? Recent scientific research has identified different strategies that can be utilized to maintain and increase one's positive emotional experience (i.e., *savoring*; Bryant, 1989, 2003), but also how certain strategies can decrease positive affect (i.e., *dampening*; Parrott, 1993; Wood, Heimpel, & Michela, 2003). Whereas previous studies have shown that, overall, the way we regulate our positive emotions can have a crucial impact on our well-being—savoring being beneficial while dampening detrimental (Bryant, 1989, 2003; Bryant & Veroff, 2007; Eisner, Johnson, & Carver, 2009; Gross, Richards, & John, 2006; Tugade & Fredrickson, 2007)—, little is known about the relative utility of specific strategies. The present paper aims to address this gap by examining the unique impact of the main savoring and dampening strategies on well-being.

Important individual differences exist in the way people typically regulate their positive emotions (Gross & John, 2003). For instance, Wood et al. (2003) showed that high self-esteem individuals are more likely to savor positive experiences, whereas low self-esteem individuals tend to dampen them. Similarly, people with lower incomes exhibit a stronger tendency to savor than their wealthier counterparts (Quoidbach, Dunn, Petrides, & Mikolajczak, in press). Such individual differences in the propensity to savor or dampen positive emotions may play an important role for one's overall well-being. Indeed, the broaden-and-build theory suggests that the cultivation of positive emotions helps to build lasting resources that, in turn, enhance life satisfaction, increase the likelihood of experiencing future positive emotions, and foster resilience to negative one's (Fredrickson & Branigan, 2005; Fredrickson, 1998, 2001; Tugade & Fredrickson, 2004).

What strategies do people use to regulate their positive emotions? In a recent article validating a new general measure of emotion regulation, Nelis,

Quoidbach, Hansenne, and Mikolajczak (in press) reviewed the literature on positive emotion regulation over the last 30 years. Their review suggests that indiviudals typically engage in four broad categories of dampening behaviors and four categories of saovring behaviors. Given that these strategies are the focus of the present paper, we will briefly detail them hereafter (for more information on the different strategies, see Nelis et al., 2010).

### *1.1. Savoring Strategies*

The first approach to prolonging and increasing positive emotional experiences is through *Behavioral Display*, that is, by expressing positive emotions with non-verbal behaviors. Studies have shown that the facial expression of emotion may play a causal role in the subjective experience of emotion (see e.g., Adelmann & Zajonc, 1989; Finzi & Wasserman, 2006; McIntosh, 1996; Strack, Martin, & Stepper, 1988).

A second strategy consists of efforts to *Be Present,* by deliberately directing attention to the present pleasant experience. Both correlational and experimental studies have shown that this strategy is linked with the increased intensity and frequency of positive emotions (Bryant, 2003; Erisman & Roemer, 2010).

A third strategy implies communicating and celebrating positive events with others—a strategy labeled *Capitalizing* (Langston, 1994). Capitalizing is associated with increased daily positive affect, over and above the impact of the positive event itself (Gable, Reis, Impett, & Asher, 2004; Langston, 1994) and improved immune response (Labott, Ahleman, Wolever, & Martin, 1990).

Finally individuals can engage in *Positive Mental Time Travel* (Positive MTT) by vividly remembering or anticipating positive events—two abilities that are very closely related (see e.g., Suddendorf & Corballis, 2007). Indeed, both cross-sectional and experimental studies have shown that positive MTT

predicts happiness (Bryant, Smart, & King, 2005; Havighurst & Glasser, 1972; Lyubomirsky, Sousa, & Dickerhoof, 2006; MacLeod & Conway, 2005; Quoidbach, Wood, & Hansenne, 2009).

### *1.2. Dampening strategies*

Not all reactions to positive events increase positive emotions. Sometimes purposely, often automatically, individuals can dampen their positive emotional experiences.

One such reaction is that of *Suppression* (i.e., repressing or hiding positive emotions due to shyness, sense of modesty, or fear, for example). Gross and John (2003) showed that the tendency to suppress positive emotions is negatively associated with trait positive affectivity, life satisfaction, and psychological well-being. The expressive suppression of positive emotions also bears physiological costs and leads to a decrease in the subjective enjoyment of a positive experience (Gross & Levenson, 1997).

Individuals can also dampen their positive experiences through *Distraction*, that is, by engaging in activities and thoughts—often worries—unrelated to the current positive event. The propensity to experience lapses of attention has been associated with negative consequences in terms of long-term affective well-being (Carriere, Cheyne, & Smilek, 2008).

*Fault Finding*—paying attention to the negative elements of otherwise positive situations or focusing on what could be even better—is another strategy that has been found to negatively correlate with happiness, optimism, self-esteem, and life satisfaction (Larsen & McKibban, 2008; Polman, 2009; Schwartz, et al., 2002).

Finally, people can engage in *Negative Mental Time travel* (Negative MTT), which encompasses negative reminiscence such as reflecting on the causes of

a positive event with an emphasis on external attribution (e.g., "*I got an A because the exam was really easy*") and negative anticipations of its future consequences (e.g., "*My streak of luck is going to end soon, I'd better be careful*", "*These positive feelings won't last*"). This type of cognition has been associated with lower self-esteem, greater rumination, and more severe depressive symptoms (Feldman, Joormann, & Johnson, 2008; see also Sweeney, Anderson, & Bailey, 1986).

### *1.3. The present study*

Are all of these strategies equally beneficial or detrimental to our well-being? Are they interchangeable or do they uniquely and specifically target different aspect of well-being? Whereas previous research on positive emotion regulation have examined either the effectiveness of a limited number of specific strategies (e.g., Bryant, 2003; Bryant, et al., 2005; Langston, 1994; Nezlek & Kuppens, 2008) or the consequences of the overall savoring and/or dampening abilities (e.g., Feldman, et al., 2008; Wood, et al., 2003), no study has compared the unique contribution of the main positive emotion regulation strategies to well-being. Yet, the cultivation of positive emotion has recently been promoted by an explosion of research on happiness enhancing interventions (e.g., Brown & Ryan, 2003; Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Lyubomirsky, Sheldon, & Schkade, 2005; Sin & Lyubomirsky, 2009). Therefore assessing which positive emotion regulation strategies are the most effective (or detrimental) could provide valuable insights in designing optimal well-being interventions.

Moreover, whereas well-being is typically referred as being composed of two different elements—emotional well-being (i.e., positive affect) and cognitive well-being (i.e., life satisfaction)—whose relative independence has been extensively emphasized (see Diener, Suh, Lucas, & Smith, 1999 for a review), little is known about how savoring and dampening strategies could specifically target one of these two components. Indirectly supporting this

speculation are studies showing that emotional and cognitive well-being can fluctuate independently from each other (see Diener, Lucas, & Scollon, 2006 for a review). For example, positive affect tend to decrease over the life span while life satisfaction tend to increase (Diener, et al., 2006). If certain strategies were found to be more efficient to increase emotional well-being while others more efficient to increase cognitive well-being, then *regulatory diversity* (i.e., typically using various savoring strategies) would lead to a greater general sense of happiness than *regulatory specificity* (i.e., typically using a few specific strategies). This intuitive—yet previously untested—hypothesis has been originally suggested by Mikolajczak (2009) with regards to the regulation of negative emotions: By using simultaneously or successively using different categories of regulation strategies (e.g., physio-relaxing techniques, cognitive reappraisal, problem-focused coping…), one acts on the different component of negative emotional experiences which improves the effectiveness emotion regulation.

Consequently, the purpose of the present paper is two-fold. We first examined the unique predictive validity of the main savoring and dampening strategies previously reviewed on both emotional and cognitive well-being. We then investigate whether regulation diversity is associated with higher overall happiness than regulation specificity.

## 2. Method

### *2.1. Participants*

A total of 282 participants were recruited via the Intranet of a Belgian University (73% females; $M_{age}$ = 33.6; *SD* = 13.9) and asked to complete online measures of general happiness, positive affect, and dispositional positive emotion regulation strategies. Among these participants, 82 also completed measures of life satisfaction. Participants included students (25%) and

university employees (75%), ranging all the way from custodial staff to senior administrators. Students and employees did not differ in any of the study variable.

### *2.2. Measures*

*The Typical Use of Savoring and Dampening Strategies* was assessed through the Emotion Regulation Profile-Revised (ERP-R), a vignette-based instrument measuring individuals' typical ability to regulate both negative and positive emotions (Nelis, Quoidbach, Hansenne, & Mikolajczak, 2010). Of interest in the present study was the savoring positive emotion scale, which includes six detailed descriptions of situations eliciting contentment, joy, awe, excitement, pride, and gratitude, respectively. For example, participants are asked to imagine finishing an important task (contentment), spending a romantic weekend away (joy), or discovering an amazing waterfall while hiking (awe). Each scenario is followed by eight possible reactions based the four main savoring strategies and the four dampening strategies described in the introduction. Respondents were allowed to select as many reactions as they wanted as long as they accurately reflected their typical behavior in the kind of situation described. Respondents were credited 1 point every time a specific strategy was selected and 8 scores, representing the use of each regulation strategy across the different scenarios, were then computed. The ERP-R has been shown to demonstrate good psychometric properties, including convergent, divergent, and predictive validity (see Nelis et al., 2010).

*Emotional well-being* (i.e., positive affect) was measured via the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). The positive affect subscale is comprised of 10 mood related adjectives for which subjects were asked to indicate the extent to which they were feeling each emotion on a 5-point scale ($\alpha$ =.84).

*Cognitive well-being* (i.e., life satisfaction) was measured using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), composed of 5 item scored on a 7-point scale ($\alpha$ =.90).

*Overall happiness* was assessed using the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999). This well-validated instrument composed of four 7-point items provides a global, subjective assessment of whether one is a happy or an unhappy person, that encompasses both emotional and cognitive well-being ($\alpha$ =.85).

## 3. Results

### *3.1. Unique contribution of each regulation strategy to well-being*

Means and inter-relationships between emotion regulation strategies, positive affect, and life satisfaction are presented in Table 1. Overall, the four savoring and four dampening strategies were moderately to largely correlated with each other in meaningful and theoretically congruent ways. That is, savoring strategies were positively correlated to each other while being negatively related to dampening strategies, and vice versa. In order to investigate the unique impact of each strategy on positive affect and life satisfaction, we conducted two multiple regression analyses (see Table 2). Results show that positive affect was negatively predicted by distraction, while being positively predicted by positive MTT and being present. Life satisfaction was negatively predicted by the use of fault finding and negative MTT while being positively predicted by capitalizing. Altogether the regulation strategies explained 10% and 18% of the variance in positive affect and life satisfaction, respectively. Note that none of these results were significantly moderated by the gender or the age of participants (*Ps*>.10), suggesting that savoring and dampening strategies might be as beneficial (or detrimental) for individuals of every age and gender.

**Table 1**
Means, standard deviations, and intercorrelations between the different regulation strategies and well-being variables.

| | | M (SD) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Distraction | 0.7 (1.1) | – | | | | | | | | | |
| 2 | Fault finding | 0.8 (1.0) | .30** | – | | | | | | | | |
| 3 | Negative MTT | 0.5 (0.9) | .27** | .27** | – | | | | | | | |
| 4 | Suppression | 0.6 (1.1) | .26** | .21** | .25** | – | | | | | | |
| 5 | Behavioral display | 2.8 (1.8) | −.28** | −.12* | −.07 | −.31** | – | | | | | |
| 6 | Capitalizing | 2.7 (1.8) | −.17** | −.09 | −.09 | −.25** | 57** | – | | | | |
| 7 | Being present | 3.7 (1.6) | −.38** | −.28** | −.19** | −.24** | 57** | .52** | – | | | |
| 8 | Positive MTT | 3.1 (1.7) | −.18** | −.05 | −.03 | −.01 | 48** | .53** | .52** | – | | |
| 9 | Positive affect | 3.0 (0.8) | −.25** | −.14* | −.11 | −.12* | 15* | .10 | .29** | .23** | – | |
| 10 | Life satisfaction | 5.0 (1.2) | .07 | −.31** | −.32** | −.01 | 02 | .27* | .17 | .09 | .25* | – |

* $p < .05$.
** $p < .01$.

**Table 2**
Multiple regression analyses with positive affect and life satisfaction as dependant variables and the different emotion regulation strategies as predictors.

| | Positive affect | | Life satisfaction | |
|---|---|---|---|---|
| | β | t | β | t |
| Distraction | −.14* | 2.21 | .16 | 1.33 |
| Fault finding | −.03 | 0.47 | −25* | 2.03 |
| Negative MTT | −.05 | 0.58 | −31* | 2.62 |
| Suppression | −.06 | 0.95 | .12 | 1.00 |
| Behavioral display | −.04 | 0.58 | −.12 | 0.73 |
| Capitalizing | −.12 | 1.52 | .31* | 2.01 |
| Being present | .20* | 2.45 | .05 | 0.31 |
| Positive MTT | .08* | 2.45 | −.06 | 0.38 |

*Note:* Positive affect: adjusted $R^2 = 0.10$, $p < .001$.
Life satisfaction: adjusted $R^2 = 0.18$, $p < .01$.
* $p < .05$.

### *3.2. Regulatory Diversity and Overall Happiness*

Given that our analyses revealed that the different regulation strategies have specific impact on the two facets of well-being, we verified our hypothesis that using multiple savoring strategies could be beneficial for overall happiness. First, we computed a total savoring score by adding the total number of savoring strategies selected across the six scenarios of the ERP-R. Second, we created a diversity score by counting how many different types of strategies participant used to achieve their total score (from 0 to 4). As we expected, these scores were highly correlated but not redundant ($r$ = .67, $p$< .001). This suggests that some participants could achieve the same total savoring score by either selecting a limited number of strategies in a wide range of situations, or by selecting a wide range of strategies in a limited number of situations.

We then entered total savoring scores and diversity scores (Step 1), and their interaction (Step 2) into a stepwise multiple regression analysis predicting overall happiness. Supporting our hypothesis, results show that savoring and regulatory diversity both independently significantly predicted happiness (β = .17, $t$(280) = 2.27, $p$ = .02 and β = .24, $t$(280) = 3.22, $p$< .01, respectively). As depicted in Figure 1, the interaction term was also significant, $t$(280) = 2.35, $p$ = .02, suggesting that the positive relationship between savoring and happiness was exacerbated when participants used a wider range of savoring strategies.

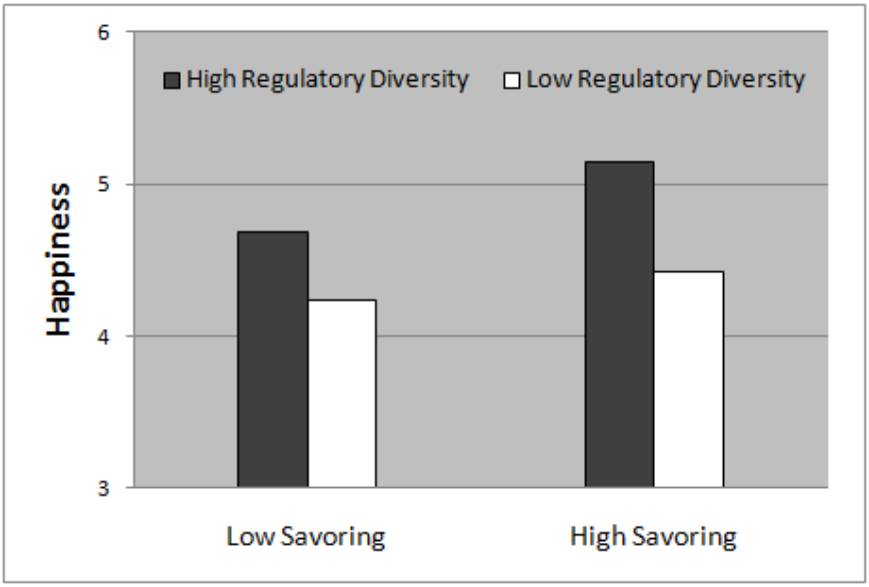


***Figure 1***. *Regulatory diversity exacerbated the relationship between savoring and happiness.*

## 4. Discussion

The present study is the first to investigate the *unique* impact of positive emotion regulation strategies on the different components that make up well-being. Consistent with our prediction, results show that, in the realm of well-being not all strategies are created equal.

Emotional well-being (i.e., positive affect) was positively predicted by being present and positive MTT, and negatively by distraction. These results suggest that high levels of daily positive emotions can mainly be achieved via two distinct—and conceptually opposite—strategies. The first consists of a mindful approach in which one focuses attention on the present moment and systematically suppresses thoughts unrelated to the current experience. The

effectiveness of this approach may be explained by the fact that people spend most of their time in a positive emotional state (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). Indeed, the best predictor of daily positive affect is the absence of alienation from the self (Csikszentmihalyi & Larson, 1987). By being present and avoiding worrying, one maximizes pre-existing positive affect. The second approach, in contrast, consists of stepping back from the present experience to mentally travel through time to remember or anticipate positive personal events. This finding is in line with previous research showing that participants who had to engage daily in 2 x 10 minutes of positive reminiscence report increases in the percentage of time they feel happy (Bryant, et al., 2005). The very different nature of these two approaches to attain emotional well-being is of interest for well-being interventions, as the importance of selecting happiness enhancing activities which are congruous with personality and lifestyle has recently been highlighted (Lyubomirsky, et al., 2005).

Cognitive well-being (i.e., life satisfaction) was positively predicted by capitalizing and negatively by fault finding and negative MTT. These findings are in line with a previous study on capitalization that showed that telling others about positive events enhances life satisfaction (Gable, et al., 2004). Although the underlying mechanisms of such an effect requires further investigation, one might hypothesize that capitalizing may promote cognitive well-being by fostering positive social interactions. By satisfying the basic human need for belongingness (Baumeister & Leary, 1995) and providing the necessary assistance when difficulties arise, positive relationships are an important determinant of life satisfaction (Diener & Diener, 1995). Furthermore, Gable et al. (2004) suggested that sharing positive experiences may allow individuals to perceive themselves positively in the eyes of others, hence boosting self-esteem and facilitating positive appraisals of one's life.

In this study, two dampening strategies appeared to be particularly detrimental to life satisfaction: fault finding and negative MTT. Findings

regarding fault finding are rather intuitive and self-explanatory. Individuals who systematically attend to imperfections and what could be better in positive situations, are of course less likely to be satisfied with their life (for similar findings, see Polman, 2009; Schwartz, et al., 2002). Similarly, the tendency to mentally re-live positive events or pre-live their future repercussions in a negative manner (i.e., external attribution of success, guilt, fear of negative consequences…) decreases life satisfaction. Again, such findings are in accordance with studies showing the key role played by future thinking in people's well-being (e.g., MacLeod & Conway, 2005; Quoidbach, et al., 2009).

It is noteworthy to mention that contrary to previous findings that showed that social sharing of positive events increases positive emotion (Gable, et al., 2004; Langston, 1994), capitalization was not associated with positive affect in our study. However, Gable and colleagues (2004) also suggested that the effect of capitalization on positive affect could be explained by the fact that sharing a positive event with others requires retelling the event, which creates an opportunity to re-experience it. Although null results should be interpreted with caution, the present findings support that hypothesis by showing that when other forms of savoring—including positive reminiscence—are controlled for, capitalizing does not have a unique effect on positive affect. A parallel can also be drawn with research on the social sharing of negative emotions that shows that telling others about one's feelings has no direct effect on emotions but rather facilitate other regulatory processes (e.g., cognitive re-appraisal, distraction, etc. ) which, in turn, help decrease distress (see Rimé, 2007 for a review).

The present findings suggest that there are several independent ways to make the best (or the worst) out of our positive emotions and that, as they target specific facets of well-being, the cultivation (or the avoidance) of all of these different strategies might facilitate lasting happiness. In support of this idea, we found that the wider the range of type of savoring strategies participants

used, the happier they reported to be, independently of their total savoring score. Consequently the happier participants were the ones that typically savored various situations using various strategies. The novel notion of regulatory diversity highlighted by this study could be of particular interest for happiness interventions. Whereas numerous self-help books and training programs focus on a specific technique (e.g., mindfulness mediation), our results suggest that one can become even happier by learning not only how to focus on the present moment but also how to proficiently step back from it while also as sharing their experiences with friends. This conclusion is consistent with studies suggesting that variety might be a key element of successful happiness enhancing activities (Lyubomirsky, et al., 2005).

In addition to fostering happiness via different routes, the expansion of people's savoring strategy repertoire might also allow the up-regulation of positive emotions in a broader range of situations, enhancing their flexibility (see Mikolajczak, 2009). For instance, if your typical savoring strategy is to share your positive experiences with your friends, improving your ability to mindfully contemplate the present moment or to relish mental simulations will help you savor positive moments even if no one is around. Hence, our findings contribute to the increasing body of evidence emphasizing the importance of the flexibility of biological and psychological processes for well-being. For example, Bonanno, Papa, Lalande, Westphal, & Coifman (2004) found that adjustment to the first two years of college depended less on regulatory strategies per se than on the ability to flexibility use different regulatory strategies in accord with situational demands. Likewise, flexibility in the levels of morning cortisol between work and rest days has been found to be a better predictor of happiness than the magnitude of these levels (Mikolajczak, et al., 2009).

Although this study breaks new ground in several ways, we acknowledge several limitations, which leave ample room for future research to probe or refine the findings. First, the sample was drawn from a University population

and future studies should investigate the effect of the different regulation strategies in a more diverse sample. Second, data were collected via self-reports. Thus, an important goal of future research lies in investigating the specific contribution of the different savoring strategies as well as the notion of regulatory diversity using experimental paradigms and more objective measures of well-being (e.g., experience-sampling, physiological markers, etc.).

Notwithstanding these limitations and the preliminary nature of our findings, our research suggests that practicing as many savoring strategies as possible, whilst avoiding the many faces that dampening can take, is likely the best way to regulate positive emotions.

## Acknowledgment

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# Chapter 5

# PERSONALITY AND MENTAL TIME TRAVEL: A DIFFERENTIAL APPROACHTO AUTONOETIC CONSCIOUSNESS

Quoidbach, J., Hansenne, M., & Mottet, C. (2008). *Consciousness and Cognition, 17*, 1082–1092.

## Abstract

Recent research on autonoetic consciousness indicates that the ability to remember the past and the ability to project oneself into the future are closely related. The purpose of the present study was to confirm this proposition by examining whether the relationship observed between personality and episodic memory could be extended to episodic future thinking and, more generally, to investigate the influence of personality traits on self-information processing in the past and in the future. Results show that Neuroticism and Harm Avoidance predict more negative past memories and future projections. Other personality dimensions exhibit a more limited influence on mental time travel (MTT). Therefore, our study provide an additional evidence to the idea that MTT into the past and into the future rely on a common set of processes by which past experiences are used to envision the future.

## 1. Introduction

‘‘Mental time travel” (MTT), i.e., the capacity to remember our past experiences and to project ourselves into possible future events, is considered as a crucial ability for human-beings (Gilbert & Wilson, 2007; Schacter, Addis & Buckner, 2007; Suddendorf & Corballis, 1997; Suddendorf & Corballis, 2007; Wheeler, Stuss & Tulving, 1997). Mental time travel importantly involves autonoetic consciousness, i.e., ‘‘the kind of consciousness that mediates an individual’s awareness of his or her existence and identity in subjective time extending from the personal past through the present to the personal future” (Tulving, 1985, p. 1). Autonoetic consciousness is thought to allow not only the subjective experience associated with re-experiencing a past event but also the ability to project oneself forward in time to mentally ‘‘pre-experience” an event (Wheeler et al., 1997). However, although the ability to consciously remember past events (i.e., episodic memory) has been extensively investigated (Tulving, 2002; Wheeler et al., 1997), relatively few studies have examined what Atance and O’Neill called ‘‘episodic future thinking,” which is ‘‘the ability to project the self forward in time to pre-experience an event” (Atance & O’Neill, 2001, p. 537). As argued by previous researchers, mental time travel into the future and into the past may rely on a common set of processes by which past experiences are used adaptively to imagine perspectives and events beyond those that emerge from the immediate environment (Atance & O’Neill, 2001; Buckner & Carroll, 2007; Hassabis & Maguire, 2007; Okuda et al., 2003; Wheeler et al., 1997). The past may indeed constrain the generation of possible and likely futures, by supplying expectancies and determining what is plausible (Johnson & Sherman, 1990). Additionally, imagining future events involves combining some basic elements (e.g., actors, objects, and actions), some of which are extrapolations from past events while others come from general semantic knowledge, to generate potential scenarios (D’Argembeau and Van der Linden, 2006).

Findings suggesting a relationship between episodic memory and episodic future thinking can be summarized as follows. First, developmental research suggests that episodic memory and episodic future thinking emerge approximately at the same time (around age of three to four) (Atance & O'Neill, 2005; Busby & Suddendorf, 2005; Levine, 2004; Suddendorf & Busby, 2005). Second, patients with brain damages who are unable to recall their personal past typically have difficulties in imagining possible future experiences (Hassabis, Kumaran, Vann & Maguire, 2007; Klein, Loftus & Kihlstrom, 2002; Tulving, 1985). Third, some functional neuroimaging data suggest that common cerebral substrates might underlie thinking about the future and past (Addis & Schacter, 2008; Addis, Wong & Schacter, 2007; Botzung, Denkova & Manning, in press; Okuda et al., 2003; Szpunar, Watson, & McDermott, 2007) although there are specific areas in the frontal pole and medial temporal lobes that are more involved with the future than with the past (Okuda et al., 2003). Finally, the factors that influence the phenomenal characteristics associated with remembering, such as the emotional valence of the events and their temporal distance from the present, have similar effects on the phenomenal characteristics associated with projecting oneself into the future (D'Argembeau and Van der Linden, 2004).

An additional important element of validation for linking past and future thinking is to investigate the relationship between MTT into the past and into the future from a personality theory perspective. This is the purpose of the present study.

The existence of relations between personality and emotion is well documented, especially between personality dimensions associated with the Behavioral Activation System (BAS) (e.g., extraversion and novelty seeking) and positive affect, and between personality dimensions associated with the Behavioral Inhibition System (BIS) (e.g., neuroticism and harm avoidance) and negative affect (Corr, 2002; Gable, Reis & Elliot, 2000; Heponiemi, Keltikangas-Jarvinen, Puttonen & Ravaja, 2003). Many studies reported also that

personality consistently modulates the interactions between emotion and cognition (Bradley & Mogg, 1994; Gomez & Gomez, 2002; Rusting, 1999). For instance, Gomez and Gomez (2002) found that high-BIS subjects generated more negative words in a word-fragmentation task, recognized more negative words in a word recognition task and recalled more negative words in a free word-recall task than low-BIS subjects, whereas high-BAS subjects displayed, recognized and recalled more positive words in the three tasks than low-BAS subjects. These results indicate that BIS is mainly associated with the processing of unpleasant information, while BAS is mainly associated with the processing of pleasant information, and more generally, that cognitive processing of emotional information is modulated by personality.

The majority of the studies on this topic investigated the relationships between personality and emotion with tasks involving mainly semantic rather than episodic memory. However, episodic memory is a central feature of autonoetic consciousness, i.e., a crucial element of self-representation in time. Indeed, a few studies have shown that neuroticism is particularly associated with the preferential processing of negative information about the self (Furnham & Cheng, 1996; Martin, Ward & Clark, 1983; Ruiz Caballero & Bermudez, 1995). However, it should be mentioned that all information related to the self is not necessarily episodic and may instead be personal semantic. Instead, episodic memory (and autonoetic consciousness) refers to memory for events that are specific in time and place that can be (p)re-experienced. Recent data also indicate that some personality dimensions are related to the phenomenology of episodic memory. Rubin and Siegler (2004) found that, of all the domains and facets of personality assessed by the NEO PI (Costa & McCrae, 1992), openness to feelings showed by far the strongest relation to the phenomenology of memory for past events, correlating with measures of belief in the accuracy of memories, sense of recollection, amount of sensory details, and feeling of emotions while remembering.

As opposed to neuroticism, neither the role of extraversion nor the other personality dimensions on positive information about the self have ever been investigated. Moreover, no study has ever investigated the role of neuroticism and extraversion on the ability to project oneself into the future. Therefore, this study aims to investigate the influence of personality traits (especially neuroticism and extraversion) on episodic past and future thinking.

More specifically, based on previous findings we hypothesize that people with high levels of neuroticism will generate a greater amount of negative projections during a verbal fluency task, i.e., the quantity task (hypothesis 1a) and will write projections with a more negative content in a story completion task, i.e., the preferential content task (hypothesis 1b). Conversely, we hypothesize that people high in extraversion will generate a greater amount of positive projections during the quantity task (hypothesis 2a) and will write projections with a more positive content in the preferential content task(hypothesis 2b). By extension, we also hypothesize to find the same links for harm avoidance (HA) and novelty seeking(NS) dimensions of Cloninger's model as these two dimensions are strongly related to neuroticism and extraversion, respectively (De Fruyt, Van De Wiele & Van Heeringen, 2000). Thus HA should be related to a greater number of negative projections (hypothesis 3a) and projections with a more negative content (hypothesis 3b) while NS should be related to a greater number of positive projections (hypothesis 4a) and projections with a more positive content (hypothesis 4b). The investigation of the influence of the other personality dimensions is purely exploratory.

As regards the phenomenal characteristics associated with MTT, we hypothesize that people with high levels of openness (hypothesis 5) and self-transcendence (ST; hypothesis 6) will report more phenomenal characteristics for both past and future. Indeed, Rubin and Siegler (2004) have found that openness was related with the phenomenology of autobiographical memory. Moreover, ST relates to imagery abilities (Cloninger, Svrakic &

Przybeck, 1993), which in turn affects phenomenal characteristics of MMT (D'Argembeau and Van der Linden, 2006). The investigation of the influence of the other personality dimensions on phenomenal characteristics is exploratory.

## 2. Methods

### *2.1. Participants*

This study was conducted on a sample of 35 healthy adults. The sample was made up of 24 women with a mean age of30.8 years (SD = 12.7) and 11 men with a mean age of 29.7 years (SD = 10.7). All participants gave written informed consent to participate in the study.

### *2.2. Materials and procedure*

Personality was assessed by the Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992) and by the Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999). The NEO PI-R is a self-rating questionnaire of 240 items measuring the five major personality dimensions: neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C). Each dimension is made up of six facets. Responses are made on a 5-pointLikert-type scale, ranging from strongly disagree to strongly agree. A validated French version of the NEO PI-R was used (Rolland, 1998). TCI-R is a 240-item self-reported questionnaire measuring four innate temperamental dimensions (novelty seeking, harm avoidance, reward dependence, and persistence) and three acquired character dimensions (self-directedness, cooperativeness and self-transcendence). Briefly, novelty seeking (NS) is the tendency to respond actively to novel stimuli leading to pursuit of rewards and escape from punishment. Harm avoidance (HA) is the tendency to inhibit responses to signals of aversive stimuli that lead to avoidance of punishment and non-reward. Reward dependence (RD) is the

tendency for a positive response to conditioned signals of reward that maintain behavior. Persistence (PS) is perseverance despite frustration and fatigue. Self-directedness (SD) is the ability of an individual to control, regulate and adapt his or her behavior to fit the situation in accord with individually chosen goals and values. Cooperativeness (C) accounts for individual differences in identification with and acceptance of other people. Self-transcendence (ST) is associated with spirituality. Responses are made on a 5-point Likert-type scale, ranging from absolutely false to absolutely right. The French version of the TCI-R has been validated and shows excellent psychometric properties (Hansenne, Delhez, & Cloninger, 2005).

MTT was assessed at three different levels, i.e., (1) in terms of quantity, (2) in terms of preferential content when people can freely remember or imagine past/future events, and (3) in terms of quality of the representations created in the mind.

*The Quantity of MTT* was assessed by an adapted version of the verbal fluency paradigm developed by MacLeod and Byrne (1996) and refers to the quantity of experiences a subject can remember and generate. In this task, participants had to think of personal experiences over six different time periods: the past/next week, including today; the past/next year; the past/next 5 to 10 years. For each time period, participants had three minutes to orally remember or generate as many positive or negative events as possible (e.g., ‘‘Please try to think of as many specific positive events that could reasonably happen to you over the next year”). Participants were informed that the responses could be trivial or important; they just had to tell whatever comes to mind. In addition, for episodic future thinking, the responses had to be events that participants knew were going to happen or events that they thought might reasonably happen. All events were tape-recorded and the number of events for each time period and valence condition was calculated for each temporal direction.

*The Preferential Contents* of MTT was assessed by a story completion task in which participants were presented with stimulus sentences and had to

write short self-related stories (10 to 15 lines) based on the content of each sentence. For instance, participants were presented with a sentence such as ‘‘I am looking out at the sunset” or ‘‘I am looking to my-self in the mirror”. Subjects had to complete a set of six stories in reference with three past events (1 positive, 1 negative, and 1 neutral) and three future events (1 positive, 1 negative, and 1 neutral). Two independent judges rated the emotional valence of each story on a 7-point scale from –3 (extremely negative) to +3 (extremely positive). Judges’ ratings for each subject were aggregated into a mean score for each temporal direction. Interjudge reliability was excellent with a Cohen’s Kappa coefficient of 0.81 (Fleiss, 1981).

*The Quality of MTT* measure was aimed to investigate the quality, i.e., the phenomenal characteristics, of time projections. Participants were asked to remember three past events and to imagine three future events from different temporal windows: an event that happened/might happen the past/next week, an event that happened/might happen the past/next year, and an event that happened/might happen the past/next five to ten years. Immediately after having remembered or imagined each event, participants had to write a very brief description of the event and then rate their subjective experience with a 7-point phenomenal characteristics rating scale adapted from D’Argembeau and Van der Linden (2004), D’Argembeau and Van der Linden (2006) Memories of past events and representations of future events were rated for visual details (1 = none, 7 = a lot), sounds (1 = none, 7 = a lot), smell/taste (1 = none, 7 = a lot), clarity of location (1 = not at all clear, 7 = very clear), clarity of the spatial arrangement of objects (1 = vague, 7 = clear and distinct), clarity of the spatial arrangement of people (1 = vague,7 = clear and distinct), clarity of the time of day (1 = not at all clear, 7 = very clear), feeling of experiencing emotions as if the event was actually happening (1 = not at all, 7 = extremely strong), emotional intensity of the event, and autonoetic consciousness, i.e., feelings of reexperiencing (or pre-experiencing) the event when remembering (or imagining) it (1 = not at all,7 = a lot). Before performing the analyses, the ratings for visual details, sounds, smell/taste, clarity of location, clarity of spatial arrangement of objects and clarity of

spatial arrangement of people were averaged into a general quality of representation measure.

The order of time period and valence of events in which participant had to project for all MTT measures has been counterbalanced through the whole sample.

Additional measures were included to control some potentially extraneous variables.

*A general verbal fluency task* (Cardebat, Doyon, Puel, Goulet, & Joanette, 1990) was used to control for differences in terms of general cognitive fluency (both phonologic and semantic) in the quantity of MTT assessment. The phonologic fluency task involved asking the participant to report aloud as many words in one minute as they could think of beginning with the letter ‘‘p”, excluding proper nouns, numbers, the same word with a different suffix, and repetitions. The semantic fluency task involved asking the participant to report aloud as many animal names as they could think of in one minute.

*The Positive and Negative Affect Schedule* (Watson, Clark, & Tellegen, 1988) was used to control the effect of mood. The PANAS is a self-report measure of mood in the present moment. It consists of a list of 20 mood related adjectives, for which participants are asked to indicate the extent to which they feel this way presently on a 5-point scale where 1 = ‘‘very slightly or not at all” and 5 = ‘‘extremely”. The scale yields two subscales of positive affect (PA) and negative affect (NA), which have been found to be largely uncorrelated and show good internal and test–retest reliability (Watson et al., 1988).

### *2.3. Statistical analyses*

The effect of gender, age, and conditions (i.e., the order of time period to which subjects were asked to answer) on the three measures of MTT were analysed

using MANOVAs. The impact of personality was assessed using multiple regression analysis for all tasks.

## 3. Results

### *3.1. Content of the events*

The amount of positive and negative events generated in the quantity task was summed across time periods (i.e., one week, one year, five to ten years). To give an idea of the content of the events that were recalled and imagined in the present study, we classified the descriptions of events into broad categories: health and physical appearance, family, romance and sex, social relationships, money and material goods, work, leisure, reflexivity (e.g., remembering being thinking about something), and finally ‘‘other” for events that could not be classified in the above categories. Percentages of events in each condition for each category are presented in Table 1.

| | **PAST** | | **FUTURE** | |
|---|---|---|---|---|
| | Positive | Negative | Positive | Negative |
| **Health & Physical appearance** | 3% | 7% | 5% | 15% |
| **Family** | 15% | 28% | 22% | 27% |
| **Romance &Sex** | 12% | 13% | 11% | 10% |
| **Social relationships** | 16% | 11% | 11% | 7% |
| **Money & Material goods** | 4% | 8% | 9% | 11% |

| | | | | |
|---|---|---|---|---|
| **Work** | 23% | 21% | 22% | 23% |
| **Leisure** | 23% | 9% | 18% | 5% |
| **Reflexivity** | 3% | 1% | 3% | 1% |
| **Other** | 1% | 1% | 0% | 1% |

***Table 1***. *Percentages of events in each category for each time period considered during interviews.*

### *3.2. Gender and age*

Results from multivariate analysis do not show any significant effect of gender on the quantity task [F(3, 31) = 1.69; p = .19], the preferential content task [F(2, 32) = 1.87; p = .17], or the quality task [F(20, 14) = 1.14; p = .40]. As regards age, regression analysis do not show any effect either on the number of reported events [F(3, 31) = 0.49; p = .69], on the preferential content task [F(2, 32) = 2.90; p = .07], or the quality task [F(20, 14) = 1.38; p = .27].

### *3.3. Effect of condition*

Results from multivariate analysis yield no significant effect of the order of presentation of positive versus negative events and of the temporally close versus distant events time period to which subjects were asked to answer (e.g., starting with the positive future rather than the negative past) on the quantity task [F(9, 71) = 1.21; p = .30], on the preferential content task [F(22, 44) = 0.94; p = .55], or on the quality task [F(60, 37) = 0.79; p = .80].

### *3.4. Personality and Quantity of MTT*

Results from multiple regression analysis with the amount of generated events in the four conditions (i.e., negative past, positive past, negative future,

and positive future) as dependent variables and the five dimensions of NEO PI-R as predictors are presented in Table 2. Results yield a significant effect of neuroticism on the number of generated negative future events[3]. The effects of other personality dimensions, including extraversion, on the numbers of projections were not significant in any condition.

When looking at specific time periods separately (i.e., next week, next year, and next five to ten years), results show a significant effect of neuroticism for all time periods in the future negative condition (a week: $p < .01$; a year: $p = .05$; 5 to10 years: $p = .02$). Other personality dimension did not predict the number of event in any time period and condition.

Table 3 provides results from multiple regression analysis with the amount of generated events in the four conditions as dependent variables and the seven dimensions of TCI-R as predictors. No significant effects of Cloninger's dimensions of personality on the number of generated events were found for any condition though there is a trend toward significance ($p = .09$) for an effect of harm avoidance on negative projections in the future. When looking at specific time periods separately, results show no significant effect of TCI-R dimension in any condition either.

Additional regression analysis including mood (i.e., PANAS) as well as phonologic and semantic fluencies as predictors were conducted for both NEO PI-R and TCI-R analysis. Including these variables does not induce any modification in the results thus revealing the absence of effect of mood on the

[3] Though usually considered as metric, personality measures use ordinal scales. Therefore we additionally conducted nonparametric analyses (i.e. rank-order correlations). Results show that neuroticism is also related to the amount of negative future projections (Spearman R= .31; p=0.07) even if the correlation doesn't reach the level of significance.

number of generated event in all conditions and the independence of the quantity task with regard to the general verbal fluency.

**Table 2**
Multiple regression analysis with the number of generated events in the four conditions as dependent variables and the five dimensions of NEO PI-R as predictors

| | Past | | | | | | Future | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Positive | | | Negative | | | Positive | | | Negative | | |
| | β | t(29) | p | β | t(29) | p | β | t(29) | p | β | t(29) | p |
| Neurcticism | −0.04 | −0.20 | .84 | 0.19 | 0.92 | .36 | 0.04 | 0.20 | .84 | 0.49 | 2.65 | .01 |
| Extraversion | 0.15 | 0.62 | .54 | 0.06 | 0.25 | .80 | 0.20 | 0.86 | .40 | 0.23 | 1.16 | .25 |
| Openness | 0.05 | 0.21 | .84 | −0.13 | −0.55 | .58 | −0.09 | −0.38 | .71 | −0.25 | −1.20 | .24 |
| Agreeableness | 0.04 | 0.17 | .86 | 0.04 | 0.22 | .83 | −0.04 | −0.21 | .84 | −0.09 | −0.50 | .62 |
| Conscientiousness | −0.09 | −0.36 | .72 | −0.21 | −0.92 | .36 | −0.11 | −0.48 | .64 | −0.03 | −0.13 | .90 |

*Note*. Positive past: Adjusted $R^2 = -0.14$. $p = .96$; Negative past: Adjusted $R^2 = -0.01$. $p = .49$; Positive future: Adjusted $R^2 = -0.12$. $p = .91$; Negative future: Adjusted $R^2 = 0.18$. $p = .05$.

**Table 3**
Multiple regression analysis with the number of generated events in the four conditions as dependent variables and the seven dimensions of TCI-R as predictors

| | Past | | | | | | Future | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Positive | | | Negative | | | Positive | | | Negative | | |
| | β | t(27) | p | β | t(27) | p | β | t(27) | p | β | t(27) | p |
| Novelty seeking | 0.14 | 0.61 | .55 | 0.21 | 1.01 | .32 | 0.18 | 0.84 | .41 | 0.26 | 1.31 | .20 |
| Harm avoidance | −0.23 | −0.82 | .42 | 0.24 | 0.88 | .39 | −0.05 | −0.17 | .87 | 0.44 | 1.74 | .09 |
| Reward dependence | −0.15 | −0.58 | .57 | −0.31 | −1.31 | .20 | −0.03 | −0.11 | .91 | 0.10 | 0.46 | .65 |
| Persistence | 0.03 | 0.13 | .89 | −0.05 | −0.22 | .83 | 0.22 | 0.99 | .33 | 0.24 | 1.20 | .24 |
| Self-directedness | −0.26 | −0.97 | .34 | −0.26 | −1.02 | .32 | −0.36 | −1.38 | .18 | −0.32 | −1.34 | .19 |
| Cooperativeness | 0.26 | 0.89 | .38 | 0.23 | 0.81 | .42 | −0.02 | −0.06 | .95 | −0.19 | −0.73 | .47 |
| Self-transcendence | 0.18 | 0.93 | .36 | 0.11 | 0.61 | .54 | 0.23 | 1.22 | .23 | 0.09 | 0.54 | .60 |

Note. Positive past: Adjusted $R^2 = -0.10$. $p = .78$; Negative past: Adjusted $R^2 = 0.01$. $p = .43$; Positive future: Adjusted $R^2 = 0.05$. $p = .62$; Negative future: Adjusted $R^2 = 0.13$. $p = .15$.

### *3.5. Personality and Preferential Content of MTT*

The results of the two multiple regression analysis assessing the effects of NEO PI-R and TCI-R dimensions on the valence of self-related stories in the past and in the future are presented in Tables 4 and 5, respectively. Results show a significant negative effect of neuroticism on the valence of both past ($\beta$= -0.40; $p<0.05$) and future ($\beta$ = -0.49; $p<0.01$) self-related stories. Harm avoidance was also found to be negatively related to the valence of the past ($\beta$= -.61; $p<0.05$) and future ($\beta$= -0.64; $p<0.01$) stories[4]. As for the quantity task, the predicted effects of extraversion, novelty seeking, and self-directedness on positive affect in the story completion task were not found.

Additional regression analysis including mood as predictor were conducted for both NEO PI-R and TCI-R analysis. Including this variable does not induce any modification in the results thus confirming the absence of effect of mood on the valence and specific emotions in the story completion task.

[4] Non parametric analyses show significant correlations between neuroticism and the valence of past (Spearman R= -.40; $p<0.05$) and future (Spearman R = -.47; $p<0.01$) stories. Though in line with parametric analyses, correlations between harm avoidance and the valence of past and future stories were not significant (Spearman R= -.30; p=0.08 and Spearman R= -.23; p=0.19, respectively).

**Table 4**
Multiple regression analysis with the valence of self-related stories in the past and in the future as dependent variables and the five factors of NEO PI-R as predictors

| NEO PI-R | Past | | | Future | | |
|---|---|---|---|---|---|---|
| | β | t | p | β | t | p |
| Neuroticism | −0.40 | −2.14 | .04 | −0.49 | −2.70 | .01 |
| Extraversion | 0.22 | 1.03 | .31 | 0.07 | 0.36 | .72 |
| Openness | −0.17 | −0.78 | .44 | −0.27 | −1.32 | .20 |
| Agreeableness | −0.00 | −0.00 | 1.00 | 0.15 | 0.88 | .39 |
| Conscientiousness | −0.19 | −1.00 | .32 | −0.01 | −0.07 | .95 |

Note. Adjusted $R^2$ for NEO PI-R and Past = 0.08; $p = 0.20$. Adjusted $R^2$ for NEO PI-R and Future = 0.14; $p = 0.09$.

**Table 5**
Multiple regression analysis with the valence of self-related stories in the past and in the future as dependent variables and the seven dimensions of TCI-R as predictors

| TCI-R | Past | | | Future | | |
|---|---|---|---|---|---|---|
| | β | t | p | β | t | p |
| Novelty seeking | −0.25 | −1.13 | .27 | −0.37 | −1.85 | .08 |
| Harm avoidance | −0.61 | −2.40 | .02 | −0.64 | −2.71 | .01 |
| Reward dependence | 0.25 | 1.09 | .28 | 0.42 | 2.00 | .06 |
| Persistence | −0.05 | −0.23 | .82 | −0.30 | −1.56 | .13 |
| Self-directedness | −0.38 | −1.63 | .12 | −0.08 | −0.37 | .71 |
| Cooperativeness | 0.16 | 0.63 | .54 | −0.00 | −0.02 | .98 |
| Self-transcendence | −0.07 | −0.42 | .68 | 0.12 | 0.75 | .46 |

*Note.* Adjusted $R^2$ for TCI-R and past = 0.02; $p = .40$. Adjusted $R^2$ for TCI-R and future = 0.16; $p = .11$.

### *3.6. Personality and Quality of MTT*

The results of the regression analysis assessing the effects of NEO PI-R and TCI-R dimensions on the phenomenal characteristics associated to MTT in the past and in the future are presented in Tables 6 and 7, respectively. Results in Table 6 show that neuroticism positively predicts the quality of memories for negative events. Moreover, conscientiousness also positively predicts the quality of representations in the positive future, negative future and negative past conditions as well as the coherence of imagined positive future events and the emotional intensity of both positive and negative future events. However, openness did not significantly relate to any phenomenal characteristics[5].

Concerning the TCI-R dimensions, results in Table 7 show that novelty seeking negatively predicts the emotional intensity of past and future positive events. Novelty seeking also positively predicts the amount of autonoetic consciousness, i.e., the feeling of mentally travelling through time and experiencing the event as if it was happening, only in the positive future condition. Autonoetic consciousness is also positively predicted by cooperativeness in the positive future, negative future and negative past conditions and there is a trend toward significance for the positive past condition (β=0.41; p=0.06). Additionally, cooperativeness also predicts the

[5] Non parametric analyses were in line with parametric findings regarding conscientiousness (C). This dimension significantly correlated with Quality of representation for positive (.51**) and negative future events (.43*) as well as negative past events (.52**). C also correlated with Coherence for positive future events (.59***). However, the relationships between C and Emotional intensity for positive (.28, p=0.10) and negative (.27, p=0.11) future events did not reach the level of significance. The relationships between neuroticism and Emotional intensity for negative future events (.25, p=0.15) as well as Quality of representation for negative past events (.01, p= 0.97) were not significant. Note: *p<0.05; **p<0.01; ***p<0.001.

degree to which subjects tend to feel emotions when imagining positive future events as well as the quality of representation for positive past events. At last, persistence is a significant predictor of coherence of generated events for both positive and negative past events. Conversely, no links were found between phenomenal characteristics and self-transcendence[6].

Additional regression analysis including mood as predictor were conducted for both NEO PI-R and TCI-R analysis. Including this variable does not induce any modification in the results thus confirming the absence of effect of mood on the phenomenal characteristics of generated events.

[6] Non parametric analyses were globally consistent with parametric results. NS negatively correlated with Emotional intensity for positive future (-.44**) and positive past events (-.39*). However, the relationship between NS and Autonoetic consciousness for positive future events was not significant (-.15, p=0.40). Regarding the relationships between Ps and Coherence, results also show a significant positive correlation for positive past events (.39*) and a trend toward significance for negative past events (.31, p= 0.07). Finally, CO significantly correlated with Pre-experiencing emotions (.36*) and Autonoetic consciousness (.40*) for positive future events as well as with Autonoetic consciousness for negative past events (.40*). Correlations between CO and Autonoetic consciousness for negative future events (.29, p=0.09) as well as with Quality of representation for positive past events (.19, p= 0.29) did not reach the level of significance. Note: *p<0.05; **p<0.01; ***p<0.001.

**Table 6**
Multiple regression analysis with the phenomenal characteristics associated with MTT in the past and in the future as dependent variables and the five factors of NEO PI-R as predictors

| | Adjusted $R^2$ | $p$ | N | E | O | A | C |
|---|---|---|---|---|---|---|---|
| | | | Positive future events | | | | |
| Quality of representation | 0.15 | .08 | $\beta = -0.05$ | $\beta = -0.03$ | $\beta = 0.17$ | $\beta = -0.01$ | $\beta = 0.45^{*}$ |
| Coherence | 0.22 | .04 | $\beta = 0.12$ | $\beta = 0.11$ | $\beta = 0.11$ | $\beta = 0.10$ | $\beta = 0.52^{**}$ |
| Pre/re experiencing emotions | 0.09 | .18 | $\beta = 0.03$ | $\beta = -0.27$ | $\beta = 0.36$ | $\beta = 0.08$ | $\beta = 0.23$ |
| Emotional intensity | 0.09 | .19 | $\beta = 0.32$ | $\beta = -0.21$ | $\beta = 0.07$ | $\beta = 0.00$ | $\beta = 0.44^{*}$ |
| Autonoetic consciousness | 0.17 | .07 | $\beta = -0.07$ | $\beta = -0.30$ | $\beta = 0.37$ | $\beta = 0.09$ | $\beta = 0.32$ |
| | | | Negative future events | | | | |
| Quality of representation | 0.18 | .06 | $\beta = 0.19$ | $\beta = 0.25$ | $\beta = 0.08$ | $\beta = 0.21$ | $\beta = 0.40^{*}$ |
| Coherence | 0.08 | .19 | $\beta = 0.15$ | $\beta = 0.28$ | $\beta = -0.00$ | $\beta = 0.31$ | $\beta = 0.21$ |
| Pre/re experiencing emotions | −0.08 | .75 | $\beta = 0.25$ | $\beta = 0.19$ | $\beta = -0.03$ | $\beta = -0.02$ | $\beta = 0.22$ |
| Emotional intensity | 0.05 | .26 | $\beta = 0.40^{*}$ | $\beta = 0.12$ | $\beta = -0.29$ | $\beta = -0.19$ | $\beta = 0.44^{*}$ |
| Autonoetic consciousness | 0.04 | .30 | $\beta = 0.21$ | $\beta = -0.20$ | $\beta = 0.32$ | $\beta = -0.08$ | $\beta = 0.33$ |
| | | | Positive past events | | | | |
| Quality of representation | 0.06 | .25 | $\beta = 0.04$ | $\beta = 0.18$ | $\beta = 0.17$ | $\beta = 0.12$ | $\beta = 0.25$ |
| Coherence | 0.29 | .01 | $\beta = 0.07$ | $\beta = -0.39$ | $\beta = 0.28$ | $\beta = 0.03$ | $\beta = 0.30$ |
| Pre/re experiencing emotions | 0.07 | .23 | $\beta = -0.01$ | $\beta = -0.38$ | $\beta = 0.32$ | $\beta = 0.08$ | $\beta = 0.18$ |
| Emotional intensity | 0.02 | .35 | $\beta = -0.06$ | $\beta = -0.26$ | $\beta = -0.06$ | $\beta = 0.07$ | $\beta = 0.27$ |
| Autonoetic consciousness | −0.03 | .55 | $\beta = 0.20$ | $\beta = -0.11$ | $\beta = 0.05$ | $\beta = 0.05$ | $\beta = 0.34$ |
| | | | Negative past events | | | | |
| Quality of representation | 0.29 | .01 | $\beta = 0.36^{*}$ | $\beta = 0.34$ | $\beta = -0.11$ | $\beta = -0.13$ | $\beta = 0.67^{***}$ |
| Coherence | 0.24 | .02 | $\beta = 0.21$ | $\beta = 0.32$ | $\beta = 0.27$ | $\beta = 0.10$ | $\beta = 0.28$ |
| Pre/re experiencing emotions | 0.01 | .40 | $\beta = 0.29$ | $\beta = 0.07$ | $\beta = -0.13$ | $\beta = 0.18$ | $\beta = 0.18$ |
| Emotional intensity | −0.02 | .51 | $\beta = 0.31$ | $\beta = 0.32$ | $\beta = -0.04$ | $\beta = 0.13$ | $\beta = 0.01$ |
| Autonoetic consciousness | 0.03 | .33 | $\beta = 0.21$ | $\beta = -0.10$ | $\beta = 0.03$ | $\beta = 0.31$ | $\beta = 0.12$ |

*Note.* $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$; N. Neuroticism; E. Extraversion; O. Openness; A. Agreeableness; C. Conscientiousness.

**Table 7**
Multiple regression analysis with the phenomenal characteristics associated with MTT in the past and in the future as dependent variables and the seven factors of TCI-R as predictors

| | Adjusted $R^2$ | $p$ | NS | HA | RD | Ps | SD | C | ST |
|---|---|---|---|---|---|---|---|---|---|
| | | | Positive future events | | | | | | |
| Quality of representation | 0.01 | .41 | $\beta = -0.31$ | $\beta = -0.28$ | $\beta = -0.15$ | $\beta = 0.09$ | $\beta = -0.02$ | $\beta = 0.42$ | $\beta = -0.21$ |
| Coherence | 0.02 | .40 | $\beta = -0.20$ | $\beta = 0.13$ | $\beta = 0.20$ | $\beta = 0.29$ | $\beta = 0.27$ | $\beta = -0.22$ | $\beta = 0.09$ |
| Pre/re experiencing emotions | 0.26 | .03 | $\beta = -0.37$ | $\beta = -0.07$ | $\beta = -0.33$ | $\beta = 0.21$ | $\beta = 0.06$ | $\beta = 0.58^{**}$ | $\beta = -0.10$ |
| Emotional intensity | 0.05 | .32 | $\beta = -0.44^{*}$ | $\beta = 0.10$ | $\beta = -0.02$ | $\beta = 0.23$ | $\beta = -0.10$ | $\beta = -0.11$ | $\beta = 0.06$ |
| Autonoetic consciousness | 0.32 | .01 | $\beta = -0.39^{*}$ | $\beta = -0.26$ | $\beta = -0.22$ | $\beta = 0.10$ | $\beta = 0.17$ | $\beta = 0.57^{**}$ | $\beta = -0.16$ |
| | | | Negative future events | | | | | | |
| Quality of representation | 0.05 | .30 | $\beta = 0.21$ | $\beta = 0.25$ | $\beta = 0.22$ | $\beta = 0.21$ | $\beta = 0.23$ | $\beta = 0.25$ | $\beta = 0.17$ |
| Coherence | −0.11 | .81 | $\beta = -0.17$ | $\beta = -0.33$ | $\beta = 0.20$ | $\beta = -0.03$ | $\beta = -0.12$ | $\beta = 0.17$ | $\beta = -0.18$ |
| Pre/re experiencing emotions | −0.07 | .68 | $\beta = -0.12$ | $\beta = -0.03$ | $\beta = -0.16$ | $\beta = -0.05$ | $\beta = -0.03$ | $\beta = 0.40$ | $\beta = -0.28$ |
| Emotional intensity | 0.00 | .44 | $\beta = -0.26$ | $\beta = -0.02$ | $\beta = 0.13$ | $\beta = -0.03$ | $\beta = -0.10$ | $\beta = -0.17$ | $\beta = -0.31$ |
| Autonoetic consciousness | 0.04 | .32 | $\beta = -0.21$ | $\beta = -0.03$ | $\beta = -0.25$ | $\beta = 0.17$ | $\beta = -0.01$ | $\beta = 0.50^{*}$ | $\beta = -0.14$ |
| | | | Positive past events | | | | | | |
| Quality of representation | 0.01 | .43 | $\beta = -0.14$ | $\beta = -0.22$ | $\beta = -0.23$ | $\beta = 0.04$ | $\beta = -0.03$ | $\beta = 0.53^{*}$ | $\beta = -0.23$ |
| Coherence | 0.11 | .18 | $\beta = -0.25$ | $\beta = 0.08$ | $\beta = 0.28$ | $\beta = 0.45^{*}$ | $\beta = 0.00$ | $\beta = -0.08$ | $\beta = 0.06$ |
| Pre/re experiencing emotions | 0.24 | .04 | $\beta = -0.33$ | $\beta = 0.11$ | $\beta = -0.22$ | $\beta = 0.17$ | $\beta = 0.24$ | $\beta = 0.40$ | $\beta = 0.00$ |
| Emotional intensity | 0.17 | .10 | $\beta = -0.59^{**}$ | $\beta = -0.11$ | $\beta = -0.14$ | $\beta = 0.05$ | $\beta = -0.04$ | $\beta = 0.26$ | $\beta = -0.06$ |
| Autonoetic consciousness | 0.30 | .02 | $\beta = -0.28$ | $\beta = 0.24$ | $\beta = -0.13$ | $\beta = -0.17$ | $\beta = -0.17$ | $\beta = -0.41$ | $\beta = -0.27$ |
| | | | Negative past events | | | | | | |
| Quality of representation | −0.04 | .58 | $\beta = -0.06$ | $\beta = 0.20$ | $\beta = 0.01$ | $\beta = 0.31$ | $\beta = 0.19$ | $\beta = -0.02$ | $\beta = -0.13$ |
| Coherence | 0.12 | .16 | $\beta = -0.17$ | $\beta = -0.23$ | $\beta = 0.31$ | $\beta = 0.41^{*}$ | $\beta = -0.24$ | $\beta = 0.05$ | $\beta = 0.15$ |
| Pre/re experiencing emotions | 0.10 | .19 | $\beta = -0.24$ | $\beta = 0.20$ | $\beta = -0.05$ | $\beta = -0.13$ | $\beta = 0.09$ | $\beta = -0.33$ | $\beta = -0.22$ |
| Emotional intensity | −0.07 | .68 | $\beta = -0.14$ | $\beta = -0.31$ | $\beta = -0.09$ | $\beta = -0.01$ | $\beta = -0.45$ | $\beta = 0.52$ | $\beta = -0.03$ |
| Autonoetic consciousness | 0.27 | .02 | $\beta = -0.23$ | $\beta = 0.10$ | $\beta = -0.11$ | $\beta = -0.20$ | $\beta = 0.04$ | $\beta = 0.63^{**}$ | $\beta = -0.27$ |

*Note.* $^{*}p < .05$; $^{**}p < .01$; NS, Novelty seeking; HA, Harm avoidance; RD, Reward dependence; PS, Persistence; SD, Self-directedness; CO, Cooperativeness; ST, Self-transcendence.

# 4. Discussion

The purpose of the present study was to determine whether the relationship observed between neuroticism and episodic memory could be extended to episodic future thinking and, more generally, to investigate the influence of the other personality traits on self-information processing in the past and in the future. The main results are (1) that neuroticism is related to negative events, particularly future events; and (2) that harm avoidance is related to the content of negative past and future events.

## *4.1. Personality and MMT in term of quantity*

We first predicted that people with high levels of neuroticism would generate a greater amount of negative future projections during the quantity task (hypothesis 1a). Results gave support to this hypothesis as people with high neuroticism generate more negative future events than emotionally stable subjects in the verbal fluency task. This finding is in agreement with previous studies showing that subjects with high neuroticism preferentially remember negative self-information (Martin et al., 1983; Ruiz Caballero & Bermudez, 1995) and experience more negative emotions (McCrae & Costa, 1991) as well as with the study of MacLeod and Salaminiou (2001) where anxious individuals were differentiated from controls by an increase in negative anticipated experiences. Neuroticism seems to play a role in both past and future MTT, adding therefore new evidences to the idea that these two abilities rely on similar mechanisms. However, our results did not confirm the relationship between neuroticism and negative memories. One possible explanation could be that subjects in our sample had relatively average scores on this trait and one can reasonably think that the relationship would have appeared in a more scatter sample. This absence of results might also suggest that the effect of neuroticism on MTT is more robust for the future than for the past. This makes sense considering that from an evolutionary perspective, it is only the present and the future, not how we represent the past, that matters

(Gilbert & Wilson, 2007; Suddendorf & Corballis, 2007). Moreover, the relationship between neuroticism and retrieval of episodic memories is constrained by reality, i.e., the actual events a person experiences, whereas as regards episodic future thinking, the effect of neuroticism might be more direct. It is also noteworthy to mention that, though some studies have shown that the effect of neuroticism on memory retrieval was affected by mood (Bradley & Mogg, 1994; Kuiper & MacDonald, 1982), while other studies did not (Lloyd & Lishman, 1975; Martin et al., 1983; Ruiz Caballero, & Bermudez, 1995), and that the ability to generate future events was significantly altered by changes in mood(Hepburn, Barnhofer, & Williams, 2006), the present finding show an impact of neuroticism on negative future thinking even when mood is controlled.

Beside neuroticism, results do not show any relationship between either the NEO PI-R or the TCI-R and the number of memories or projections. However, several lines of evidence suggest that extraversion is associated with positive emotion (Hotard, McFatter, McWhirter & Stegall, 1989; McCrae & Costa, 1991; Meyer & Shack, 1989; Williams, 1981) and Larsen and Ketelaar (1991) found that extraverts show heightened emotional reactivity when imagining agreeable events. Therefore, we expected that extraversion and, by extension, novelty seeking could be related to the number of positive memories or projections (hypothesis 2a and 4a, respectively). Nevertheless, in the above studies, subjects had to imagine standard events developed by the authors and not personal events. Thus, one possible explanation of the absence of significant effect is that relationships between extraversion and positive emotions could be principally observed when dealing with semantic information (Rusting, 1999) or, at least, does not imply episodic processing. Indeed, extraverts are mainly oriented toward external stimulations and therefore less oriented toward themselves. Additionally, one could also have imagined that agreeableness could be positively related to the number of positive memories/projections as agreeable people tend to experience more positive emotion and that conscientiousness could be positively related to the

number of positive future projections as conscientious people tend to plan for future in a more considered way. Results of the present study suggest that, beside neuroticism, personality dimensions do not play an important role in MTT as regards the quantity of memory/projection an individual can generate.

### *4.2. Personality and preferential content of MTT*

Along with the number of memories/projections a person can generate in a given amount of time, a second important aspect of MTT involves the type of memories/projections that comes preferentially to people's mind when asked to engage in MMT. Results support hypothesis 1b showing that neuroticism is a significant predictor of the valence of self-related stories for both past and future conditions. Moreover, TCI-R dimension of harm avoidance also has the same negative impact on the valence of projections and memories as we expected in our hypothesis 3b given the similarities between neuroticism and harm avoidance and because this dimension has been found to be a very strong predictor of negative affect (Stewart, Ebmeier & Deary, 2005).

Once again, no effect of extraversion was observed although we expected extraverts to generate more positive stories (hypothesis 2b). This corroborates results on quantity of MTT. The relationship between extraversion and positive emotions thus does not seem to be observed when dealing with episodic material. This finding needs to be investigated further in future studies.

### *4.3. Personality and Quality of MTT*

Quality of MTT, i.e., phenomenal characteristics accompanying memories and projections, is another important aspect of autonoetic consciousness (D'Argembeau and Van der Linden, 2004, 2006). The results of the present study suggest that some personality traits are specifically associated with

phenomenal characteristics of reported events. More specifically, subjects with high scores of conscientiousness create a more precise representation in their mind for positive and negative future events as well as for negative past events. This means that planning, a core feature of conscientiousness could depend on the ability to elaborate a precise representation of an event. In other words, the richness of representation favours the planning of future events. Moreover, people who recall past negative events with high quality, may be particularly driven imagine and avoid such events in future, and hence act in a more conscientious way. Neuroticism was also found to be associated with the emotional intensity of negative projection and with the quality of representation for negative memories, which confirms the idea that this dimension plays definitively a role in the representation of self in time.

Surprisingly, we could not confirm our hypothesis 5 according to which subjects with high levels of openness would report more phenomenal characteristics. Openness did not relate to phenomenal characteristics associated with past and future MTT even though this dimension has been previously found to have the strongest relationship with the phenomenology of autobiographical memory (Rubin & Siegler, 2004) and with visual and spatial details. More particularly, the openness to feelings facet (O3) correlated strongly with measures of belief in the accuracy of memories, recollection, sensory imagery and feeling of re-experiencing emotions. As the size of our sample was not sufficient to investigate the effect of facet on MTT, no conclusion can be drawn on this issue.

Regarding the TCI-R dimensions, the main results show that subjects with high score of NS generate less emotionally intense positive events in the past and in the future. Moreover, they have less a feeling of pre-experiencing positive events than low NS subjects. This result is not in agreement with previous studies associating NS with positive affect, and could suggest that the expression of positive emotion is not a key facet of NS. The present study also shows that subjects with high scores of cooperativeness report positive

memories with more visual, sensorial and spatial details. Additionally, cooperativeness seems to play systematically a role in the feeling of re/pre-experiencing an event (i.e., autonoetic consciousness) whatever its emotional valence. Since cooperativeness is related to empathy, tolerance, and the social dimension of personality, including non-verbal communication, one can speculate that individuals with high scores on this dimension elaborate a more sensorial representation of events. Indeed, sensorial aspects of a representation are related to the non-verbal dimensions of an event. Finally, results yield an effect of persistence on the coherence of negative and positive memories. Persistence is a personality dimension related to tenacity and perseverance despite fatigue. Consequently, individuals with high scores of persistence are more concrete and logical, and therefore report more coherent memories. Unexpectedly, we could not confirm our hypothesis 6 according to which subjects with high levels of self-transcendence would report more phenomenal characteristics. Indeed, people with high scores of self-transcendence have been found to have better self-detachment and more mental fantasies (Cloninger et al., 1993). ST did not have any effect on quality of representation although this dimension is also usually associated with visual imagery which was found to affect phenomenal characteristics of MMT (D'Argembeau and Van der Linden, 2006).

As it has been reported previously, positive and negative affect did not show any relationship with the quality of MTT. The present findings suggest that the representation of self in time seems to be independent of current mood, and therefore confirm and extend the results of previous studies on episodic memory (Lloyd & Lishman, 1975; Martin et al., 1983; Ruiz Caballero& Bermudez, 1995).

### *4.4. General conclusion*

Before concluding, several limitations of the present study should be mentioned. First, the gender distribution is quite uneven. Indeed, research has

shown that females have more detailed and emotionally intense autobiographical memories than men (Davis, 1999; Fujita, Diener, & Sandvik, 1991). Second, the N of the study is a bit small, though the statistical analysis shows that it is large enough to obtain significant results. Finally, the statistical validity (type I error inflation with multiple significance tests) should be underlined given the relatively high number of comparisons.

The results of the present study show that some personality traits are related to our ability to remember our past and to project ourselves into the future. The relationships between personality and autonoetic consciousness are globally consistent with existing data on personality and emotional information processing. More particularly, neuroticism and harm avoidance seem to be strongly related to autonoetic consciousness. These dimensions relate both to the number of reported events during the interviews and the emotional valence of the free story completion task. These findings thus confirm the influence of neuroticism on negative emotional regulation as regards past events and extend it to future events. Therefore, our study provide an additional evidence to the idea that MTT into the past and into the future rely on a common set of processes by which past experiences are used to envision the future.

Concerning the other personality dimensions our results show that surprisingly extraversion and novelty seeking are not particularly associated with past or future MTT. This suggests that the relationships between these traits and positive emotions could be limited to semantic information. This interesting result should be investigated in further studies.

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# Chapter 6

# MONEY GIVETH, MONEY TAKETH AWAY: THE DUAL EFFET OF WEALTH ON HAPPINESS

Quoidbach, J., Dunn, E.W., Petrides, K.V., & Mikolajczak, M. (2010). *Psychological Science*, *21*, 759-763.

## Abstract

The present study provides the first evidence that money impairs people's ability to savor everyday positive emotions and experiences. In a sample of working adults, wealthier individuals reported lower savoring ability. Moreover, the negative impact of wealth on savoring undermined the positive effects of money on happiness. Supporting the causal influence of money on savoring, experimentally exposing participants to a reminder of wealth produced the same deleterious effect on savoring as did actual individual differences in wealth. Finally, moving beyond self-report, participants exposed to a reminder of wealth spent less time savoring a piece of chocolate and exhibited reduced enjoyment of it. The present research supplies evidence for the previously untested notion that having access to the best things in life may actually undercut the ability to reap enjoyment from life's small pleasures.

## Introduction

Can experiencing the best life has to offer undermine one's ability to savor everyday joys? This question springs from one of the most puzzling findings uncovered by well-being research: that objective life circumstances explain little of the variance in happiness (Lyubomirsky, Sheldon, & Schkade, 2005). In particular, income appears to exert a surprisingly modest impact on happiness (e.g., Aknin, Norton, & Dunn, in press), especially in wealthy societies (Diener & Oishi, 2000; Veenhoven, 1991). Although a number of explanations have been proposed for the weakness of the money-happiness relationship (e.g., Dunn, Aknin, & Norton, 2008), one of the most intriguing—but untested—explanations lies in what Gilbert (2006) termed the experience-stretching hypothesis. According to this perspective, experiencing the best things in life—such as surfing Oahu's famous North Shore or dining at Manhattan's four-star restaurant Daniel—may actually mitigate the delight one experiences in response to the more mundane joys of life, such as sunny days, cold beers, and chocolate bars (Gilbert, 2006; Parducci, 1995).

Wealth, of course, opens the door to a wide range of experiences, from luxury travel and fine dining to lattes and pedicures. Indeed, just thinking about wealth may increase perceived access to such enjoyable experiences, introducing the risk that everyday pleasures will be taken for granted. Consistent with this reasoning, research has demonstrated that even subtle reminders of wealth can exert profound effects on thought and behavior; in particular, priming people with the concept of money or wealth appears to increase feelings of self-sufficiency (Vohs, Mead, & Goode, 2006, 2008). This suggests that merely thinking about money may lead people to believe that any experiences they desire are potentially obtainable. Unfortunately, such perceived abundance may run counter to appreciating pleasurable experiences. In one of the few studies on this topic, Kurtz (2008) found that college seniors derived greater happiness from the final weeks of college when they were led to feel that graduation was impending, suggesting that

scarcity may increase savoring. Savoring is a form of emotion regulation used to prolong and enhance positive emotional experiences (Bryant, 1989, 2003). Researchers have identified four common strategies—that can be employed alone or in combination—to savor a positive event, including displaying positive emotions nonverbally, staying present in the moment, thinking about the event before and afterward, and telling others (Tugade & Fredrickson, 2007; Quoidbach, 2009).

In the present research, we hypothesized that savoring may be undermined by financial wealth, due to the abundance of pleasurable experience wealth promises; providing some initial support for this hypothesis, we observed a significant negative correlation ($r$ = -.21) between income and self-reported savoring ability in a preliminary study. Therefore, we attempted to replicate this finding, while investigating the causal relationship between wealth and savoring. Because the ability to savor promotes happiness (Bryant, 1989, 2003; Bryant, Smart, & King, 2005; Meehan, Durlak, & Bryant, 1993; Quoidbach, 2009; Tugade & Fredrickson, 2007), we further hypothesized that the negative effect of wealth on savoring may counteract the other emotional benefits that money provides, thereby diminishing the overall relationship between money and happiness. Thus, in Study 1 we examined the association between wealth and savoring ability, and tested whether the positive relationship between wealth and happiness is undermined by the negative effect of wealth on savoring. In addition, we manipulated the salience of money to test whether reminders of wealth reduce self-reported savoring ability; addressing an alternative causal path, we examined whether savoring ability reduces the desire to pursue wealth. In Study 2, we moved beyond self-report and tested whether thinking about money leads people to exhibit reduced savoring behavior when presented with one of the little joys of daily life.

## Study 1

### *Method*

#### *Participants*

We recruited 374 adult employees from Belgium's University of Liège, from custodial staff to senior administrators, for an online survey. Twenty-three participants refused to answer money-related items, leaving a total of 351 participants (66% females; ages 21-89 years, $M_{age}$ = 37.9; *SD* = 12.9).

#### *Procedure*

To test whether thinking about money has a causal impact on savoring, we randomly assigned participants to a money prime or control condition. In the money prime condition, the questionnaire displayed a photograph of a large stack of Euro bills, which was blurred beyond recognition in the control condition; this mental priming technique has been used successfully to heighten the accessibility of the concept of money at a level below awareness (Vohs, et al., 2006, 2008). The questionnaire included items measuring savoring ability, happiness, desire for future wealth, and current wealth (in that order).

#### *Measures*

*Savoring*. Participants completed the Emotion Regulation Profile-Revised, a vignette-based instrument measuring individuals' typical ability to regulate both negative and positive emotions; this measure has good psychometric properties, including strong convergent, divergent, and predictive validity (Nelis, Quoidbach, Hansenne, & Mikolajczak, in press; see also Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Of interest in the present study was the savoring positive emotion scale, which includes six detailed descriptions of situations eliciting contentment, joy, awe, excitement, pride, and gratitude, respectively. For example, participants are asked to imagine finishing an

important task (contentment), spending a romantic weekend away (joy), or discovering an amazing waterfall while hiking (awe). Each scenario is followed by eight possible reactions, including the four savoring strategies described in the introduction (i.e., displaying positive emotions, staying present, anticipating/reminiscing, and telling others). Participants select the response(s) that best characterize their typical behavior in each situation. They receive one point for each savoring strategy selected, and scores across the different scenarios are then aggregated into an overall savoring score (α = .83).

*Happiness*. We assessed happiness using the well-validated Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999), composed of four 7-point items (α = .84).

*Desire for wealth*. On two open-ended items, participants indicated their ideal income and how much money they would need to win in the lottery to live the life of their dreams, allowing us to assess whether savoring ability was related to desire for wealth.

*Current wealth*. Participants reported their life savings on a 7-point scale, ranging from 1 (below 1,000€) to 7 (over 75,000€), as well as reporting their monthly income after taxes. These items, which were positively correlated (r = .38, p < .001), were standardized and aggregated to create an overall wealth index.

## *Results*

### *Current wealth, money prime, and savoring*

To test whether wealth and the money prime produced similar, deleterious effects on savoring, we entered participants' current wealth and experimental condition into a regression predicting savoring scores. Supporting our hypothesis, participants' wealth significantly predicted lower ability to savor positive emotions, β = –.17, $t(348) = 3.18$, $p < .01$. Likewise, compared to the

control group, participants assigned to the money prime condition exhibited significantly lower savoring scores, β = –.11, $t(348) = 1.99$, $p < .05$. Thus, both individual differences in wealth and a situational prime designed to increase thoughts of wealth produced similar negative effects, suggesting that thinking about wealth plays a causal role in impairing savoring.

*Savoring and desire for wealth*

To test an alternative causal pathway—that savoring increases contentment with one's existing situation, reducing the desire to pursue money—we entered savoring ability scores into regressions predicting participants' desired incomes and lottery winnings.7 Savoring ability did not predict desired income, β = -.08, $t(333) = 1.47$, $p = .14$, or lottery winnings, β = .08, $t(302) = 1.37$, $p = .17$.

*Current wealth, savoring, and happiness*

To investigate how wealth and savoring relate to happiness, we first entered savoring ability into a regression predicting happiness, controlling for experimental condition. Dovetailing with past research, savoring ability positively predicted happiness (β = .34, $p < .001$). Replacing savoring ability with wealth in this regression, we found a modest, but reliable relationship between wealth and happiness (β = .12, $p < .03$), consistent with previous research. Because wealth was negatively related to savoring (as discussed above) and savoring was positively related to happiness, we tested whether savoring suppressed the relationship between wealth and happiness. A suppressor is "a variable which increases the predictive validity of another variable…by its inclusion in a regression equation" (Conger, 1974, p. 36). Following recommendations of MacKinnon, Krull, and Lockwood (2000), we performed mediation analyses to determine whether the effect of wealth on

[7] Given the significant effect of the money prime manipulation, all subsequent analyses were computed controlling for experimental condition.

happiness was weakened by the ability to savor positive emotion (Baron & Kenny, 1986). As depicted in Figure 1, when savoring ability was included along with wealth in a regression predicting happiness, wealth became a stronger predictor of happiness (β = .18, $p < .001$). A Sobel test confirmed that savoring ability suppressed the relationship between wealth and happiness ($z = 2.91$, $p < .01$).

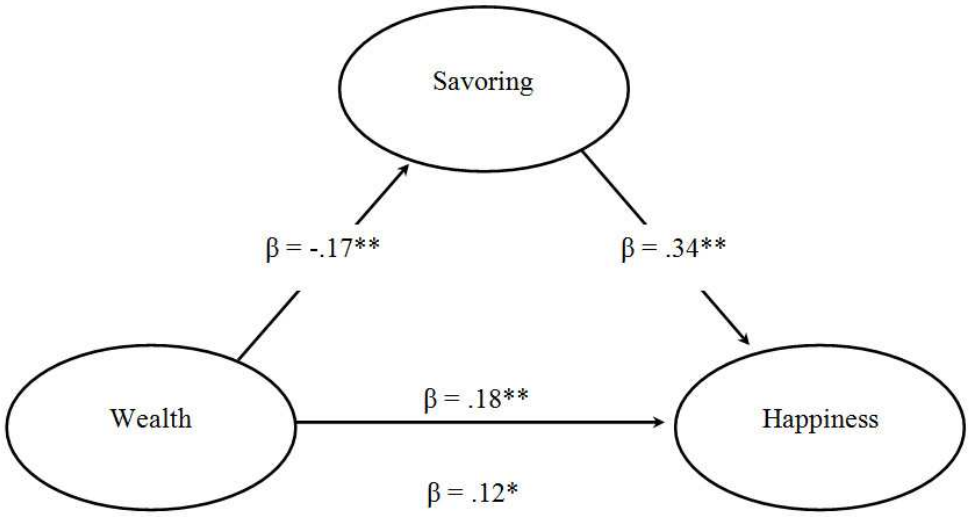


***Figure 1****. Results of regression analyses testing the suppressing effect of savoring in the relationship between wealth and happiness (*p < .05, **p<.01). The effect of wealth on happiness when savoring was not included in the model is indicated in parentheses.*

*Discussion*

Study 1 suggests that wealth may impair savoring; both individual differences in wealth and a situational reminder of wealth produced similar deleterious effects on savoring. Conversely, the ability to savor positive emotions was unrelated to the desire for wealth. The present findings further demonstrate

that the emotional benefits of wealth are undermined by the negative impact of wealth on savoring; controlling for savoring ability significantly increased the relationship between wealth and happiness. Thus, wealth may fail to deliver the happiness one might expect because of its detrimental consequences for savoring. Given long-standing debates regarding the extent to which people can accurately introspect about their own emotion regulation styles (e. g., Salovey & Grewal, 2005), however, we sought to replicate our central finding—that wealth reduces savoring—using a behavioral measure of savoring. Because the wealth prime produced the same effect as actual wealth on savoring in Study 1, while permitting causal inferences, we used priming to investigate whether wealth reminders could produce observable variations in savoring one of life‘s small delights: chocolate.

## Study 2

### *Method*

#### *Participants*

Forty participants (57% females, 43% males; $M_{age}$ = 23.0; *SD* = 7.5; ages 16–59 years) on the University of British Columbia campus volunteered for a taste-test study.

#### *Procedure*

Participants completed a brief questionnaire assessing demographics and attitudes toward chocolate. The questionnaire was presented in a binder, and on the adjacent page were materials from an “unrelated study” displaying a picture of Canadian money or neutral photo. Next, participants were instructed to eat a piece of chocolate and, when ready, to complete a brief follow-up questionnaire.

*Savoring*

To create behavioral measures of savoring, two observers (who were blind to condition) surreptitiously watched the participant. Because savoring food entails staying present in the moment, taking the time to appreciate and reap pleasure from it (Macht, Meininger, & Roth, 2005), we asked the observers to measure the amount of time participants spent eating the chocolate (using stopwatches). To capture the extent to which participants displayed positive emotions while eating, observers rated how much enjoyment participants displayed on a scale from 1 (not at all) to 7 (a great deal). Given that observers showed high correspondence in measuring eating time ($r$ = .99, $p$<.01) and rating enjoyment ($r$ = .71, $p$<.01), their scores were averaged.

*Results and discussion*

Because females spent significantly more time savoring the chocolate than males (β = .53, $p$< .01), we conducted analyses of covariance comparing participants' eating time and enjoyment between conditions, controlling for gender, as well as baseline attitudes toward chocolate. Compared to those in the control condition, participants in the money prime condition spent less time eating the chocolate, $F(1, 31) = 6.02$, $p$ = .02, and displayed less enjoyment, $F(1, 35) = 9.85$, $p$< .01 (see Table 1). Thus, a simple reminder of wealth undermined participants' ability to savor the pleasurable experience of eating chocolate, as they devoted less time to eating it and exhibited lower levels of enjoyment.

| | Time eating (in seconds) | | Observers' rating of enjoyment | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Money prime | 32.0 | 14.4 | 3.6 | 1.2 |
| Control | 45.4 | 29.0 | 5.0 | 1.2 |

***Table 1****. Means and standard deviations of savoring indicators in the two experimental conditions*

## General Discussion

The present research provides the first evidence that money interferes with people's ability to savor positive emotions and experiences. Examining a large sample of working adults, we found that wealthier individuals reported lower savoring ability. Indeed, the negative impact of money on savoring undercut the other emotional benefits provided by money. Supporting the causal influence of money on savoring, experimentally exposing participants to a reminder of wealth produced the same negative effect on savoring associated with actual wealth. Moving beyond self-report, we observed that a reminder of wealth led participants to devote less time to savoring a piece of chocolate and to exhibit reduced enjoyment from this small pleasure of everyday life.

Thus, we found converging evidence for our hypothesis using (1) a broad self-report measure, which assessed the use of four savoring strategies across six different scenarios and (2) a more focused behavioral measure of savoring that captured the extent to which participants stayed present and displayed positive emotion to prolong and enhance the experience of eating chocolate. Because our behavioral measure was not designed to capture the

interpersonal or intertemporal components of savoring, it would be interesting to test whether wealth produces observable differences in the extent to which people reminisce and tell others about positive experiences.

Taken together, our findings supply evidence for the provocative and intuitively appealing—yet previously untested—notion that having access to the best things in life may actually undermine the ability to reap enjoyment from life's small pleasures. Going beyond past theorizing, our research demonstrates that a simple reminder of wealth produces the same deleterious effects as actual wealth, suggesting that perceived access to pleasurable experiences may be sufficient to impair everyday savoring. In other words, one need not actually visit the pyramids of Egypt or spend a week in the legendary spas of Banff—simply knowing that these peak experiences are readily available may increase the tendency to take the small pleasures of daily life for granted.

This perspective is consistent with the intriguing theoretical notion that hedonic adaptation may occur not only in response to past experiences, but also in response to anticipated future experiences (Frederick & Loewenstein, 1999). Regarding past experiences, research has begun to examine individual differences in the extent to which memories of the past enhance or diminish joy in the present (Liberman, Boehm, Lyubomirsky, & Ross, 2009). Thus, an important research goal lies in delineating when, how, and for whom awesome life experiences—in the past and future—shape the extent to which individuals savor diverse pleasures in the present.

Our findings also contribute to a new wave of research on money and happiness; whereas a great deal of previous research has documented the magnitude of the relationship between money and happiness (see Diener & Biswas-Diener, 2002 for a review), researchers are increasingly moving toward examining when and why money promotes happiness, in order to understand their surprisingly small interrelationship (e.g., Dunn, Aknin, &

Norton, 2008; Van Boven, 2005). Our studies provide a novel contribution by demonstrating that the emotional benefits that money gives with one hand (i.e., access to pleasurable experiences), it takes away with the other by undercutting the ability to relish the small delights of daily living.

## Authors' Note

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# Chapter 7

# THE PRICE OF AWESOMENESS: OUTSTANDING EXPERIENCES REDUCE EVERYDAY SAVORING

Quoidbach, J., Dunn, E.W., & Hansenne, M. (in preparation).

## Abstract

The present research investigates the paradoxical notion that having had or planning to have awesome experiences may undercut enjoyment for simpler pleasures. In Study 1, participants were presented with pictures of enjoyable vacation spots and asked to imagine winning a trip to each of the destinations. Providing a measure of anticipatory savoring, participants reported how excited about the trip they would be the week before leaving. To provide a measure of past amazing experiences, participants were asked to complete a brief record of their travel history before or after judging the vacation destinations. Results show that participants who had traveled the world reported less anticipatory savoring for future vacation destinations. In Study 2, participants reported all the travels they were planning to do within the next 10 years before or after judging future vacation destinations. Similarly to past experiences, the more participants were planning to visit outstanding places, the fewer days they were willing to spend in simple vacation destinations. Study 3 and 4 further showed that these effects could be explained by the fact that recalling one's experiential background activates a general self-perception, which in turn alters savoring; manipulating this self-perception directly impacted savoring. Moving beyond self-report and expanding our findings to a broader context, results from Study 5 show that

thinking about one's outstanding past experiences in general can be sufficient to impair participants' motivation to savor life little pleasures such as a holyday. Taken together, our studies provide the first evidence that, whereas outstanding life experiences color life and can undoubtedly contribute to happiness, they also have the paradoxical power to reduce it.

## Introduction

Imagine how you would feel if you got the chance to travel the world, sleep in Palaces, and taste the finest bottles of Champagne. Visions of fulfillment may come to mind, and you would probably predict feeling quite content of having had the opportunity to experience the best that life has to offer. But can one really die happy after seeing Venice or does awesomeness has a price? According to what Gilbert termed the *experience-stretching hypothesis*, outstanding experiences may lower people's satisfaction with more mundane joys (Gilbert, 2006; Parducci, 1995). For instance, the memory of an amazing trip in the Caribbean might decrease the enjoyment of one's current vacation to the local beach—even if that trip took place years ago and was followed by numerous less exciting vacations. The present research aims to investigate this hypothesis empirically and, more specifically, to determine whether and when great experiences undermine enjoyment of life's smaller pleasures.

The roots of the experience-stretching hypothesis can be found in Helson's (1964) adaptation level theory according to which people's judgments of current levels of stimulation depend upon whether this stimulation exceeds or falls short of the level of stimulation to which their previous history has accustomed them. For example, the perceived quality of a given dinner will be influenced by the usual quality of past dinners. Over the years, Helson's model has largely been discussed and enriched on the theoretical level to take into account the effect of various parameters such as time (e.g., a series of fancy dinners experienced last year might not have the same impact as one

experienced last week) and particularly extreme experiences on hedonic adaptation (Frederick & Loewenstein, 1999).

Curiously enough, however, the proposition that having awesome experiences may undercut enjoyment for simpler pleasures has only been investigated by a handful of empirical studies. In the first attempt to test this notion, Brickman, Coates, and Janoff-Bulman (1978) compared major lottery winners and control individuals regarding their current happiness and their enjoyment with different mundane pleasures (e.g., talking with a friend, watching television, hearing a funny joke…). Their results show that lottery winners were not happier than controls and reaped significantly less enjoyment from simple everyday joys. Similarly, a recent study on money and happiness shows that people's wealth was negatively related to their ability to savor various positive events. Moreover, the study demonstrated that a simple reminder of wealth produces the same deleterious effects, suggesting that wealth salience might be as detrimental as actual wealth (Quoidbach, Dunn, Petrides, & Mikolajczak, 2010).

Whereas experience-stretching is typically considered to be a function of past experiences, a few research suggest that it is theoretically possible for anticipated future experiences to promote adaptation to stimuli in the present—a process labeled "feedforward" (Frederick & Loewenstein, 1999). Indeed, recent research on mental time travel indicates that the ability to remember the past and the ability to project oneself into the future rely on a common set of processes by which past experiences are used to envision the future (Addis, et al., 2007; Atance & O'Neill, 2001; Buckner & Carroll, 2007; Quoidbach, Hansenne, & Mottet, 2008; Wheeler, Stuss, & Tulving, 1997). Aside from addiction research on rodents showing that pre-adaptation can occur (i.e., rats injected with gradually increasing doses of heroin can tolerate lethal dosages but only if they were injected at the expected time and location; see Siegel, 1978 for a review), longitudinal studies on income satisfaction also suggest a potential feedforward phenomenon. Van Praag and his colleagues

showed that individuals' current satisfaction with their income depends not only on the norm set by their past income but also on what they will earn in the future. The more participants would actually make several years later—identified by the researchers as a proxy for *expected income*—the less they were likely to be satisfied with a modest income in the present (see Van Praag, 2007).

Although they suggest that past and future awesome experiences may undermine the ability to savor life's smaller pleasures, the studies reviewed here only provide indirect evidence for this hypothesis. Indeed, it is unclear that money is an accurate proxy for outstanding experiences: not everyone dedicates their wealth on gourmet dinners and amazing travels. Thus, the negative relationship between money and savoring previously found in the literature could be explained by other effects that money can have on people such as increased stress (Gardner & Oswald, 2007) and exacerbated focus on performance (Vohs, et al., 2006, 2008).

Moreover, provided that recalled or anticipated outstanding experiences impairs savoring for more mundane ones, nothing is know about the underlying mechanisms of such an effect. As recently pointed out by Lyubomirsky (in press), a question that is yet unresolved in the hedonic adaption literature concerns whether the stimulus to which one adapts must be an actual situation (e.g., the situation of driving a particular car, having a particular job, or drinking a specific type of wine) or the broader identity associated with that situation (e.g., identifying oneself as a luxury car driver, a young urban professional, or a wine connoisseur). From a cognitive psychology perspective, this distinction could result in two distinct mechanisms of comparison. The first one would be that comparisons rely on episodic autobiographical knowledge: People compare their current experience with specific memories of similar past experiences which informs their judgment on the value of the situation they are presently encountering. The second hypothesis is that the underpinnings of comparison are mainly

based on semantic autobiographical knowledge. That is, individuals judge the quality of a given experience based on how they see themselves regarding the type of experiences under consideration. From that perspective, actual past experiences one had should only matter to the extent that they shape self-perceptions. In other words, a past extraordinary vacation could alter one's present enjoyment of a simple vacation because the two experiences are compared one to another. But a past extraordinary vacation could also alter the present experience because it shaped one's self identity such that the individual sees himself or herself as "the kind of person who goes on great vacations". Note that these two mechanisms are not mutually exclusive.

Finally, no study has investigated the conditions that could modulate the intensity of experience-stretching. For instance, adaptation theorists have posited that stimuli experienced in the distant past could gradually drop out the judgmental context (see e.g., Hardie, et al., 1993; Parducci, 1995; Ryder & Heal, 1973). Conversely, activating representations of one's past—or future—experiences might increase their impact on savoring the present. Indeed, the degree to which a particular knowledge unit influences a given judgment depends on its accessibility (Higgins, 1996). The more accessible a given piece of information is, the more likely it is to influence judgment (Mussweiler, 2003). For example, patients suffering from chronic pain show mood improvement when they are asked to remember a time in the past when they were worse off than the present (Affleck, Tennen, Urrows, Higgins, & Abeles, 2000). Likewise, participants asked to imagine potential future personal tragedies before judging various aspects of their life report higher satisfaction than participants asked to imagine positive events (Dermer, et al., 1979).

The present studies investigate the experience-stretching hypothesis directly by examining whether past awesome experiences diminish people's ability to savor simpler positive experiences, and whether this effect can account for the negative relationship between wealth and savoring. In addition, we investigated the role of two theoretical moderators of experience-stretching:

the time elapsed since one had great experiences and the degree of activation of these experiences. We further tested whether experience-stretching could occur for anticipated future events. Finally, we examined the two proposed underlying mechanisms of experience-stretching (i.e., episodic-based vs. semantic-based comparisons)

As an initial test of whether outstanding experiences could undermine enjoyment of simpler ones, we examined the influence of participants' travel history on anticipated excitement of winning vacation trips (Study 1). Extending our findings to future events, we then investigated the effect of participants' projected travels on enjoyment of hypothetical vacation trips (Study 2). In both studies, we hypothesized that the more participants traveled (or plan to travel) the world, the less they would enjoy going on relatively simple vacation trips. We further hypothesized that this relationship would be moderated by the salience of one's travel history (or plans) at the time of judging the different vacation trips. Exploring the question of the underlying mechanisms leading one's experiential background to reduce present enjoyment, we investigated the hypothesis of an episodic-based comparison process by measuring how having to recall positive or negative specific travel memories impacted enjoyment ratings for simple destinations (Study 3). Addressing the other potential underlying process, we investigated how manipulating participants' self-perception of being a modest or a great traveler impacted their motivation to savor simple destinations (Study 4). Finally, moving beyond the specific domain of travels and self report measures of savoring, we examined how thinking about an outstanding experience in general could diminish participants' intention to savor one of life little joys: a holyday (Study 5).

## Study 1

### *Method*

#### *Participants*

We recruited 220 adult employees (62% women; $M_{age}$= 35.0, *SD* = 11.1) from University of Liège for an online survey. Participants ranged in age from 23 to 81 years and, by occupation, all the way from custodial staff to senior administrators. Seventeen participants refused to answer wealth-related items and were thus not included in the analyses involving money.

#### *Procedure*

To test whether travel experiences salience could moderate the effect of actual past travel experiences on savoring, we randomly assigned participants to an experience salience or a control condition. In the experience salience condition, participants were asked to complete a record of their travel history before reporting how much they would savor different hypothetical vacation locations. In the control condition, participants reported how much they would savor the vacation locations before answering the travel history items. In both conditions, questionnaires ended with items measuring participants' wealth.

#### *Measures*

*Savoring.* Participants were presented with a set of three popular vacation destinations, namely Las Vegas, Djerba, and Cancun (picture and name). They were asked to imagine winning a vacation trip to each of the location and to report how excited about the trip they would be the week before leaving on a 7-point scale. We aggregated these three items into an overall measure of anticipate savoring (α = .71).

*Past travel experiences.* Participants were provided with a list of 27 countries drawn from travel brochures (e.g., France, Italy, Czech Republic, US, Canada, Vietnam…). For each of them, they were asked to indicate on a 4-point

scale whether they (0) never visited the country, (1) visited it once, (2) twice, or (3) more than three times. Scores to the different items were aggregate into an overall travel experiences score (α = .83). In addition, participants were asked to report for each country they already visited the number of years elapsed since their last travel. The mean number of years elapsed was used as an indicator of recentness of travel experiences.

*Wealth.* Participants reported their life savings on a 7-point scale, ranging from 1 (below 1,000€) to 7 (over 75,000€), as well as reporting their monthly income after taxes. These items, which were positively correlated ($r$ = .28, $p$< .001), were standardized and aggregated to create an overall wealth index. This measure had been shown to be a reliable indicator of wealth in previous research (Quoidbach, Dunn, et al., 2010).

*Data analysis*

We first investigated the relationships between wealth, travel experiences, and savoring using multiple regressions. In order to make sure that our results were independent from the fact that participant who traveled more actually already visited the locations targeted by our savoring measure, we controlled whether participants had previously visited these locations in the regression. Note, however, that results were virtually identical without controlling for this variable.

## *Results*

*Wealth, past travel experiences and anticipatory savoring*

To investigate how wealth and travel experiences relate to anticipatory savoring for future vacations, we first entered wealth into a regression predicting savoring. Dovetailing with previous findings, wealth negatively predicted anticipatory savoring, (β = -.19), $t$(199) = 2.57, $p$ = .01. Replacing wealth with travel experiences in this regression, we found a negative

relationship between travel experiences and savoring (β = -.25), $t(216) = 3.89$, $p < .01$, providing initial support for the experience-stretching hypothesis.

*Experience-stretching mediates the relationship between wealth and savoring*

To test our hypothesis that wealth impairs savoring via an experience-stretching process, we performed mediation analyses to determine whether the negative effect of wealth on savoring was mediated by travel experiences (Baron & Kenny, 1986). As depicted in Figure 1, when travel experiences were included along with wealth in a regression predicting savoring, the relationship between wealth and savoring became non significant (β = -.11), $t(199) = 1.54$, $p = .13$, indicating a mediation. A Sobel test confirmed that travel experiences significantly mediated the relationship between wealth and savoring ($z = 2.74$, $p < .01$).

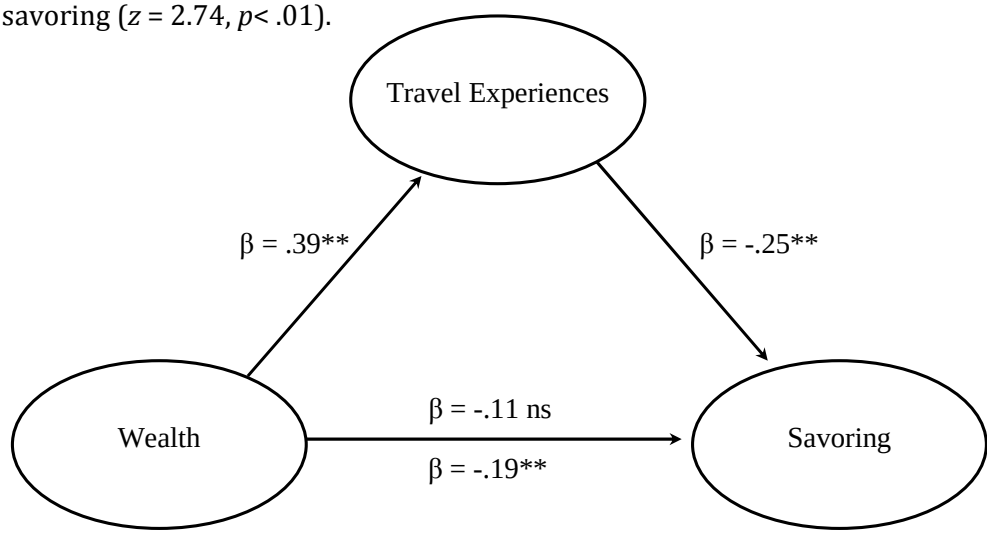


***Figure 1****. Results of regression analyses testing the mediating effect of travel experiences in the relationship between wealth and savoring of a pleasurable but ordinary location. Asterisks indicate coefficients significantly different from zero, *p < .05; **p ≤ .01. When travel experiences are included, the initial beta weight decrease from β = -.19 to β = -.11.*

*Moderating role of time and experiences salience*

We suggested that experience-stretching could be a dynamic process that depends more on the salience of past experiences than on these experiences per se. To test this hypothesis, we examined whether the salience of one's travel history (i.e., recalling past travels before or after answering savoring items) moderates the relationship between travel experiences and savoring. A 2(condition: salience vs. no salience) x2(travel experiences: 1 SD bellow the mean vs. 1 SD above the mean) ANOVA was performed on savoring. In line our hypothesis, analyses yielded a significant Condition x Travel experiences interaction, $F(1, 62) = 7.89$, $p<.01$, effect size estimate ($\eta_p^2$) = .12. As shown in Figure 2, participants who traveled little and participants who traveled a lot did not differ in anticipatory savoring when not reminded of their travel history, $F(1, 20) = 0.59$, $p = .46$, $\eta_p^2 = .03$, but differed significantly when this history was made salient, $F(1, 42) = 7.11$, $p = .01$, $\eta_p^2 = .15$.

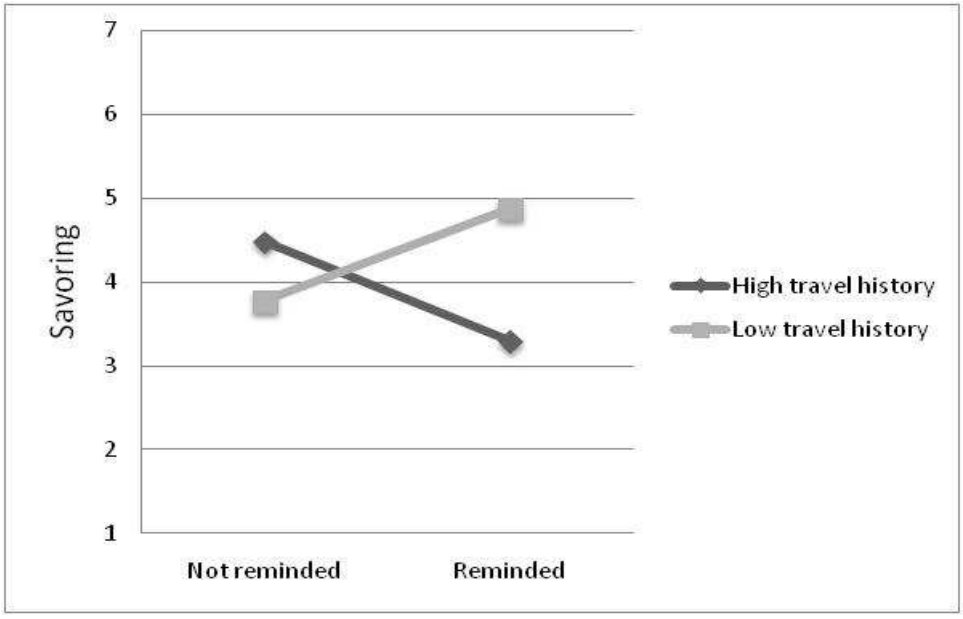


***Figure 2.*** *Experience salience moderates the relationship between travel history and savoring.*

Interestingly, the recentness of one's past travel experiences had no influence on experience-stretching. We found no direct effect of time elapsed on savoring, (β = -.07), $t(206) = -1.05$, $p = .30$, no significant time x travel history interaction, $F(1, 210) = 0.69$, $p = .79$, $\eta_p^2 = .00$, and no significant 3-way time x travel history x salience interaction, $F(1, 210) = 1.43$, $p = .23$, $\eta_p^2 = .01$.

*Discussion*

Study 1 provides evidence for the experience-stretching hypothesis that is, the paradoxical notion that having had awesome experiences undermines the ability to savor future positive events. Our results show that the more participants traveled the world the less they reported anticipatory savoring to the idea of winning different vacation trips. These findings were independent from the fact that participants had previously visited or not the proposed vacation destinations, suggesting that this effect is distinct for the mere lassitude of visiting the same place several times. Replicating previous studies showing that money may impair savoring (Brickman, et al., 1978; Quoidbach, Dunn, et al., 2010), our results show that higher personal wealth was associated with lower anticipatory savoring. The present study further demonstrates that the deleterious effect of wealth can be explained by an experience-stretching phenomenon; travel history fully mediated the relationship between wealth and savoring. Finally, Study 1 shows that the experience-stretching process is not automatic. Indeed, having travel a little or a lot had no impact on savoring when participants' travel history was not previously activated, but had a large effect when it was recalled beforehand. In contrast, the actual time elapsed since participants last traveled had no impact on experience-stretching. Although travel experiences recentness was expected to play a moderating role at a theoretical level, the fact that it was not related in the present study is not totally surprising. Indeed, numerous studies have shown that people's subjective feeling of temporal distance

between an earlier period and the present is only modestly associated with actual time (Ross & Wilson, 2003).

In Study 2, we tested whether anticipated future outstanding experiences could have the same deleterious effect on savoring as actual past experiences. Moreover, given the long-standing debate about whether adaptation phenomena modify the actual experience (i.e., *feeling* more or less happy) or simply lead to scale relabeling (i.e., using a different *label* for the same experience; see Frederick & Loewenstein, 1999), we sought to replicate our central finding—that activated travel experiences reduces savoring—using a measure of enjoyment that would not be sensitive to scale norming: the number of days people would be willing to spend in the different vacation destinations out of their annual two-week vacation.

## Study 2

### *Method*

#### *Participants*

We recruited 153 participants through a large survey service based in the U.S. (50 % women; $M_{age}$ = 31.7; SD = 9.9; Age range: 18 – 66 years) for a brief online questionnaire. Following the same procedure used in Study 1 participants were randomly allocated to an experience salience condition (i.e., asking participants to list their future travels before reporting how much they would savor different vacation locations) or to a control condition in which this order was reversed.

#### *Measures*

*Savoring.* Similarly to our previous studies, we asked participants to report enjoyment for five potential future vacation destinations drawn from

the list of the most typical vacation spot in America (i.e., Las Vegas, The Grand Canyon, Cap Cod, Niagara Falls, and Disneyland). In order to avoid the potential confound of scale norming mentioned above, we designed a measure of enjoyment that slightly differed from the previous one. We asked participants for each location to indicate how many of their 15 days of yearly vacation they would be willing to spend in that specific place, knowing that if they stayed in the location all 15 days, they would have no vacation time left for anything else that year. Time spent in each location thus provides a measure of enjoyment that is not dependent on verbal labels (e.g., "extremely happy") and would allow us to conclude that our results are specifically due to experience-stretching and not language-squishing (see Gilbert, 2006). Internal consistency analysis of our 5-item savoring scale yield a Cronbach's α of .76.

*Future travel experiences.* Participants were asked to list all the cities, countries, and vacation locations they were planning to visit in the next 10 years. To create a measure that would distinguish outstanding travel plans from less ambitious ones, we credited participants 1 point per destination within the country they currently lived in and 2 points per destination located outside. Note that we originally distinguished between countries participants were *certain* to visit and countries participants *would love* to visit. However, this distinction did not interact with the present results.

### *Results and Discussion*

Supporting our hypothesis that anticipated travel experiences could have the same detrimental effect on savoring as actual past travels, we found a significant negative relationship between our measure of future travel experiences and the number of days participants were willing to spend on popular vacation destinations (β = -.23), $t(148) = -2.77$, $p < .01$. Similarly to Study 1, we found that experiences salience moderated the relationship between future travels and savoring. Results from the 2(condition: salience vs. no salience) x2(future travel experiences: 1 SD bellow the mean vs. 1 SD above the mean) ANOVA showed a significant Condition x Future travel experiences

interaction, $F(1, 34) = 5.00$, $p = .03$, $\eta_p^2 = .14$. As shown in Figure 3, participants who planned to travel little and participants who planned to travel a lot did not differ in savoring when not reminded of their travel plans for the future, $F(1, 16) = 0.17$, $p = .69$, $\eta_p^2 = .01$, but differed significantly when these plans was made salient, $F(1, 18) = 11.76$, $p < .01$, $\eta_p^2 = .42$.

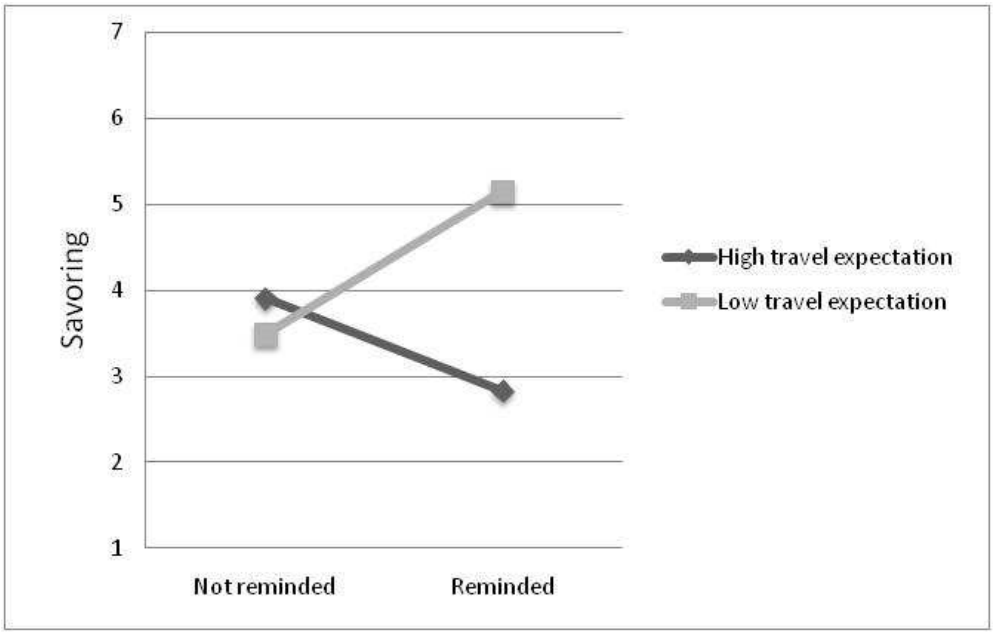


***Figure 3.*** *Experience salience moderates the relationship between travel expectations and savoring.*

In addition to the effect of past experiences, Study 2 shows that anticipated future outstanding experiences can reduce enjoyment in the present, supporting the existence of a feedforward mechanism. Moreover, the pattern of results was similar to the one found in Study 1; experience-stretching occurred only when future awesome experiences were previously activated.

As mentioned in the introduction, two main mechanisms may drive these findings. First, by recalling or anticipating their own travel experiences prior to judging how much they would enjoy potential travel destinations, people might bring to mind *specific* mental images to which present stimuli are compared to (i.e., episodic representations). Because people who traveled (or plan to travel) the world are more likely to recall (or anticipate) visiting exotic, awesome locations than their sedentary counterparts, the outstanding mental representations they compare the proposed simple destinations to might decrease their motivation to savor them. Alternatively (or concurrently), the number of memories or projections participants generate can inform them on the type of traveler they are, activating semantic autobiographical knowledge. Because people who traveled (or plan to travel) the world are more likely to consider themselves as "great travels" than their sedentary counterparts, their self-perception will reduce the motivation to savor simple destinations. Study 3 and Study 4 address these two mechanisms, respectively.

## Study 3

### *Method*

#### *Participants*

We recruited 109 adult employees (64% women; $M_{age}$= 38.4, *SD* = 12.7, ages range: 21-74 years) from University of Liège for an online survey.

#### *Procedure*

Participants were randomly assigned to one of two experimental conditions by the study website. In the first condition (i.e., negative recall), participants were asked to complete a record of their travel history and then to report their three worst travel experiences before judging how much they would savor different vacation locations. In the second condition (i.e., positive recall),

participants were asked to complete a record of their travel history and then to report their three best travel experiences before judging.

*Measures*

*Savoring.* Similarly to Study 1 participants were presented with a set of three different popular vacation locations (picture + name) and asked to report how excited they would be if they won a trip to the location ($\alpha$ = .80).

*Past experiences.* To measure travel history we provided participants with a list of the 50 most visited countries in the world (World Tourism Organization, 2008). Similarly to Study 1, participants were asked to indicate for each of them on a 4-point scale whether they (0) never visited the country, (1) visited it once, (2) twice, or (3) more than three times (α = .86).

*Results and discussion*

Consistent with previous findings, we found a negative relationship between the number of past travel experiences and anticipatory savoring in the two groups. That is, both in the negative and the positive recall condition, the more participants had travel the world, the less they savored, β = -.39, $t(1,41) = -2.69$, $p = .01$, and β = -.34, $t(1,51) = -2.55$, $p = .01$, respectively. Interestingly, we found no significant differences in savoring between the negative and the positive recall groups, $t(1,93) = 0.25$, $p = .80$. Among participants for which past travel experiences were made salient, the fact of recalling the worst or the best (coded -1 and +1) had no influence on savoring, β = -.02, $t(2,93) = 0.15$, $p = .88$, and the interaction between the number of past travel experiences and the valence of the specific memories recalled was not significant either, β = .05, $t(3,93) = 0.50$, $p = .62$.

Results from Study 3 show that whereas the overall number of visited countries led to experience-stretching, the specific memories reported by participants did not have much influence on their motivation to savor. Although they do not provide direct evidence for it, these findings suggest that

the comparison process that underlies experience-stretching might not be based on episodic memories but rather on semantic-like self-perceptions. However, our findings should be interpreted with caution, as it is possible that when indicating where they traveled on the list of 50 countries, participants actually recalled as many specific memories of past travels. In such case, the three worst or three best travels participants were asked to recall afterwards were not sufficient to counterbalance the effect of the other memories evoked by the list of countries ($M_{past\ travels}$ = 19.9, $SD$ = 10.4). We conducted Study 4 to rule out this explanation as well as to investigate directly the possibility that comparisons that lead to experience-stretching are based on self-perceptions. More specifically, we hypothesized that if reporting one's travel history activates self-perceptions of being either a modest or a great travel that modifies savoring responses, then manipulating these self-perceptions directly should be sufficient to produce the effect on savoring. In addition, the previously found negative relationship between extraordinary past experiences and savoring should lose significance in such context, given that past experiences no longer inform participants about their identity.

## Study 4

### *Method*

#### *Participants*

A convenient sample of 45 Belgian adults (67% women; $M_{age}$= 29.9, $SD$ = 6.3, ages range: 23-53 years) were recruited to participate in the study. Participants were told they would be asked to complete a computerized test aimed at determining their traveler's profile as well as to complete a few follow-up questions regarding their travel preferences.

*Procedure*

Participants were presented with a list of 50 countries and asked to indicate how many time they visited each of them (similarly to Study 3). Whereas participants were led to believe they were completing an actual test on which the computer would provide them individualized feedback, they were actually randomly assigned to one of two experimental conditions. In the first condition (i.e., modest traveler), after validating their questionnaire, participants were presented with a results screen explaining that they traveled to less extraordinary places than the "average Belgian". In the second experimental condition (i.e., great traveler), participants were told the opposite, that is, that they traveled to more extraordinary locations than the average Belgian. On the second part of both questionnaires, participants were then asked to complete our target measure of savoring for simple travels. Finally, in order to control for the potential confound of our self-perception manipulation with a mood induction effect, questionnaires ended with a mood measure.

*Measures*

*Savoring.* Similarly to previous studies, participants were presented with a set of three different popular vacation locations previously pretested as pleasant but rather simple, and asked to report how excited they would be if they won trip to the location. Expanding our specific measure of anticipatory savoring to capture the other dimensions of savoring (see Quoidbach, 2009), we also asked participants to report on a 7-point scale how much they would 1) display positive emotions non verbally, 2) talk about the trip to their friends, 3) clear-up their schedule to be as present as possible during the trip, and 4) look at the pictures they took once the trip was over. These five savoring items were aggregate into a savoring score ($\alpha$= .94).

*Past experiences.* Travel history was assessed through the same measure we used in Study 3 ($\alpha$ = .76).

*Mood*. Because the two types of feedbacks could potentially induce different emotional reactions, which in turn might have affected participants' savoring responses, we administered the well-validated Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), to control for a confunding effect of mood. The PANAS is comprised of 10 positive and 10 negative mood related adjectives for which subjects are asked to indicate the extent to which they are feeling each emotion presently on a 5-point scale ($\alpha$ =.84 and $\alpha$ =.85, for PA and NA, respectively).

### *Results and discussion*

Although there was no significant differences between the two experimental groups regarding their levels of NA, $t(43) = 0.32$, $p = .75$, the "great traveler" group exhibited higher levels of PA following the manipulation, $t(43) = 2.41$, $p = .02$. Because PA was significantly positively correlated with savoring ($r = .37$, $p = .01$), we entered participants' experimental condition and travel history into a regression predicting savoring scores, controlling for PA. Consistent with our hypothesis, we found a significant effect of group, such that participants who were led to believe they were great travelers reported significantly less savoring than participants who were told they were modest travelers, $\beta = -.30$, $t(3,44) = -2.01$, $p = .05$. As expected, there was no significant independent effect of travel history on savoring, suggesting that outstanding past experiences might impair savoring to the extent that they shape one's self-perception, $\beta = -.01$, $t(3,44) = -0.07$, $p = .95$.

Along with findings from Study 3, results for Study 4 suggest that the underling mechanism of experience stretching lies in a comparison process between a given experience and one's semantic self-knowledge rather than in a contrast with specific episodes. Thinking about past (or future) outstanding experiences might therefore be detrimental to everyday savoring because of the facet of self-identity it brings to the fore. In Study 5 we aimed at

transposing the general idea that thinking about awesome experiences impairs savoring outside of the travel context. In addition, given the long-standing debates regarding the extent to which people can be accurately aware of their own emotion-regulation styles (e.g., Salovey & Grewal, 2005), we sought to replicate our central finding using a more subtle, non self-report measure of savoring of one of life simple joys: how participants planned to spend the first day of their Spring break.

## Study 5

### *Method*

#### *Participants*

On the day preceding the beginning of the Spring Break (i.e., Easter vacations), a sample of 115 university employees were recruited to participate in a brief online study on mood. For various reasons (e.g., they already took their vacation a few weeks earlier, they were saving vacation days for later, their work status included no vacation, etc.), ten participants turned out not to be on vacation the next day and were therefore removed from the study, which left a total of 105 participants (68% women; ages 24–67 years, $M_{age}$ = 39.6, *SD* = 11.6).

#### *Procedure*

Participants were randomly assigned to an experimental group or to a control group. In the experimental group, participants we first asked to think of a fancy, outstanding experience they had in the past (such as an amazing travel, food, or VIP social event experience) and to describe it in a couple of sentences. They were then invited to indicate their current mood on an 11-point scale ranging from -5 *extremely negative* to +5 *extremely positive*. Finally, participants were asked to indicate their plans for their first vacation day (i.e., the following day) on an open-ended question. The specific instructions were

as follow: *"The Spring Break is coming soon! How have you planned to spend your first day of vacation?"*. In the control group, participants directly reported their mood and their vacation plan, without previously recalling an outstanding experience.

*Savoring*

Following a similar procedure to the one Wood et al. (2003) used to measure savoring intentions following positive events, we asked two independent coders who were blind to participants' condition to assess the extent to which participants plans for their first day of vacation were either likely to increase or maintain their positive affect (i.e., savoring), likely to have no hedonic consequence (i.e., neutral), or likely to spoil their positive feelings (i.e. dampening). Examples of intentions judged as savoring include the following: "Hiding Easter eggs in the yard and playing with the kids," "Enjoying a bottle of wine with friends," and "Taking some quality time with my spouse." Examples of intentions judged as neutral include the following: "Going grocery shopping", "Nothing in particular", "Going to my usual Saturday workshop." Examples of intentions judged as dampening include the following: "Doing my taxes", "Work on a paper.", and "Cleaning the house like every other Saturday." Savoring, neutral, and dampening intentions were coded +1, 0, and -1, respectively. Given the excellent interjudge reliability with Kappa coefficient = 0.82 (p <.001), 95% CI (0.72, 0.92), judges' ratings for each subject were aggregated into a mean savoring score.

## *Results and discussion*

Mean savoring scores and standard deviations in the two experimental groups are reported in Table 1. Results show that participants who previously recalled an awesome experience were significantly less likely to make plans to savor the first day of vacation than participants in the control group, $t(103) = 1.95$, $p = .05$. As expected, this significant difference was even stronger after controlling for participants' mood, $F(1, 105) = 5.98$, $p = .02$.

| | Savoring | |
|---|---|---|
| | Mean | S.D. |
| Experimental group (N = 63) | 0.84 | 1.43 |
| Control group (N = 42) | 0.26 | 1.58 |

***Table 1**. Means and standard deviations of savoring in the two experimental conditions*

Expanding our findings to a broader context, results from Study 5 show that thinking about one's outstanding past experiences in general can be sufficient to impair participants' motivation to savor life little pleasures such as a holyday.

## General discussion

The foregoing studies provide the first evidence that having awesome experiences may actually undermine the ability to reap enjoyment from life's smaller pleasures. The more participants had traveled the world, the less they reported anticipatory savoring of winning different vacation trips. This effect mediated the negative relationship found between money and savoring. Our findings also show that the negative impact of past experiences on savoring was moderated by the salience of one's travel history, such that the detrimental effect of past travels was exacerbated when they were recalled prior to reporting savoring but had no influence when they were not previously reactivated. These results are analogous—although the effect is in the opposite direction—with recent findings on hedonic adaption showing that owners of luxury cars are no happier driving than owners of compact 2-door coupes, *unless* their cars' attributes are on their minds while driving

(Schwarz, Kahneman, & Xu, in press). Interestingly, the actual time elapsed since participants' travel experiences had no influence on savoring, confirming that perceived and actual time are often not strongly related (Ross & Wilson, 2003).

In addition to past experiences, our research shows that pre-adaptation to future experiences can occur; the more participants were planning to visit outstanding places, the fewer days they were willing to spend in simple vacation destinations. Similarly to past experiences as well, this effect was moderated by the salience of one's travel plan. Thus, future experiences had only a deleterious effect on savoring when they were previously activated.

Going beyond previous research on hedonic adaptation which examined how repeated or constant exposure to a stimulus (e.g., noise, marriage, disability) reduces the emotional impact of that same stimulus (see for reviews Frederick & Loewenstein, 1999; Lyubomirsky, in press), our study demonstrates that adaption can take a more pervasive form, whereby awesome experiences may diminish enjoyment in a wider range of situations. Consistent with this conclusion, we found that merely thinking about a past outstanding experience led participants to disregard the pleasure of having a day off as they made fewer plans to savor it. Our findings also provide the first direct evidence that anticipated future experiences can produce the same deleterious effects as actual past experiences, consistent with the proposition of Frederick & Loewenstein (1999). In other words, one need not actually visit the pyramids of Egypt or the picturesque streets of Montmartre—simply knowing that these awesome travels will be experienced in the future may reduce satisfaction for simpler destinations. These results are consistent with the increasing number of developmental (Atance & O'Neill, 2005a; Suddendorf & Busby, 2005), neuropsychological (Hassabis, et al., 2007; Klein, et al., 2002; Tulving, 1985), functional neuroimaging (Addis, et al., 2007; Okuda, et al., 2003 ; Szpunar, et al., 2007), and personality (D'Argembeau & Van der Linden,

2006; Quoidbach, et al., 2008) researches showing that the ability to remember the past and to envision the future are intrinsically connected.

How do previously recalled/anticipated travels diminish enjoyment? The present research tested two potential underlying mechanisms of experience-stretching. The first lied in the notion that by recalling/anticipating outstanding experiences, people activate specific episodes that might later act as high comparison standards. The second potential explanation consisted in the fact that reporting outstanding experiences might lead individuals to see themselves as "the kind of people" who have modest or great experiences, subsequently affecting their motivation to savor a given situation. Our results provide support to this second hypothesis. Whereas we found that the recall of positive vs. negative specific travel episodes did not modify participants savoring scores beyond the effect of one's overall travel history, manipulating participants' self-perception of being a modest or a great traveler was sufficient to alter savoring and totally wiped out the effect of travel history.

Consequently, our findings shed some preliminary light on an important unresolved question in hedonic adaptation research: whether the stimuli to which people adapt must be actual situations or merely the knowledge of that situation (Lyubomirsky, in press). Beyond their theoretical contribution, our findings that the identity derived from a situation can matter more than the situation itself, open new grounds in several ways. First, it could be particularly interesting for the fast growing field of well-being interventions (e.g., Brown & Ryan, 2003; Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Lyubomirsky, Sheldon, & Schkade, 2005; Sin & Lyubomirsky, 2009) to investigate the conditions under which an outstanding experience will modify or not one's self-identity in a detrimental way. One such condition could be the type of attribution that is being made about the causes of event. For instance, a dinner at a world famous restaurant might yield deleterious consequences for future savoring if one feels entitled to it (e.g., a reward for hard work) but not if one feels particularly lucky or grateful (e.g., a present from a generous

friend). In addition, future studies could investigate the potential important role played by individual differences in the extent to which people are prone to experience-stretching. Traits such as gratitude (see e.g., Emmons, 2007; Emmons & McCullough, 2003; Wood, Maltby, Gillett, Linley, & Joseph, 2008) and humility (see e.g., Ashton & Lee, 2005) might help preventing from experience-stretching, whereas pride proneness (see e.g., Tracy & Robins, 2007) might exacerbate it. Consistent with this idea, Liberman, Boehm, Lyubomirsky, & Ross (2009) recently found that low dispositional happiness was associated to an increased tendency to contrast the present with better past life events, while high dispositional happiness was associated to an increased tendency to endow these past positive life events—that is, to acquire joy from retrospectively thinking about them.

Our findings also raise the question of whether reminiscing about positive memories is always good. Whereas several studies and popular books recommend engaging regularly in positive reminiscence or anticipation to increase well-being (e.g., Bryant, et al., 2005; Havighurst & Glasser, 1972; Lyubomirsky, 2008; Lyubomirsky, et al., 2006; Quoidbach, et al., 2009; Sheldon & Lyubomirsky, 2006), the present study suggests that relishing in positive memories and expectations might not always be beneficial. Clearly, remembering your last trip to Rome, Paris, or New-York may not be the best strategy to maximize your satisfaction with a family camping trip.

In addition to finding means of preventing experience-stretching, another promising avenue of research could lie in investigating how this phenomenon can be used to our advantage? Whereas people reminded of their rich experiential background reported lower enjoyment for simple vacations than when not reminded, people with a poor experiential background actually reported more enjoyment. This was remarkably summarized by a participant's feedback: "*Seeing all of these countries, I felt like I traveled so little. It made me want to go on vacation right away*". Thus, investigating the strategies that could lead people to contrast their present experiences in ways

that promote enjoyment could constitute a fruitful approach for savoring, happiness, and even marketing researches.

Whereas outstanding life experiences color life and can undoubtedly contribute to happiness, they also have the paradoxical power to reduce it. This side effect is all the more important that the frequency of positive affect matters more to people's well-being than its intensity (Diener, et al., 1991). Our research demonstrates that because it is likely to change our self-identity, awesomeness comes at a hidden price: it impairs our ability to savor simple, everyday joys. Probably a good thing to keep in mind before going on that luxury Nile cruise or having a glass of that marvelous champagne…

# Chapter 8

# BLASÉ EXPERT OR PASSIONATE CONNOISSEUR? DISPOSITIONAL HAPPINESS MODULATES HEDONIC ADAPTATION TO POSITIVE EXPERIENCES

Quoidbach, J., Dunn, E.W., & Hansenne, M. (in preparation).

## Abstract

The present research investigates how individual differences in dispositional happiness lead to differences in the way people adapt to repeated exposure to positive stimuli. At the very beginning of their training, 21 participants enrolled in an oenology course were asked to rate their enjoyment for a mundane wine and an exceptional wine in a baseline blind test. Over the next 10 weeks, participants were exposed to over 80 high quality wines as part of their class. At the end of the program participants were asked to engage the same blind test that baseline. Results show that dispositional happiness significantly moderated changes in enjoyment ratings of the mundane wine between pre-test and post-test. Specifically, happy individuals ended up liking the wine more and less happy individuals ended up liking it less. There was no moderating effect of happiness for the exceptional wines. Implications for research on hedonic adaptation and happiness interventions are discussed.

## 1. Introduction

What makes some people adapt to positive events, while others develop an exacerbated sensitivity to them? Whereas one of the most pervasive human traits is the tendency to grow accustomed to positive experiences that are constant in one's life (Brickman & Campbell, 1971; Brickman, et al., 1978; Lyubomirsky, in press), hedonic adaptation is not the only possible response to repeated exposure to positive stimuli (see Frederick & Loewenstein, 1999). From classic mere exposure effects (i.e., increased hedonic response to repeated exposure to stimuli that are initially neutral; Zajonc, 1968) to progressive increases in reactivity to repeated exposure to drugs (Robinson & Berridge, 1993, 2001), and even cartoons (Deckers, Buttram, & Winsted, 1989), experience can sometimes lead to *sensitization* (Groves & Thompson, 1973). In the present study, we suggest that the propensity towards hedonic adaptation or sensitization that follows repeated positive experiences may be linked to dispositional happiness. More specifically, we investigate the notion that one element that might distinguish happy folks from their less happy counterparts is their tendency to exhibit sensitization rather than hedonic adaption in response to positive experiences.

Previous research on adaptation and sensitization has shown that the type of experiences determine increases or decreases in affective intensity over the course of an event. Although adaptation seems to be the norm in many domains (for a review, see Frederick & Loewenstein 1999), Strauss, et al. (2005) found for example that repeated exposure to fearful faces led to a neural habituation response but that repeated exposure to angry faces led to a neural sensitization response. Similarly, manipulating participants' perception of the potential danger of an ambient odor strongly influenced its perceived intensity over time, such that subjects who believed the odor was harmless showed adaptation, while those suspecting it to be hazardous showed sensitization (Dalton, Wysocki, Brody, & Lawley, 1997). It has been argued that highly complex experiences might be more prone to sensitization. For

instance, it is commonly believed—although previously untested—that the full appreciation of moldy cheeses, fine wines, and Italian opera might require time and a certain level of expertise (Frederick & Loewenstein 1999).

However, there are reasons to believe that individual differences might also be an important determinant of adaptation vs. sensitization to life events. In some individuals the repeated use of addictive drugs produces incremental neuroadaptations, rendering specific neural systems increasingly and perhaps permanently, hypersensitive ('sensitized') to drugs, while increased tolerance seem to grow for others (Robinson & Berridge, 1993). The idea of such individual differences is also in line with recent empirical work by Diener, Lucas, & Scollon (2006) which highlighted the key moderating role played by personal dispositions in the rate of hedonic adaptation. For example, on average, people adapt to marriage within two years, yet some people stay happily married till death do they part, while the joys of marriage fade away after a few months for others (Lucas, et al., 2003). In fact, dispositional happiness might be intrinsically related to the speed of adaptation (Lyubomirsky, in press); such that happy individuals do not adapt as quickly to positive events. This proposition is consistent with recent research on trait-happiness and the way people consider their memories. Liberman, Boehm, Lyubomirsky, & Ross (2009) found a relationship between dispositional happiness and people's self-reported tendency to treat memories of positive events as sources of enhanced or attenuated happiness through the use of "endowment" and "contrast" strategies. Whereas participants high in dispositional happiness reported endowing their positive past experiences (i.e., savoring and acquiring joy from retrospectively thinking about them), participants low in dispositional happiness reported a greater tendency to contrast the present with these particularly positive past life events, which reduced their enjoyment of the moment.

These previous studies suggest that dispositional happiness could be related to the propensity to either adapt or increase sensitivity to recurrent positive events. To test this hypothesis experimentally, we conducted blind wine taste tests among oenology school students before and after they completed a 10-week training program. We hypothesized that dispositional happiness would moderate the changes in participants' hedonic reactions to wine, such that repeated exposure to high quality wines over the course of the training would lead happier individuals to enjoy wine more the second time than the first time (showing signs of sensitization) and less happy individuals to enjoy it less (showing signs of adaptation).

## 2. Method

### *2.1. Participants*

Twenty-five adults enrolled in a prestigious oenology class were recruited to participate in a study on wine and emotions. Four participants dropped the class over the course of the study, leaving a total of 21 participants (5 women; ages 24-60 years; $M_{age}$ = 39.4, SD = 10.2) who completed both parts of the study.

### *2.2. Procedure*

On the first day of the oenology class, and before having started to taste any other wine, participants were asked to take part in a short blind taste study. Before the tasting, participants completed a questionnaire that requested their demographic information and their level of expertise in oenology on a scale from 1 (novice) to 5 (expert).

In order to account for the theoretical proposition that highly complex stimuli might be more prone to sensitization than simpler ones, we included two types of wine in our blind test: a respectable yet simple everyday wine and an exceptional, complex wine. Both wines were selected by the First Sommelier

of Belgium, also in charge of the oenology class. The simple wine retailed for approximately $15 and the exceptional wine for approximately $150 a bottle. After tasting each wine participants were asked to report their experience on a short questionnaire.

The oenology class lasted ten weeks (four hours per week) during which participants got to taste and analyze a total of 80 quality wines (ranging from $20 to $50 per bottle). On the last day of class (and before having started to taste any other wine), participants were asked to blind taste the two target wines a second time and to complete the same questionnaire about their experience. Participants were then asked to complete a measure of dispositional happiness.

Note that the order of tasting (i.e., simple wine or exceptional wine first) was counterbalanced across participants.

### *2.3. Measures*

*Wine enjoyment*. Participants' hedonic reactions to wines at both times were assessed via three items scored on a 7-point scale (from not at all to a great deal): "Did you experience pleasure while tasting this wine?", "Would you enjoy drinking this wine on a regular basis?", and "Are you looking forward to tasting this wine in the future?" Scores on these three items were aggregated into a total score (mean $\alpha$ across times and wine types = .91).

*Dispositional Happiness* was assessed using the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999). This well-validated measure is composed of four items scored on a 7-point Likert-type scale ($\alpha$ = .81).

## 3. Results

Means and standard deviations of enjoyment ratings for the two wines at Time 1 and Time 2 are presented in Table 1. Paired-sample t tests showed no

significant increase in enjoyment from Time 1 to Time 2 for the simple wine, $t(20) = 1.20$, $p = .25$, $d = .26$, but a significant increase in enjoyment for the exceptional wine $t(20) = 3.08$, $p < .01$, $d = .67$.

| *Type of wine* | **Time 1** | | **Time 2** | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| Simple | 8.3 | 3.1 | 9.2 | 3.7 |
| Exceptional | 11.1 | 5.5 | 14.3 | 4.1 |

***Table 1****. Means and standard deviations of enjoyment ratings across times and wine types.*

In order to investigate whether dispositional happiness moderated the changes in wine enjoyment that followed repeated exposure to quality wines, we conducted regression analyses predicting the difference score of enjoyment across time (Time 2 – Time 1) form dispositional happiness scores (Judd, Kenny, & McClelland, 2001). These analyses controlled for participants' initial levels of wine expertise.

Consistent with our hypothesis, results for the simple wine show that dispositional happiness significantly moderated the changes in enjoyment after the training ($\beta = .46$), $t(20) = 2.22$, $p = .04$. The scatter plot depicting this moderation is presented in Figure 1.

There was no significant moderation of dispositional happiness regarding the changes in enjoyment for the exceptional wine, ($\beta = -.03$), $t(20) = -0.11$, $p = .92$, suggesting that both happy and unhappy participants benefited from their wine experiences in appreciating a highly complex and extraordinary wine.

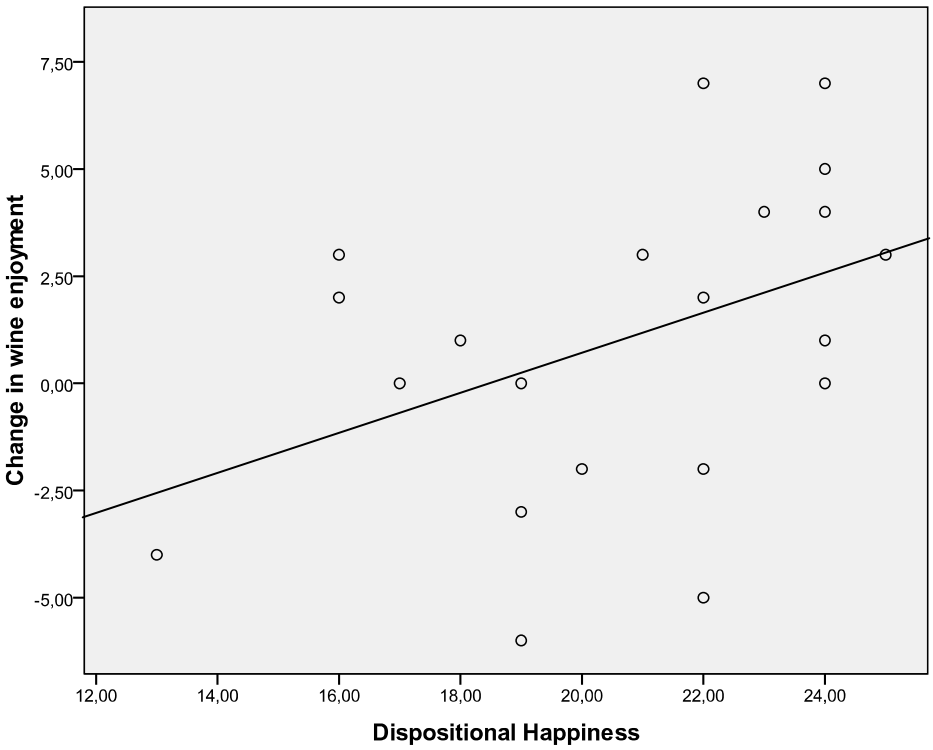


***Figure 1**. Moderating effect of dispositional happiness on enjoyment of a simple wine after a 10-week oenology class.*

Note that we found no significant correlation between dispositional happiness and increases in self-reported wine expertise ($r$ = .14, $p$ = .55), suggesting that the present results cannot be explained by the fact that happier individuals were also the ones who learned the most about wine.

## 4. Discussion

The present study provides the first evidence that dispositional happiness might be tied to the way we either adapt or are sensitized to repeated positive experiences. After taking a 10-week oenology class, participants with lower

happiness scores showed decreased levels of enjoyment for a pleasant but rather simple wine in a blind test, whereas participants with higher happiness scores showed increased levels of enjoyment. However, both happy and unhappy individuals significantly appreciated more an exceptional wine after their training.

The present findings are consistent with recent research showing that less happy individuals report detrimentally comparing their positive past experiences with the present ones, while happier individuals report using these past experiences to enhance their joy in the present (Liberman et al., 2009). Moving beyond self-report, our study provides additional support for this idea.

Why does greater happiness lead to sensitization and lower happiness to adaptation? Although the underlying mechanisms that drove participants' enjoyment judgments are beyond the scope of the present paper, we believe that happiness might be related to differences in the way individuals engage in comparative judgment. Specifically, according to the selective accessibility model (Mussweiler, 2003), people can engage in two fundamental comparison processes: similarity testing and dissimilarity testing. In similarity testing, accessible knowledge is used to indicate target–standard similarity, which typically leads to assimilation effects. In dissimilarity testing accessible knowledge is used to indicate target–standard dissimilarity, which typically leads to contrast effects. Which of these hypotheses is tested depends on a very quick and holistic preliminary assessment of the overall perceived similarity between the target and the standard. We suggest that because happiness is related to the use of more inclusive cognitive categories (e.g., Isen & Daubman, 1984) and to a more holistic way of processing information (Fredrickson & Branigan, 2005), dispositionally happy people might have a greater tendency to perceive similarities between past and present positive experiences. In turn, this preliminary assessment leads them to engage in similarity testing, which often results in assimilation: past positive

experiences reinforce their current enjoyment. Conversely, an exacerbated tendency to process information in an analytic manner would lead dispositionally unhappy people to perceive fewer similarities between past and present positive experiences. This preliminary assessment would, in turn, lead to the engagement in dissimilarity testing, which often results in contrast: past positive experiences diminish their current enjoyment. Such a model is of course speculative and future research is needed to put it to the empirical test.

Our study also provides some initial empirical support to the untested notion that complex experiences such as tasting an exceptional wine are more prone to sensitization than simpler experiences, as we found a relatively large increase in enjoyment for the outstanding wine after the training. Although dispositional happiness did not moderate this increase, it is too early to conclude that particularly exceptional experiences are immune to individual differences in adaptation or sensitization. One explanation for the differences between responses to the simple and the outstanding wines is that the wines that the participants had been tasting during their course were more modest than our exceptional wine, creating very little room for the unhappy individuals to contrast it with something better. Therefore, a ceiling effect may explain the present results. We predict that the relationship between dispositional happiness and hedonic adaptation/sensitization would probably be the same for great wines if the training had included even better wines. Nevertheless, it would be interesting for future research to delineate individual differences in hedonic adaption to different types of experiences varying in complexity.

Another fruitful avenue for future studies would be to investigate the extent to which adaptation/sensitization is a source or a consequence of happiness. Although the present study suggests that differences in trait levels of happiness might drive people to show either adaptation or sensitization to some positive events, it is also likely that these two processes can sometimes be a cause of happiness. Indeed, by developing and practicing the relevant

skills, people can exert some control over the extent and the speed of their hedonic adaptation (Lyubomirsky, in press). Strategies such as cultivating gratitude (Emmons & McCullough, 2003), imagining life without the good things we take for granted (Koo, Algoe, Wilson, & Gilbert, 2008), and engaging in various savoring behaviors (Bryant, 2003; Bryant & Veroff, 2007; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010) can promote sensitization over adaptation and increase happiness.

A practical implication of the present work is the idea that great experiences and expertise might not be beneficial for everyone. Individuals with high levels of dispositional happiness might accrue enjoyment from their expertise for both mundane and exceptional stimuli. However, the same expertise might only be beneficial for exceptional stimuli for individuals with less sunny dispositions. For simpler experiences, unfortunately, they would end up being less satisfied than they used to be. Although appealing, undertaking a tour of the best French restaurants, enrolling in an oenology class, or learning everything there is to know about Jazz music might not be the best choices to increase your downstream satisfaction if you are typically not a happy person. Although people often engage in these types of activities with the intention to learn how to better appreciate the things they like, some individuals will ironically finish up enjoying most of these things (the non exceptional ones) less than they used to. In short, taking a moment to reflect on one's own disposition before engaging in experiences that potentially modify one's standard of comparison might be a simple strategy for increasing happiness.

# Chapter 9

# GENERAL DISCUSSION

## 1. Summary

The goal of the present dissertation was to investigate how outstanding life experiences shape the extent to which individuals enjoy diverse pleasures in the present: the experience-stretching hypothesis. More specifically, we can summarize our work as an endeavour to answer four fundamental questions surrounding this notion:

1. Is the experience-stretching hypothesis supported empirically? In other words, do past outstanding experiences reduce subsequent enjoyment of simpler ones?
2. Can anticipated outstanding experiences yield similar deleterious effect as actual past experiences?
3. What are the underlying mechanisms that drive such effects?
4. Can individual differences moderate the propensity towards experience-stretching?

In this general discussion, we will first attempt to answer each of these questions. We will then discuss practical implications of our findings, that is, how the present work could provide valuable insight to the fast growing field of well-being and positive psychology interventions. After reviewing several limitations of our work, we will present some ongoing follow-up studies and future research perspectives on experience-stretching. Finally, we will finish this dissertation with a few concluding remarks.

### *1.1. Do past outstanding experiences reduce subsequent enjoyment of simpler ones?*

Although intuitively appealing and theoretically grounded, the experience-stretching hypothesis had, to date, received only indirect empirical support. The first goal of this dissertation was to investigate this hypothesis empirically.

Results from the different studies reported in this dissertation lend strong support to the notion that outstanding experiences and, more broadly, "having it all" can impair savoring. In the two studies described in Chapter 6, we found converging evidence using both self-report and behavioral measures that wealth diminishes peoples' ability to savor small pleasures such as romantic gateways, beautiful sceneries, and chocolate bars. Note that these results also suggest a causal link between money and savoring, as we found that the ability to savor simple things was not related to the desire to pursue wealth. Consistent with these findings, results from the set of studies reported in Chapter 7 show that the more money participants had, the less likely they were to enjoy simple vacation destinations.

Why does money reduce enjoyment? Because money opens the door to a wide range of outstanding experiences. For example, in the aforementioned vacation study, wealthier individuals tended to have traveled to many exotic places, which in turn decrease their intention to savor simple destinations. In other words, awesome experiences fully mediated the negative effect of wealth on savoring. Note, however, that one need not to have experienced a huge number of outstanding events for one's savoring ability to be impaired—the last study reported in Chapter 7 shows that merely recalling one past outstanding, luxury personal event is sufficient to produce observable changes in participants' intention to savor a day off.

The negative consequences of outstanding experiences and wealth on savoring are far from being harmless. As found in Chapter 4, a low propensity

to engage in savoring behaviors is related to low levels of daily positive affect and satisfaction with life. Consequently, low savoring ability was tied with reduced overall happiness. This observation is corroborated by findings of Chapter 6, which show that savoring suppressed the positive relationship between wealth and happiness. People could be noticeably happier from the comfort that money provides if they did not lose their ability to relish in small joys of daily living along the way.

### *1.2. Can anticipated outstanding experiences yield similar deleterious effect as actual past experiences?*

It has been suggested that adaptation could occur not only for events individuals actually experience but also for the ones they imagine experiencing in the future (Frederick & Loewenstein, 1999). However, this idea of *feedforward* has never been tested empirically. The present work provides both indirect and direct support for this hypothesis.

First, we have found in the study described in Chapter 5 that episodic memory and episodic future thinking were both related to the present self in a similar fashion. In particular, the propensities to remember and to imagine negative personal events were both related to participants' current levels of Neuroticism and Harm Avoidance. In addition to this indirect evidence, we have found in Chapter 7 that the number of anticipated future travels was negatively related to the motivation to savor simple vacations. Just as having travelled the world led participants to look down popular places, believing that they will travel the world in the future yielded similar effect.

Consistent with these results, we have found in Chapter 6 that merely thinking about money reduces savoring, independently of one's actual wealth. Participants exposed to reminders of money showed diminished levels of savoring both on a broad self-report measure, assessing the use of four

savoring strategies across six different situations, and on a more focused behavioral measure that captured the extent to which participants stayed present and displayed positive emotion to prolong and enhance the experience of eating chocolate.

Taken together, our findings suggest that imagined or perceived access to pleasurable experiences may be sufficient to impair everyday positive emotion regulation.

Although, the idea that one can adapt to things he or she has not experienced yet might seem odd and surprising, it is actually consistent with most recent research on human consciousness. As human beings, we are the only species[8] that possesses *autonoetic consciousness*, a "kind of consciousness that mediates an individual's awareness of his or her existence and identity in subjective time extending from the personal past through the present to the personal future" (Tulving, 1985, p. 1). In other words, the perception of who we are now is not only determined by what we are currently doing, but also by what we have done in the past and what we anticipate doing in the future. Yet, as we will develop in the next section, changes in self-perception that can follow exposures to outstanding events seem to be one of the most important underpinnings of experience-stretching. The fact that our self-identity is a product of past, present, and future experiences thus provides a rather straightforward explanation for our findings that adaptation occurs for anticipated events.

In addition to supplying empirical evidence for the feedforward hypothesis, the present findings also speak to the increasing number of studies showing that mental time travel into the past and into the future rely on a common set of processes (Atance & O'Neill, 2001; Buckner & Carroll, 2007; Hassabis,

[8] Note that, although still debated, the possibility of mental time travel in animals has been raised (see e.g., Suddendorf & Busby, 2003)

Kumaran, Vann, & Maguire, 2007; Okuda et al., 2003; Wheeler, Stuss, & Tulving, 1997). Whereas previous research has shown that both re-experiencing and pre-experiencing positive personal events can boost one's happiness (Lyubomirsky et al., 2006; Quoidbach, Wood, & Hansenne, 2009) , the present findings show these two types of mental time travel can also yield similar negative effect on savoring.

### *1.3. What are the underlying mechanisms of experience-stretching?*

Two distinct mechanisms could potentially drive experience-stretching. Some could hypothesize that people directly compare their current experiences with specific ones they recall or imagine (i.e., *autonoetic comparison*). Others could argue that individuals usually don't have time to engage in such mental time travel and that experience-stretching pertain to downward comparisons with a broader and more abstract kind of self-knowledge (i.e*., noetic comparisons*).

The present findings suggest that the later explanation might underlie most instance of experience-stretching. Reminding individuals of outstanding elements of their past or future seems to activate a broad, abstract perception of themselves with regard to the category of events under consideration (e.g., travels, food, leisure). In turn, this self-perception of "having it all" would lower people's motivation to savor positive experiences that appear simpler than what they believe they are accustomed to. Our data seem to corroborate this explanation as we found that manipulating participants' sense of identity produced similar deleterious effects on savoring as their actual past experiences did. Furthermore, when participants were led to believe they were great vs. modest travelers, it wiped out the effect of their actual past travel experiences, suggesting that self-perception mediates the effect of past experiences.

Consistent with the noetic comparison hypothesis, we found no support for the idea that experience-stretching was driven by direct comparison between present and particular past experiences; remembering specific positive or negative travels did not alter participants' level of savoring. These findings are in line with recent research showing that people often do not have the attentional capacity to compare their present experiences with alternatives (Morewedge, Gilbert, Myrseth, & Wilson, 2008).

How exactly does self-identity alter savoring? Recent theorizing about the way individuals react to emotional events can provide a useful framework to understand our findings.

According to Wilson and Gilbert (2008), when an emotional event occurs, people start by attending to it, that is, to allocate attentional resources to the situation. The amount of allocated resources is dependent upon two key elements: self-relevance ("Is it important to me?") and understanding ("Do I understand it sufficiently?"). Indeed, people are constantly bombarded with a great deal of sensory information, and it would be maladaptive to orient to every novel piece of it without regard to the importance of that information for the self. Similarly, it is more adaptive for individuals to process ambiguous, poorly understood information than information that is easily explained (see Wilson & Gilbert, 2008 for a review of the evidence supporting this view). Consequently, if the event is deemed to be both self-relevant and unexplained, people allocate a lot of attention to it. Because by definition, paying attention to a positive situation means savoring it (i.e., focusing awareness to the present moment, engaging in mental time travel), the event triggers an important affective reaction. Conversely, if the event is deemed to be either unimportant or sufficiently explained, people do not allocate as much attention to it, and the event only triggers little affective reactions, if any.

We believe that our findings about the deleterious effect of changes in self-identity on savoring that follow outstanding experiences can be explained

using Wilson and Gilbert's perspective. First, by modifying one's self identity, outstanding events can shape the perceived self-relevance of future events. If John sees himself as a world traveler, going camping 15 kilometers away from home might not be perceived as very self-relevant or in line with his personal goals. He is less likely to invest attentional resources to this event, and therefore to savor it. Second, even if the event is self-relevant, the initial explanation that is given to it can determine how much additional cognitive work is necessary to understand its larger implications. For example, John is on a great vacation in South America but has a ''I'm a world traveler'' schema; he does not need to do further cognitive work to understand the meaning and the implications of the event. Thus, the situation quickly ceases to grab his attention, which has negative consequences on savoring. In contrast, Heather who is on the same vacation to South America but sees herself as an inexperienced traveler, has to do more cognitive work to alter her self-schemas and understand the implications of her Latin adventures for her goals and self-concept. Consequently, many things keep grabbing her attention, which increases savoring (i.e., being present, thinking about the travel once back home, anticipating future travels…).

Although the present research breaks new grounds in several ways, we must acknowledge that many important questions regarding the mechanism of experience-stretching remain unanswered. First, although we did not find support for the autonoetic comparison hypothesis, our results by no means suggest that people never make such comparisons. Clearly, naïve observation of everyday life shows that they do. Future research should try to delineate the circumstances under which individuals would engage in autonoetic rather than noetic comparisons, and how these two types of comparison might interact with regard to savoring.

Second, we have not tested empirically the two aforementioned mediators of noetic comparison (i.e., self-relevance and understanding). A more solid understanding of how the different mechanisms operate to produce

experience-stretching is necessary to design sound happiness interventions. Future research could, for example, manipulate the self-relevance and the understanding people have of positive events to measure subsequent changes in savoring.

Lastly, although compelling, Wilson and Gilbert's theory provides only one of other potential account for our findings. Another (and non-mutually exclusive) explanation could lie in the perception of abundance that is triggered when one judges a stimulus in regard with his outstanding past. Presumably, past experiences inform individuals about the likelihood that these experiences will occur in the future. If Jim has travelled many countries in the past, then he has reasons to believe that he will travel a lot in the future as well. According to Cialdini's (1993) scarcity principle, when a resource becomes scarce, it increases in value, making it more likely to be desired (e.g., Finkel & Eastwick, 2009; Lynn, 1992; Williams, Radefeld, Binning, & Sudak, 1993) and savored (Kurtz, 2008). Consequently the perception of abundance that emerges from one's rich experiential background could reduce the perceived value of a positive event (because there will be plenty occasions to experience it in the future) and, thus, diminish the motivation to savor it.

In sum, the present work provides evidence that experience-stretching is supported by noetic comparisons. Future research should now try to focus on breaking down these comparisons in order to nail the underlying cognitive processes (e.g., self-relevance, understanding, and perception of abundance) that lead to an impairment of savoring, and delineate their relative influence.

### *1.4. Can individual differences moderate the propensity towards experience-stretching?*

Because recent findings suggest that happy individuals might use the memories of their best past experiences to enhance their joy in the present,

rather than engaging in downward detrimental comparisons (Liberman et al., 2009), we investigated whether trait-happiness could moderate experience-stretching .

Our study provides evidence for this moderation. After taking a 10-week oenology class, participants with lower happiness scores showed decreased levels of enjoyment for a pleasant but rather simple wine in a blind test, whereas participants with higher happiness scores showed increased levels of enjoyment. It is indeed plausible that because happiness is related to a holistic way of processing information (Fredrickson & Branigan, 2005), happier participants might have perceived more similarities between past and present positive experiences. On the contrary, less happy participants would have processed information in a more analytic manner, paying exacerbated attention to the differences between past and present experiences. Although these underlying mechanisms have yet to be explored, our work demonstrates that experience-stretching is not a fatality—or at least not for everyone.

The present work has focused on dispositional happiness as a moderator of experience-stretching. However, other personality traits could also potentially modulate hedonic adaptation. For example, we have seen in Chapter 4 that neuroticism and harm avoidance were closely related to different aspects of mental time travel. Experience-stretching might also be weaker for individuals scoring high in self-directness (see Cloninger, 2004). Self-directed individuals tend to accept themselves more fully and might have a stronger propensity to integrate both great and simple life experiences as part of their self-identity. It would be therefore interesting to investigate the moderating role of personality in experience-stretching more extensively in future research.

Beyond the investigation of variations at the individual level, the potential existence of cultural variation in hedonic adaptation represents another exciting question for future research. Previous studies have demonstrated that the effect of positive life events on well-being is weaker among cultures

high in global well-being (Oishi, Diener, Choi, Kim-Prieto, & Choi, 2009). The tendency to overlook simple pleasures might thus be weaker in less happy societies (e.g., ex-Soviet countries, see Inglehart, 2004 for a ranking of happiness across nations) than in the Western world. Moreover, research has shown cultural variation in which emotions (and what intensity levels) are considered as pleasant or unpleasant feelings. For example, Americans tend to value and pursue high-arousal positive affective states (e.g., excitement, enthusiasm), whereas East Asians are likely to prefer low-arousal positive affective states (e.g., calm, peacefulness) (see Tsai, 2007 for a review). Given such cultural differences in the types of experiences people pursue and in the way they emotionally react to them, one can hypothesize that important cultural differences might exist in the propensity to experience-stretching.

Finally, future studies should also investigate whether the proclivity to undergo experience-stretching is a source or a consequence of happiness. Although our results suggest that differences in trait levels of happiness may modulate hedonic adaptation, it is also likely that experience-stretching can sometimes be a cause of (un)happiness. Indeed, by developing and practicing the relevant skills, people can exert some control over the extent and the speed of their hedonic adaptation (Lyubomirsky, in press). Strategies such as cultivating gratitude (Emmons & McCullough, 2003), imagining life without the good things we take for granted (Koo, et al., 2008), and engaging in various savoring behaviors (Bryant, 2003; Bryant & Veroff, 2007; Quoidbach, Berry, et al., 2010) can slow down adaptation to positive experiences and increase happiness. Therefore, it would be interesting to delineate in more depth the causal links that unite experience-stretching and happiness. More specifically, a fascinating question for future research on hedonic adaptation would be to examine whether proneness towards experience-stretching is a stable personal disposition.

## 2. Implications

With hundreds of books published each year, the enthusiasm for the quest for personal happiness as never been as strong as it is today. Becoming happier is not only a tremendous popular topic on the self-help shelves, it is also becoming a declared policy goal of an increasing number of governments throughout the world, with Gross National Happiness (GNH) supplementing the classic Gross Domestic Product (GDP) as an indicator of economic performance and social progress (Stiglitz, Sen, & Fitoussi, 2009).

Scientific evidence shows that objective life circumstances only account for 10% of the variance in people's happiness, leaving about 40% under their direct control (the remaining 50% being genetically determined; Lyubomirsky, Sheldon, et al., 2005). Therefore, researchers from the positive psychology movement have encouraged individuals to engage in what they call "*intentional activities*" to increase their happiness and recent years have witnessed an explosion of such scientifically validated happiness-inducing activities.

Among these activities, many aim at slowing down the natural process of hedonic adaption (see Lyubomirsky, 2008 for a review)—a goal that is believed to be one of the secret of sustainable happiness (Lyubomirsky, in press; Sheldon, Boehm, & Lyubomirsky, in press). It is for example recommended to keep a gratitude journal (Emmons & McCullough, 2003), to imagine one's life without a given positive element (Koo, et al., 2008), and to remember earlier times when what one now has was something only hoped for (Bryant & Veroff, 2007). We believe our work can bring valuable insight to the field of well-being interventions. It suggests that hedonic adaptation to positive events could be slowed down either by preventing experience-stretching from occurring and/or by increasing savoring behaviors.

### *2.1. Preventing experience-stretching*

Our findings suggest several ways people could prevent experience-stretching from turning their happiest moments into a detrimental source of downward comparisons.

A first way to prevent experience-stretching could be to frequently set our comparison standards to lower levels. For instance, one can purposely switch once in a while his or her favorite brand of breakfast cereals for a cheaper one. That way, he or she will be more likely to savor it instead of taking it for granted. This idea is in line with recent studies showing the positive psychological consequences of variety (e.g., Sheldon, et al., in press) and surprise (e.g., Wilson & Gilbert, 2008). We are currently testing the effect of such "giving up intervention" on subsequent savoring and preliminary results suggest that abundance can sometimes be less pleasurable than scarcity (Quoidbach & Dunn, in prep). Sixty participants were asked to taste of piece of chocolate and to report their enjoyment of it, while observers surreptitiously coded their non-verbal pleasure reactions. Participants were then randomly assigned to one of three experimental groups: a *scarcity group* in which participants were not allowed to eat chocolate for a week, an *abundance group* in which participants were provided with 500gr. of chocolate with the instructions to eat as much as they comfortably could during the next week, and a *control group* with no specific instructions. One week later, participants came back to the lab and tasted the initial piece of chocolate a second time. As expected, subjects did not differ in their self-report and observers-report savoring of the chocolate at Time 1. However, at Time 2, both the abundance and the control groups showed significant decrease in savoring, whereas the scarcity group savored the chocolate as much as the first time. Consequently, participants in the scarcity group ended up in a much better mood after eating the chocolate than their "luckier" counterparts who were given plenty of free chocolate.

Another avenue to prevent experience-stretching could rely in the exploitation of our findings about the role of self-identity. Recall that Chapter 7 showed that the self-identity associated with memories of outstanding experiences mattered more than these experiences per se. One could therefore imagine that regularly reflecting on how our most outstanding experiences are not part of our identity could deprive these memories from their deleterious consequences. Beyond prevention, experience-stretching could potentially be used in ways that are beneficial rather than detrimental for savoring. For example, well-being interventions and recommended activities could manipulate people's self-identity in ways that stresses the idea they have a relatively poor experiential background, which in turn should increase their desire to savor even simple pleasures.

Aside from happiness interventions, the present findings could also potentially be used in marketing. It would be interesting to see whether advertisements designed to make consumer feel like they are part of a connoisseur elite or not can shift preferences and purchase behaviors.

### *2.2. Increasing savoring*

Another way the present dissertation suggests happiness can be maximized is by increasing people's ability to savor life little pleasures. Indeed, individuals' final savoring reaction in face of a positive event is determined by their motivation to savor it (which is affected by experience-stretching) but also by their ability to do so. Therefore, even if experience-stretching has not occurred and one's initial motivation to savor a simple positive experience is high, he or she might not be able to do it because of low dispositional ability to up-regulate positive emotions. Conversely, a low motivation to savor caused by experience-stretching could potentially be compensated—at least partially—by a natural tendency to efficiently regulate positive emotions.

We have detailed in Chapter 2 four main ways individual can increase and prolong their daily positive emotional experiences: non-verbally expressing

positive emotions, staying in the present moment, sharing positive feelings with others, and thinking about positive events before and afterwards. Although people vary in their propensity to use these strategies (Nelis, Quoidbach, Hansenne, & Mikolajczak, in press), recent research shows that, among other emotion regulation skills, the ability to savor positive emotions can be successfully trained (Nélis, Quoidbach, Mikolajczak, & Hansenne, 2009).

Results from our study described in Chapter 4 suggest that these strategies have different effects on cognitive and emotional well-being. When experiencing positive events, focusing attention on the present moment and engaging in positive rumination increase and prolong positive emotions, whereas telling others promotes a feeling of life satisfaction. As the strategies targeted different components of well-being, our findings suggest that a key and novel element to increase people's ability to savor could be by promoting regulatory diversity. Indeed, we have found that the wider the range of savoring strategies participants used, the happier they reported to be, independently of their total savoring score.

Previous research has shown that several training that focused on a specific savoring strategy can result in significant increases in well-being. For example, we found that cultivating the ability to look forward to future positive personal events (i.e., positive mental time travel) leads to increases in happiness levels (Quoidbach, et al., 2009). The present findings on the importance of regulatory diversity could be used to inform future positive emotion regulation trainings and to increase their effectiveness. Moreover, interventions aimed at expanding participants' savoring strategy repertoire might also allow them to up-regulate their positive emotions in a broader range of situations, enhancing their flexibility (see Mikolajczak, 2009). For instance, if your typical savoring strategy is to share your positive experiences with your friends, improving your ability to mindfully contemplate the present

moment or to relish in mental simulations will help you savor positive moments even when no one is around.

## 3. Limitations

Although this study breaks new ground in several ways, we must acknowledge several limitations, which leave ample room for future research to probe or refine its findings.

First, a significant portion of the data collected as part of this dissertation was obtained on a sample of Belgian university workers. Although we believe such a population represents an interesting sample because it includes individuals of all ages and occupations (from theoretical physicists to custodial staff), it would be interesting to replicate our findings with participants from more diverse backgrounds. In particular, we have discussed the potential existence of cultural variations in the proneness to adapt to life events and future research should include participants from other cultures in order to generalize our findings.

Second, the present dissertation largely focuses on money and travel experiences, and one might wonder if experience-stretching can really be transposed to all kinds of experiences. With regard to this issue, we have conducted several additional studies that are not reported in this dissertation which show similar experience-stretching for other life domains. We found for example a significant negative correlation between the numbers of times participants ate at a restaurant that featured stars in the Michelin's guide and how much they reported they would savor a plate of spaghetti. Similarly, we found a significant negative correlation between the numbers of sexual partners participants had in the past and how attractive they found pictures of average looking potential partners (i.e., composite pictures of hundreds of faces). Recall also that the fifth study of Chapter 7 shows that remembering an outstanding experience in general (i.e., of unspecified content) can reduce

subsequent savoring of a day off. Nevertheless, future research should explore the experience-stretching hypothesis in a wider range of context in order to delineate which kinds of experiences are likely to impair savoring and which are not. For example, as suggested in Chapter 8, particularly complex experiences might not be as prone to hedonic adaptation.

Third, the present work mainly relies on self-reports to measure savoring. However, the last decade has witnessed a wealth of empirical demonstrations of people's surprisingly limited insight when it comes to predict their own behavior and emotions (Dunn, Wilson, & Gilbert, 2003; Epley & Dunning, 2006; Gilbert, Killingsworth, Eyre, & Wilson, 2009; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Gosling, John, Craik, & Robins, 1998; Vazire & Mehl, 2008; Wilson & Gilbert, 2003). People tend to overestimate, for example, how likely they are to donate to charity (Epley & Dunning, 2000), complete important tasks ahead of schedule (Buehler, Griffin, & Ross, 1994), and how they would react to a wide range of emotional events (see Gilbert & Wilson, 2007; Gilbert & Wilson, 2009 for recent reviews). Therefore, one cannot exclude that the relationships between personal experiences and savoring have been artificially inflated by such overestimations of future savoring behaviors. Fortunately, we can present some reassuring evidence in these regards as the wealth prime used in Chapter 6 had similar deleterious effects on self-report and objective behavioral measures of savoring (i.e., munching time). Nonetheless, it would be interesting—even if somehow challenging—for future research to replicate and extend the present findings using more objective measures of savoring (e.g., experience sampling, informant-reports, physiological indicators of positive emotion regulation, etc.).

Fourth, the articles reported in our dissertation explored the interrelationships between wealth, outstanding experiences, and savoring using classic linear statistics. Although linear regressions are typically used and widely understood, they might only reflect a simplified version of reality. For example, one may hypothesize that the relationship between past

experiences and savoring is curvilinear. In that case an individual would have to live a minimum number of outstanding past experiences to truly appreciate a positive event (e.g., knowing enough about wine to be able to enjoy it) but not too many in order not to ruin the motivation to savor it (e.g., not being able to enjoy house wines because of one's numerous exposure to higher quality wines). These considerations also raise the question of a potential threshold of experiences under which one's savoring ability remains intact. A certain number (or frequency) of outstanding experiences might be necessary for one's experience to stretch (e.g., three vacation trips a year). Research on money and happiness has previously shown such threshold effect. For instance, analyses from a recent Gallup survey show that money matters a great deal for happiness when people are making fewer than 60,000 dollars a year: individuals get progressively unhappier the poorer they are. Above that threshold, however, money and happiness are unrelated (Kahneman, 2010).
Therefore, future studies should try to refine the present findings using more sophisticated statistics to better understand the potential subtleties of experience-stretching.

Finally, as we have previously mentioned, future research is also needed to investigate in more depth the underlying mechanisms that drive experience-stretching (see p.155-156).

## 4. Ongoing Follow-up Studies and Future Perspectives

Throughout the previous sections of this dissertation, we have described a number of additional studies that ought to be conducted in order to refine our findings and to palliate several methodological issues. This section presents additional ongoing studies and future research projects that does not stem directly from limitations but rather extends our work on experience-stretching.

*Beyond happiness*

In addition to being a desirable state in itself, happiness is a crucial determinant of many positive outcomes in life such as mental and physical health, fulfilling social and romantic life, and job performance (see Lyubomirsky, et al., 2005 for a review). Amassing money and engaging in outstanding experiences could therefore bear downstream negative consequences in these domains as well. Along with happiness, it would be interesting to investigate the impact of experience-stretching on other indicators of adjustment in future research.

*The paradoxical benefits of adversity*

Although the present work focus on the deleterious consequences of money, luxury, and outstanding experiences, another fruitful avenue for future research would be to investigate the flipside of experience-stretching, that is, how adversity can increase savoring. Indeed, if awesome experiences carve our self-identities in ways that impair savoring, it is reasonable to believe that the opposite might be true. Much anecdotal evidence suggests that a serious accident, a terrible disease, or a near death experience can change people's outlook on life and how precious it is. We are currently conducting a 3-study research project to investigate empirically this paradoxical notion that "bad can be good".

The first study is correlational. We are administering to a large sample of American adults a series of questionnaires that measure how many important negative life events they experienced over the course of their life (e.g., getting fired, divorce, illness…) as well as their happiness and ability to savor life small pleasures. We hypothesize that, in direct opposition to money and outstanding experiences, the more adversity one experienced, the more he or she should savor life. We further hypothesize that this increase in savoring partially suppresses the negative relationship between negative life events and happiness, such that individuals who underwent traumatic experiences are not as unhappy as one would expect.

The second study we are currently conducting aims at testing our hypothesis that adversity can increase savoring with a direct experimental manipulation, allowing causal inference. One group of participants is asked to reflect on their worst life experience before completing different savoring measures, while the other group simply completes the savoring measures. In addition participants who have to reflect on their worst experience are asked to do so either by focusing on how the negative event shaped the person they are now or by focusing on how the negative event does not define who they are now. In line with the findings reported in the present dissertation, we are expecting that recalling a very negative experience can temporarily increase savoring, especially when one feels this experience is tied to his or her identity.

Finally, the third study, still in preparation, aims at expanding our investigation of the hidden benefits of adversity in a population of subjects that underwent a serious medical condition: colectomy patients. Our goal is to compare, using a behavioral measure of savoring (i.e., the chocolate eating task), how much pleasure colectomy patients withdraw from eating chocolate compare to matched controls.

*The value of expertise*

Building on our findings that oenology students with low levels of dispositional happiness ended up liking less a wine they once quite appreciated, we are currently running a research project that questions the value of expertise.

Many people join photography clubs, undertake gastronomic tours, and take wine-tasting, music, or fashion classes to sharpen their knowledge of the things there are passionate about. Although the goal of these individuals is most often to learn to better appreciate the things they love, our findings suggest that, ironically, it may have the opposite effect. This could be at least the case for people with less sunny dispositions, who would only gain from expertise "new tools" to express their proclivity to dissatisfaction.

In order to test this idea, we are currently comparing Jazz novices and experts' reactions to stimuli of varying levels of quality (e.g., from "elevator Jazz" to all-time Jazz classics), and investigating how personality traits modulate enjoyment in both groups. Likewise, we are running a study on video games enjoyment with regard to the happiness x expertise interaction. Participants are asked to play the first level of a racing video game and to report their enjoyment of it. They are then trained on more complicated races of the game (levels 2 to 5). Lastly, participants are asked to play the first easy level one more time and to report their enjoyment. In line with our previous work, we are expecting that gain in expertise will translate into increased enjoyment for dispositionally happy players (e.g., trying to beat one's previous top score), whereas players with less happy dispositions will show decreased enjoyment of the game (e.g., finding it too easy).

## 5. General Conclusion

Our thesis offers the first evidence for the intuitively appealing—yet previously untested—notion that experiencing the best things in life can undermine the ability to enjoy simpler pleasures.

On the theoretical level, we hope that our work provides a novel contribution to the field of hedonic adaptation by shedding light on some of the underlying mechanisms through which people adapt to positive life circumstances. First, although many studies have demonstrated the hedonic treadmill (i.e., happiness levels remain stable despite improving life circumstances), the present research is the first one that offers an explanation on how this might happen concretely. What wealth and outstanding experiences give with one hand, they take it away with the other by altering people's motivation to up-regulate their emotions (i.e., savoring). Moreover, our findings supply, for the first time, some evidence with regard to the nature of comparative judgments that lead individuals to adapt to positive events.

On the practical level, we hope that our work can bring valuable insight about what makes people happy and how to increase well-being. While the world has recently witnessed the limitations of short-sighted capitalism the hard way, our findings further highlight, at the individual level, the danger of chasing luxury and top-dollar experiences. One can quickly develop self-perceptions that drive him or her away from the small pleasure of daily living. Yet, as shown by our data and beautifully said by Nietzsche in our opening quote, *"the least, the softest, lightest, a lizard's rustling, a breath, a flash, a moment, a little makes the way of the best happiness."*

Maybe the famous painter Pablo Picasso had found the key to happiness when he said *"I'd like to live as a poor man with lots of money."*

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