Chapter 14
Optimizing Happiness

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Abstract We consider a resource allocation problem in which time is the principal resource. Utility is derived from time-consuming leisure activities, as well as from consumption. To acquire consumption, time needs to be allocated to income generating activities (i.e., work). Leisure (e.g., social relationships, family, and rest) is considered a basic good, and its utility is evaluated using the Discounted Utility Model. Consumption is adaptive and its utility is evaluated using a reference-dependent model. Key empirical findings in the happiness literature can be explained by our time allocation model. Further, we examine the impact of projection bias on time allocation between work and leisure. Projection bias causes individuals to overrate the utility derived from income; consequently, individuals may allocate more than the optimal time to work. This misallocation may produce a scenario in which a higher wage rate results in a lower total utility.

14.1 Introduction

> "The constitution only gives you the right to pursue happiness. You have to catch it yourself."
>
> — Benjamin Franklin

The Ancient Greeks believed that happiness was controlled by luck, fate, or the gods and was beyond human control [38]. Socrates and Aristotle regarded the human desire to be happy as self-evident and focused instead on how to become happy. In recent years, the science of happiness has emerged as a new area of research that attempts to determine what makes us happy. This area of research has at its foundation the measurement of happiness or well-being by means of self-reports.

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In line with Easterlin [16] and Frey and Stutzer [21], we use the terms happiness, well-being and life satisfaction interchangeably and assume that these measures are a satisfactory empirical approximation of individual utility.

In developed countries, particularly in the United States, economic progress is a key factor in improving individuals' well-being. Tocqueville [55] observed, "The lure of wealth is therefore to be traced, as either a principle or an accessory motive at the bottom of all that the Americans do, this gives to all their passions a sort of family likeness." Survey results show, however, that happiness scores have remained flat in developed countries despite considerable increases in average income. In Japan, for example, a fivefold increase in real per capita income has led to virtually no increase in average life satisfaction (Figure 14.1). A similar pattern holds for the United States and Britain. In spite of these survey results, we contend that most people believe that more money will buy them more happiness.

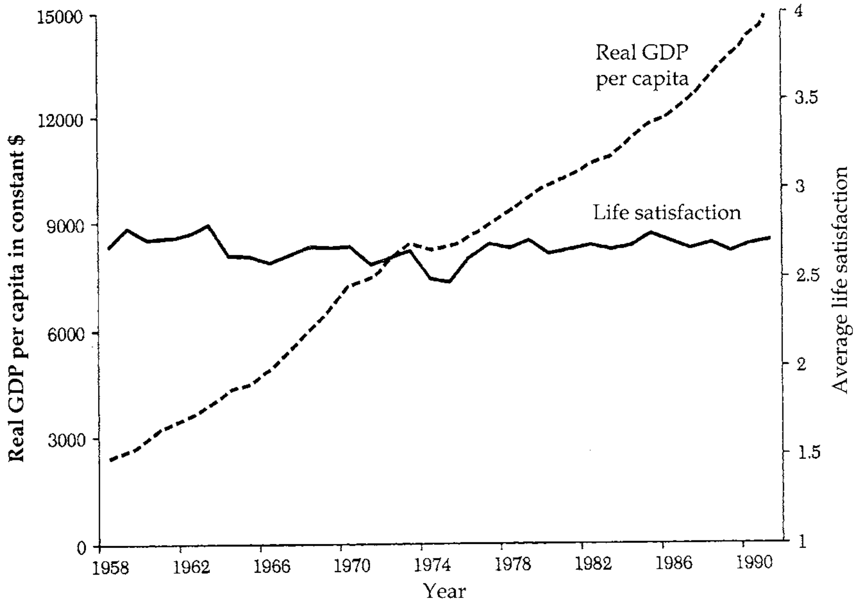

Fig. 14.1 Satisfaction with life and income per capita in Japan between 1958 and 1991. *Source:* [21, figure 2]

The purpose of this chapter is twofold. The first is to show that an adaptation and social comparison model of time allocation is consistent with key empirical findings on the relationship between money and happiness. The second is to show that under the plausible psychological assumption of projection bias there could be a misallocation of time resulting in some paradoxical predictions. It is because of projection bias that individuals believe that more money will buy them a lot more happiness than it actually does, and this may even lead to a scenario in which a higher wage rate results in a lower total utility.

We present our adaptation and social comparison model of time allocation in Section 14.2. An individual allocates a fixed amount of time between work and leisure in each period. The total utility is the discounted sum of utility derived from consumption and leisure. Leisure (e.g., time spent with friends and family) provides direct utility and is not adaptive. In contrast, there is evidence in the literature that beyond a set level of income at which basic needs are met, consumption is adaptive. The carrier of per-period utility of consumption is therefore the relative consumption with respect to a reference level. In general, the reference level of consumption depends on past consumption and social comparison. A rational individual will allocate the same fixed proportion of time to work and leisure in each period (say 40% to work and 60% to leisure) and choose an increasing consumption path over time.

In Section 14.3, we summarize some key empirical findings from the "happiness" literature. Our model, under the assumption of optimizing individual utility, is consistent with some of the findings in the literature. Our model can explain (1) why happiness scores in developed countries are flat in spite of considerable increases in average income and (2) why there is a positive relationship between individual income and happiness within a society at any given point in time. However, this optimization model cannot explain, without some further assumptions, the puzzle: *Why do we believe that more money will buy us lot more happiness than it actually does?*

In Section 14.4, we introduce projection bias into our model. Projection bias causes people to underestimate the effects of adaptation, which in turn causes them to overestimate the utility derived from adaptive goods. This is akin to buying more food at the grocery store when hungry or ruling out the possibility of a large turkey dinner for Christmas after finishing a hearty meal at Thanksgiving. Similarly, an individual who moves to a more prosperous neighborhood may insufficiently account for the increased desire for fancy cars and a higher standard of living that will occur once he begins to compare himself to and identify with his new neighbors. A pernicious effect of projection bias may be that an individual continues to allocate more and more time to work at the expense of leisure.

In Section 14.5, we examine the impact of wage rate on total utility. Under projection bias, an individual may allocate a greater amount of time to work than what is optimal. The resulting misallocation of time between work and leisure could actually lower total utility at higher wage rates.

Social comparison has been found to be a determinant of behavior in both human and animal studies. In Section 14.6, we examine the implications of our model when reference levels are influenced by social comparison.

An underlying tenet of our human condition is that to gain happiness, you must either earn more or desire less. Indeed, in our model, initial adaptation level and social comparison act to reduce the available budget. Reference levels can be moderated through reframing or perspective seeking activities. Such activities, however, require an investment of time. In Section 14.7, we extend the time allocation model to include the possibility that reference levels can be influenced by investing time in reframing activities such as meditation or other spiritual practices.

Finally, we conclude our chapter in Section 14.8 and discuss some implications of our model to improve individual and societal well-being.

14.2 Time Allocation Model

We consider a simple model of work–leisure decisions. In each period t, $t = 1$ to T, an individual divides one unit of time between work, w_t, and leisure, ℓ_t. Work produces income at a rate of μ units of money per unit of time spent at work. For simplicity, this wage rate is constant over the T periods. The individual anticipates the total amount of income generated by work during the entire planning horizon $(\mu \sum_{t=1}^{T} w_t)$ and plans consumption, c_t, $t = 1$ to T, so that total consumption $(\sum_{t=1}^{T} c_t)$ does not exceed total income. For simplicity, we assume that the individual borrows and saves at an interest rate of zero percent. We also set the price of the consumption good to a constant over time that is equal to one unit.

The individual derives utility from both consumption (i.e., necessities and conveniences of life) and leisure (e.g., time spent with friends and family, active and passive sports, rest). We assume that the per-period utility derived from consumption and leisure is separable and that the total utility is simply the discounted sum of per-period utilities.

We posit that leisure provides direct utility and is not reference dependent. One always enjoys time spent with friends and family. Sapolsky et al. [47] observed that amongst the baboons of the Serengeti, those who had more friends suffered from less stress (measured by levels of stress hormones including cortisol). Cicero said, “If you take friendship out of life, you take the sun out of the world.” Similarly, family warmth, sleep, sex, and exercise improve life satisfaction. Some aspects of leisure could indeed be adaptive, but Frank [19] argues that conspicuous consumption is much more adaptive than leisure. Leisure is often consumed more privately and is valued for itself and not often sought for the purpose of achieving prestige or status. Solnick and Hemenway [53] found that vacation days are not reference dependent. Similarly, consumption of basic goods (food and shelter) is not adaptive. Since a large part of consumption in affluent societies is adaptive, we assume for simplicity that consumption is reference dependent, but that leisure is not. Our results should hold with the weaker assumption that consumption is more reference dependent than leisure.

There is considerable evidence that the utility derived from consumption depends primarily on two factors: (1) adaptation or habituation to previous consumption levels and (2) social comparison to a reference or peer group [6, 8, 16–20, 32].

A woman who drives a rusty old compact car as a student may find temporary joy upon acquiring a new sedan when she lands her first job, but she soon adapts to driving the new car and assimilates it as a part of her lifestyle. Brickman et al. [6] find that lottery winners report only slightly higher levels of life satisfaction than the control group just a year after their win (4.0 versus 3.8 on a 5-point scale). Clark [8] finds evidence that job satisfaction—a component of well-being—is strongly related to changes in pay, but not levels of pay. Klein [30] reports that when monkeys were offered raisins and not the customary apple, their neurons fired strongly in response to the welcome change. After a few repetitions, this euphoria stopped as the animals had adapted to the better food. People also adapt to country clubs and dining in fine restaurants. A crucial implication of adaptation is that the utility derived from the same \$3,000 per month worth of consumption is quite different for someone who is used to consuming that amount of goods and services than for someone who is used to consuming only \$2,000 per month. Several authors have proposed models that account for adaptation in the determination of the total utility of a consumption stream [42, 45, 59, 60].

In addition to adaptation, the utility derived from consumption also depends on the consumption of others in an individual's peer group. Driving a new Toyota sedan when everyone else in the peer group drives a new Lexus sedan seems quite different than if others in the peer group drive economy cars. Frank [18, 19] provides evidence from the psychological and behavioral economics literature that well-being or satisfaction depends heavily on social comparison. Solnick and Hemenway [53, table 2] asked students in the School of Public Health at Harvard to choose between living in one of two imaginary worlds in which prices are the same. In the first world, you get \$50,000 a year, while other people get \$25,000 a year (on average). In the second world, you get \$100,000 a year, while other people get \$250,000 a year (on average). A majority of students chose the first world.

People are likely to compare themselves to those who are similar in income and status. A university professor is unlikely to compare herself to a movie star or a homeless person. She will most likely compare her lifestyle to those of other professors at her university and similarly situated colleagues at other, comparable universities. Medvec et al. [39] find that Olympic bronze medalists are happier than Olympic silver medalists, as the former compare themselves to the athletes who got no medal at all, whereas the latter have regrets of missing the gold.

Relative social position influences biochemical markers such as serotonin in vervet monkeys [37]. When a dominant monkey is placed in an isolation cage, a new monkey rises to the dominant position. The serotonin level increases in the newly dominant monkey and decreases in the formerly dominant monkey. Elevated levels of serotonin are found in the leaders of college fraternities and athletic teams. Higher concentrations of serotonin are associated with better mood and enhanced feelings of well-being.

We now state our adaptation and social comparison model of time allocation. We assume the discount factor to be 1. The set of decision variables in our model comprises three vectors, each with T components. The first vector is leisure, $\mathbf{l} = (\ell_1, \ell_2, \ldots, \ell_T)$, measured in time units. The second vector is work, $\mathbf{w} = (w_1, w_2, \ldots, w_T)$, also measured in time units. The third vector is consumption, $\mathbf{c} = (c_1, c_2, \ldots, c_T)$, measured in dollars. All three vectors take non-negative values. The individual's total utility, interpreted as happiness or life satisfaction, is given by

$$V(\mathbf{l},\mathbf{c}) = \sum_{t=1}^{T} u(\ell_t) + \sum_{t=1}^{T} v(c_t - r_t), \tag{14.1}$$

$$r_t = \sigma s_t + (1-\sigma)a_t,\ t = 1,\ldots,T, \tag{14.2}$$

$$a_t = \alpha c_{t-1} + (1-\alpha)a_{t-1},\ t = 2,\ldots,T, \tag{14.3}$$

where a_1 and s_t, $t = 1,\ldots,T$, are given.

In the above model, r_t is the reference level in period t. The reference level is a convex combination of social comparison level, s_t, and adaptation level, a_t. The adaptation level is the exponentially weighted sum of past consumptions in which recent consumption levels are given greater weight than more distant past consumption levels.

For the remainder of the chapter, the initial adaptation level, a_1, will be set to zero by default. Both u and v are normalized to take a value of zero if evaluated at zero. The first component, u, is the contribution of leisure to happiness; the second component, v, is the contribution of consumption to happiness. Both u and v are concave and twice differentiable. To capture the phenomenon of loss aversion [28, 56], we allow v to be non-differentiable at zero, with $v'(0^-) \geq v'(0^+)$.[1] Loss aversion is an important feature of adaptation models, as it imparts the behavioral property that the individual will be reluctant to choose negative values for the argument of v—that is, to choose consumption below the adaptation level (see Figure 14.2).

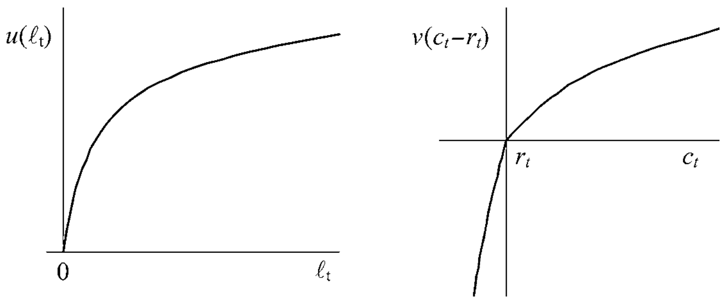

Fig. 14.2 Exemplary per-period utility for leisure and consumption

That leisure is considered a basic good implies that the per-period utility of leisure depends solely on the leisure time experienced during that period. For basic goods, the Discounted Utility Model is appropriate [4]. In contrast to leisure, consumption is considered an adaptive good. It contributes positively to happiness during a given period only if consumption is above some reference point; consumption

[1] It is appropriate to think of v as the value function of prospect theory. This function is usually taken to be concave for gains and convex for losses. As our focus is on the positive region of v, we assume for mathematical tractability that v is concave throughout. Empirical evidence shows that v is close to linear in the negative domain [1], so that the assumption of concavity for gains and linearity for losses is not farfetched.

below the reference point yields unhappiness. The dynamics of the adaptation level, a_t, are endogenously determined by the individual's own behavior. Specifically, the adaptation level is a convex combination of past consumption and past adaptation level [3, 59]. The parameter α measures the speed of adaptation. If $\alpha = 0$, then the reference level does not change and consumption is a basic good (for example, food and shelter in poor countries). If $\alpha = 1$, then the reference level is always equal to the previous period's consumption (e.g., buying a car in the next period that is worse than the current car would feel like a loss). For mathematical tractability and insight, we will often set $\alpha = 1$ in our examples.

Work does not contribute to utility, but does provide the budget to purchase consumption. An individual can plan consumption based on their total lifetime income. As there is just one unit of time available per period, time spent at work reduces the available time for leisure. Work yields μ monetary units per unit of time. With this in mind, the individual faces the following obvious time and money constraints:

$$\ell_t + w_t \leq 1, \ \ t = 1, \ldots, T, \quad \text{and} \tag{14.4}$$

$$\sum_{t=1}^{T} c_t \leq \mu \sum_{t=1}^{T} w_t. \tag{14.5}$$

14.2.1 Optimal Allocation

The goal is to choose $(\mathbf{l}, \mathbf{w}, \mathbf{c})$ so as to maximize $V(\mathbf{l}, \mathbf{c})$. To explicitly solve for the optimal time and consumption allocation problem, it is convenient to define *effective consumption* as $z_t = c_t - r_t$. We redefine the problem as one of finding the optimal values of ℓ_t and z_t in the usual form of a discounted utility model. The next step is to express the budget constraint, (14.5), in terms of z_t. To do so, we use the definition of effective consumption and the dynamics of (14.2) and (14.3) to write

$$c_t = z_t + \sigma s_t + (1-\sigma)a_t, t = 1, \ldots, T, \quad \text{and} \tag{14.6}$$

$$\begin{aligned} a_t &= \alpha c_{t-1} + (1-\alpha)a_{t-1} \\ &= \alpha z_{t-1} + \alpha\sigma s_{t-1} + (1-\alpha\sigma)a_{t-1}, \quad t = 2, \ldots, T+1. \end{aligned} \tag{14.7}$$

One can then recursively calculate the overall lifetime consumption. In the general case where both α and σ are strictly positive, we have

$$\sum_{t=1}^{T} c_t = \sum_{t=1}^{T} \kappa_t (z_t + \sigma s_t) + \frac{(\kappa_0 - 1)}{\alpha} a_1, \quad \text{where} \tag{14.8}$$

$$\kappa_t = \frac{1 - (1-\sigma)(1-\alpha\sigma)^{T-t}}{\sigma}, \quad t = 0, \ldots, T. \tag{14.9}$$

To see this, let C, Z, S, and A denote the summation from $t = 1$ to T of c_t, z_t, s_t, and a_t, respectively. Adding expression (14.6) from 1 to T and expression (14.7) from 2 to $T+1$ (defining a_{T+1} in the obvious way) yields

$$C = Z + \sigma S + (1-\sigma)A, \quad \text{and}$$
$$A + a_{T+1} - a_1 = \alpha Z + \alpha\sigma S + (1-\alpha\sigma)A.$$

From the second equation, we have that $A = Z/\sigma + S + (a_1 - a_{T+1})/\alpha\sigma$, which we plug into the first equation to obtain

$$C = \frac{1}{\sigma}(Z + \sigma S) + \frac{1-\sigma}{\alpha\sigma}(a_1 - a_{T+1}). \tag{14.10}$$

Using (14.7), one can verify that

$$a_{T+1} = \alpha \sum_{t=1}^{T} (1-\alpha\sigma)^{T-t}(z_t + \sigma s_t) + (1-\alpha\sigma)^T a_1.$$

Replacing a_{T+1} in (14.10) produces (14.8) and (14.9).

If $\sigma = 0$, then we notice that $c_t = z_t + a_t$ and that $a_t = \alpha z_{t-1} + a_{t-1}$. Using induction it follows that

$$\sum_{t=1}^{T} c_t = \sum_{t=1}^{T} (1 + (T-t)\alpha) z_t + T a_1. \tag{14.11}$$

Finally, if $\alpha = 0$, adding expression (14.6) from 1 to T produces

$$\sum_{t=1}^{T} c_t = \sum_{t=1}^{T} (z_t + \sigma s_t) + (1-\sigma) T a_1. \tag{14.12}$$

We assume the general case in which $\alpha, \sigma > 0$. Replacing (14.8) in the left-hand side of (14.5), using $\sum_{t=1}^{T} w_t = T - \sum_{t=1}^{T} \ell_t$ in the right-hand side of (14.5) and rearranging terms produces

$$\max_{(\mathbf{l},\mathbf{z})} \; V(\mathbf{l},\mathbf{z}) = \sum_{t=1}^{T} u(\ell_t) + \sum_{t=1}^{T} v(z_t), \tag{14.13}$$

$$\text{s.t.} \quad \mu \sum_{t=1}^{T} \ell_t + \sum_{t=1}^{T} \kappa_t z_t \le \mu T - \sum_{t=1}^{T} \sigma \kappa_t s_t - \frac{\kappa_0 - 1}{\alpha} a_1. \tag{14.14}$$

The first order conditions are

$$u'(\ell_t) = \mu\lambda, \; t = 1, \ldots, T, \text{ and} \tag{14.15}$$
$$v'(z_t) = \kappa_t \lambda, \; t = 1, \ldots, T. \tag{14.16}$$

It is interesting to examine expression (14.14). The left-hand side contains the drivers of utility: leisure time and effective consumption. The wage rate increases not only the price of leisure (in reality, it makes consumption more affordable) but also the maximum budget, μT. Effective consumption is multiplied by the coefficient, κ_t, which is easy to see from (14.9) that it is decreasing in t. If we interpret this coefficient as a price, we observe that effective consumption is more expensive to purchase at the beginning of the planning horizon than at the end. The reason for this, of course, is that early consumption above the adaptation level increases future adaptation levels.

The right-hand side of (14.14) contains the constraints of the drivers of utility. The main constraint is the total money that could be earned if all available time were to be spent working, μT. This maximum budget is reduced by (a weighted sum of) the social comparison level and the initial adaptation level. Subsequent adaptation levels are not included, as they follow endogenously from the optimization program. In summary, *social comparison and current adaptation reduce the available budget*.

We assume that the right-hand side of the modified budget constraint (14.14) is non-negative. It follows from (14.15) that the optimal time allocated to leisure, ℓ_t, is the same in every period. Let ℓ denote this constant value. The remaining time is devoted to work, $w = 1 - \ell$, which is also constant.

We now examine (14.16). Knowing that κ_t is decreasing and that v' is strictly decreasing implies that the optimal effective consumption, z_t, is necessarily increasing over time. To ensure that $z_1 \geq 0$, it is sufficient to have $v'(0^-) \geq \kappa_1 u'(0)/\mu$. That effective consumption is increasing is intuitive. Recall that consumption above the adaptation level yields positive utility during the current period, but lowers utility during the subsequent periods as it increases the adaptation levels. This negative effect fades the closer one gets to the final period. Hence, optimal planning induces increasing values of z_t. Of course, increases in z_t produce increases in c_t, as is evident from expression (14.8). This expression shows that an increase in z_t directly translates to an increase in c_t and an additional increase in $c_{t+1}, \ldots, c_T$. Hence, consumption increases more than effective consumption.

In the optimal plan, a decision maker follows a regular schedule of w hours of work and ℓ hours of leisure. Both consumption and effective consumption are increasing, which means saving in early periods, followed by borrowing later in life. If the consumption good is not adaptive, $\alpha = 0$, and there is no social comparison, $\sigma = 0$, then it follows from (14.6) that consumption and effective consumption are constant, as $c_t = z_t + a_1$.

It is possible to find a closed form solution if both u and v take a power form with the same exponent β, that is, $u(\ell) = \ell^\beta$ and $v(z) = z^\beta$, $\ell, z \geq 0$. In this case,

$$\ell = \frac{\mu T - \sum_{t=1}^{T} \sigma \kappa_t s_t - ((\kappa_0 - 1)/\alpha) a_1}{\mu T + \mu^{1/(1-\beta)} \sum_{t=1}^{T} (1/\kappa_t)^{\beta/(1-\beta)}} \quad \text{and} \tag{14.17}$$

$$z_t = \frac{\mu T - \sum_{t=1}^{T} \sigma \kappa_t s_t - ((\kappa_0 - 1)/\alpha) a_1}{\kappa_t^{1/(1-\beta)} (1/\mu)^{\beta/(1-\beta)} T + \kappa_t^{1/(1-\beta)} \sum_{t=1}^{T} (1/\kappa_t)^{\beta/(1-\beta)}}. \tag{14.18}$$

Assuming $\beta > 0$, we verify that time spent on leisure decreases with social comparison level, initial adaptation, and wage. In contrast, effective consumption increases with wage. Actual consumption can be derived from effective consumption using (14.6) and (14.7).

14.3 Income–Happiness Relationship

Total utility in our model is regarded as an empirical approximation of happiness. Aristotle believed that happiness must be judged over a lifetime and that its constituent parts included wealth, relationships, and bodily excellences (e.g., health and beauty). To Bentham [5], happiness was attained by maximizing the positive balance of pleasure over pain as measured by experienced utility [29]. He argued that human affairs should be arranged to attain the greatest happiness for the greatest number of people.

In recent years, researchers have been able to measure happiness and have collected a great deal of empirical data that relates income, as well as other social and biological factors, to happiness. Happiness in these surveys is measured by *asking* people how satisfied they are with their lives. A typical example is the *General Social Survey* [12], which asks "Taken all together, how would you say things are these days—Would you say that you are very happy, pretty happy, or not too happy?" In the World Values Survey, Inglehart and colleagues [24] use a 10-point scale with 1 representing dissatisfied and 10 representing satisfied to measure well-being. Pavot and Diener [41] use five questions each rated on a scale from one to seven to measure life satisfaction.

Davidson et al. [9, 11] have found that when people are cheerful and experience positive feelings (e.g., funny film clips), there is more activity in the front left section of their brains. The difference in activity between the left and right sides of the prefrontal cortex seems to be a good measure of happiness. Self-reported measurements of happiness correlate with this measure of brain activity, as well as with ratings of one's happiness made by friends and family members [33]. Diener and Tov [13] report that subjective measures of well-being correlate with other types of measurements of happiness, such as biological measurements, informant reports, reaction times, open-ended interviews, smiling behavior, and online sampling. Kahneman et al. [26] discuss biases in measuring well-being that are induced by using a focusing illusion in which the importance of a specific factor (e.g., income, marriage, health) is exaggerated by drawing attention to it. Nevertheless, Kahneman and Krueger [25] argue that self-reported measures of well-being may be relevant to future decisions, as idiosyncratic effects are likely to average out in representative population samples. Frey and Stutzer [21] conclude as follows: "The existing research suggests that, for many purposes, happiness or reported subjective well-being is a satisfactory empirical approximation to individual utility."

If people pursue the goal of maximization of happiness and have reported their happiness levels truthfully in the variety of surveys discussed above, then how do we explain that happiness scores have remained flat in spite of significant increases in real income over time (Figure 14.1)? Of course, happiness depends on factors other than income such as the genetic makeup of a person, family relationships, community and friends, health, work environment (unemployed, job security), external environment (freedom, wars or turmoil in society, crime), and personal values (perspective on life, religion, spirituality). Income, however, does influence an individual's happiness up to a point and has a moderating effect on the adverse effects of

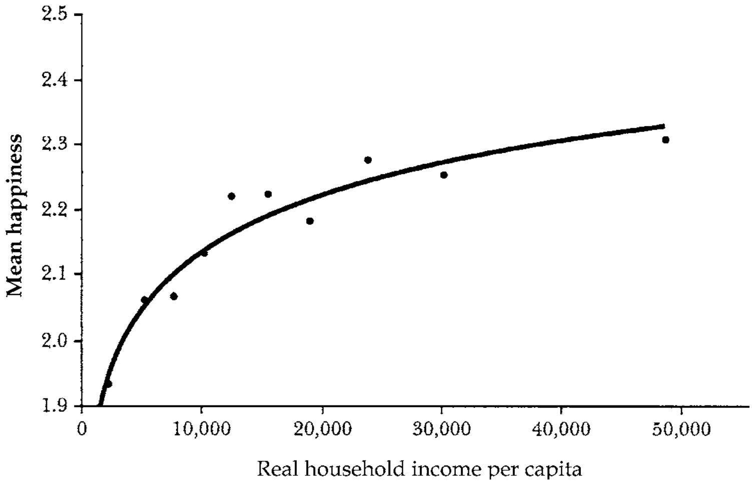

Fig. 14.3 Mean happiness and real household income for a cross-section of Americans in 1994. *Source:* diTella and MacCulloch [14]

some life events [52]. As shown in Figure 14.3, mean happiness for a cross-section of Americans does increase with income, though at a diminishing rate. In fact, richer people are substantially happier relative to poorer people in any given society.

Our time allocation model is consistent with the joint empirical finding that happiness over time does not increase appreciably in spite of large increases in real income, but happiness in a cross-section of data does depend on relative levels of income. That rich people are happier than poor people at a given time and place is easy to justify even by the Discounted Utility Model. Income effects are magnified if the reference level depends on social comparison as, by and large, richer people have a favorable evaluation of their own situation compared to others. Over time, though, both rich and poor people have significantly improved their living standards, but neither group has become happier. Adaptation explains this paradoxical finding.

Consider Mr. Yoshi, a young professional living in Japan in the 1950s. He was content to live in his parents' house, drive a used motorcycle for transportation, wash his clothes in a sink and listen to the radio for entertainment. Also consider Ms. Yuki, a young professional living in Japan in the 1990s. She earns five times the income of Mr. Yoshi in real terms. She wants her own house, automobile, washing machine, refrigerator, and television. She travels abroad for vacation and enjoys expensive international restaurants. Because Mr. Yoshi and Ms. Yuki are in similar social positions for their times, then both will have the same level of happiness. Happiness does not depend on the absolute level of consumption, which is substantially higher for Ms. Yuki. Instead, happiness depends on the level of consumption relative to the adaptation level. Ms. Yuki has become adapted to a much higher level of consumption and therefore finds that she is no happier than Mr. Yoshi. In our time allocation model, as the wage rate (μ) increases, total utility stands still if the initial reference point (r_1) also increases in the same manner calculated by the model. Thus, the “Easterlin Paradox”—that happiness scores have remained flat in developed countries despite considerable increases in average income—can be explained by the total utility maximization, provided the initial reference level, which measures expectations, increases with prosperity. Happiness scores for poorer countries have in fact increased over time as the increased income has provided for additional basic goods such as adequate food, shelter, clean water, and health care.

Many authors have given a qualitative argument that the reference point is higher for a person living in 1990s Japan than in 1950s Japan. Actually, we now show that as μ increases, total utility stands still if a_1 increases. In the following numerical example, we set $\alpha = 1$ and $\sigma = 0$. An individual with $a_1 = 0$ and $\mu = 1$ would obtain a total optimal utility of 11.4. This is obtained by solving the leisure–consumption problem (14.1) assuming the power form for u and v with exponent 0.5. This same optimal total utility is obtained by setting $\mu = 5$ and $a_1 = 3.4$. Thus, a substantial increase in wage does not lead to an increase in total utility if the initial reference level has also increased.

So far, we have seen that our time allocation model is consistent with empirical findings that within a country richer people are happier than poorer people, but, for prosperous countries, well-being does not increase over time in spite of permanent increases in income for all. In a survey in the United States, when asked to specify a single factor that would most improve their quality of life, the most frequent answer was “more money.” Thus, the puzzle remains: why do people believe more money will buy them more happiness when in fact it may not. There is also some evidence that people are working harder at the expense of leisure; sleep time has gone down from 9.1 h per night to 6.9 h per night during the 20th century. The misallocation of time between work and leisure is difficult to prove, but we will show that under the plausible psychological assumption of projection bias such a misallocation is indeed possible.

14.4 Predicted Versus Actual Happiness

> The great source of both the misery and disorders of human life, seems to arise from over-rating the difference between one permanent situation and another.
>
> — Adam Smith (1759, Part III, Chapter III]

If people plan optimally, then they will maximize happiness by appropriately balancing time devoted to work and to leisure and by choosing an increasing consumption path. Optimal planning, however, requires that one correctly predict the impact of current consumption on future utility. An increase in consumption has two perilous effects on future utility. First, the adaptation level goes up and therefore future experienced utility declines (e.g., people get used to a fancier car, a bigger house, or vacation abroad). Second, the social comparison level may go up, which again reduces experienced utility. When one joins a country club or moves to a more prosperous neighborhood, the peer group with which social comparisons are made changes. The individual now compares himself with more prosperous "Joneses" and comparisons to his previous peer group of less prosperous "Smiths" fades. If the individual foresees all this, then he can appropriately plan consumption over time and realize higher total utility in spite of a higher level of adaptation and an upward movement in peer group. The rub is that people underestimate adaptation and changes in peer group. Loewenstein et al. [35] have documented and analyzed underestimation of adaptation and have called it *projection bias*.

Because of projection bias, an individual will realize less happiness than predicted. The gap between predicted and actual levels of happiness (total utility) further increases if one plans myopically rather than optimally. An example of a myopic plan is to allocate a budget or income equally in each period (constant consumption), as opposed to an increasing plan. A worse form of myopic planning would be to maximize immediate happiness through splurging (large consumption early on) which is what some lottery winners presumably end up doing.

We buy too much when hungry [40], forget to carry warm clothing during hot days for cooler evenings, predict that living in California will make us happy [48], and generally project too much of our current state into the future and underestimate adaptation [22, 34, 36]. vanPraag and Frijters [57] estimate a rise of between 35 and 60 cents in what one considers required income for every dollar increase in actual income. Stutzer [54] also estimates an increase in adaptation level of at least 40 cents for each dollar increase in income. After the very first year, the joy of a one-dollar increase in income is reduced by 40%, but people are unlikely to foresee this reduced contribution to happiness. People do qualitatively understand that some adaptation to the change in lifestyle that comes with higher income will take place; they simply underestimate the magnitude of the changes.

In our model, the chosen consumption plan determines the actual reference level, r_t, by means of (14.2) and (14.3). In every period, an individual observes the current reference level, but may fail to correctly predict the value of this state variable in future periods. According to projection bias, the predicted reference level is somewhere between the current reference level and the actual reference level. The relationship between the actual and predicted reference levels can be modeled using a single parameter, π, as follows:

$$\begin{aligned}\text{Predicted reference level} = {} & \pi(\text{current reference level}) \\ & + (1-\pi)(\text{actual reference level}).\end{aligned}$$

Thus, when $\pi = 0$, there is no projection bias, and the predicted reference level coincides with the actual reference level. If $\pi = 1$, then the individual adopts the current reference level as the future reference level. An intermediate value of $\pi = 0.5$ implies that the individual's predicted reference level is halfway between the current and actual reference levels. This projection bias model can be extended to any state variables that influence preferences, such as satiation level [3]. If consumption stays above the actual reference level over time, then an individual with projection bias may be surprised that the actual, realized utility in a future period is lower than what was predicted. The reason, of course, is that the actual reference level is higher than anticipated. Actual happiness associated with higher levels of consumption may be much lower than what was hoped for. This gap may motivate an individual to work even harder to increase income in the hopes of improving happiness. But this chase for happiness through higher and higher consumption is futile if the reference level keeps increasing.

To formalize these ideas, let τ be the current period. The actual and predicted reference levels for a subsequent period t are r_t and $\hat{r}_{\tau,t}$, respectively. Now,

$$\hat{r}_{\tau,t} = \pi r_\tau + (1-\pi) r_t,$$

for which r_t follows the dynamics governed by (14.2) and (14.3). The *actual* utility is given by the chosen consumption plan according to the time allocation model; however, the chosen consumption plan might not be the optimal one. The reason for this is that during period τ, the individual will maximize the *predicted* utility given by

$$\hat{V}_\tau(\ell_\tau, \ell_{\tau+1}, \ldots, \ell_T; c_\tau, c_{\tau+1}, \ldots, c_T | r_\tau, \pi) = \sum_{t=\tau}^{T} u(\ell_t) + \sum_{t=\tau}^{T} v(c_t - \hat{r}_{\tau,t}). \quad (14.19)$$

The difference between the actual and the predicted utility can be demonstrated by a simple example. Figure 14.4 compares the optimal plan to the plan implemented by an individual experiencing the most extreme form of projection bias, namely, $\pi = 1$ and $\alpha = 1$. In this example, wage is set to one, and both $u(x)$ and $v(x)$ are set to $\sqrt{x}$.

The optimal consumption plan exhibits an accelerating, increasing pattern, as argued in Section 14.2. This is indeed rational for an individual who is fully aware of two facts: (1) increments and not absolute levels are the drivers of utility of consumption and (2) high consumption at the beginning of the time horizon heavily taxes utility in later periods, as it raises the adaptation level in a permanent way. Hence, it is no surprise that consumption is low in the beginning and high toward the end of the planning horizon. As expected, the optimal time for work and leisure is constant over time.

A rational individual would allocate approximately 80% of his time to leisure and 20% to work. Now, consider the projection bias plan; the consumption plan under projection bias begins in period 1 with a plan to consume 0.5 units. The amount of time devoted to work and leisure is the same, i.e., 50% to work and 50% to leisure. This is not a coincidence. If $\pi = 1$, then the individual predicts that the reference point for consumption will remain constant; therefore, this individual treats both leisure and consumption as basic goods. As u and v are identical, an equal allocation of time to work and leisure is optimal. Moreover, the individual plans to maintain the constant level of consumption of five units per period.

In period 2, the individual realizes that the reference level, r_2, is higher than r_1; in fact, $r_2 = c_1 = 0.5$. This is a cause of concern, as the original plan of flat consumption of 0.5 units will yield zero utility, $v(0.5-0.5) = 0$ for the consumption component. Here, projection bias enters again. The individual again predicts that the

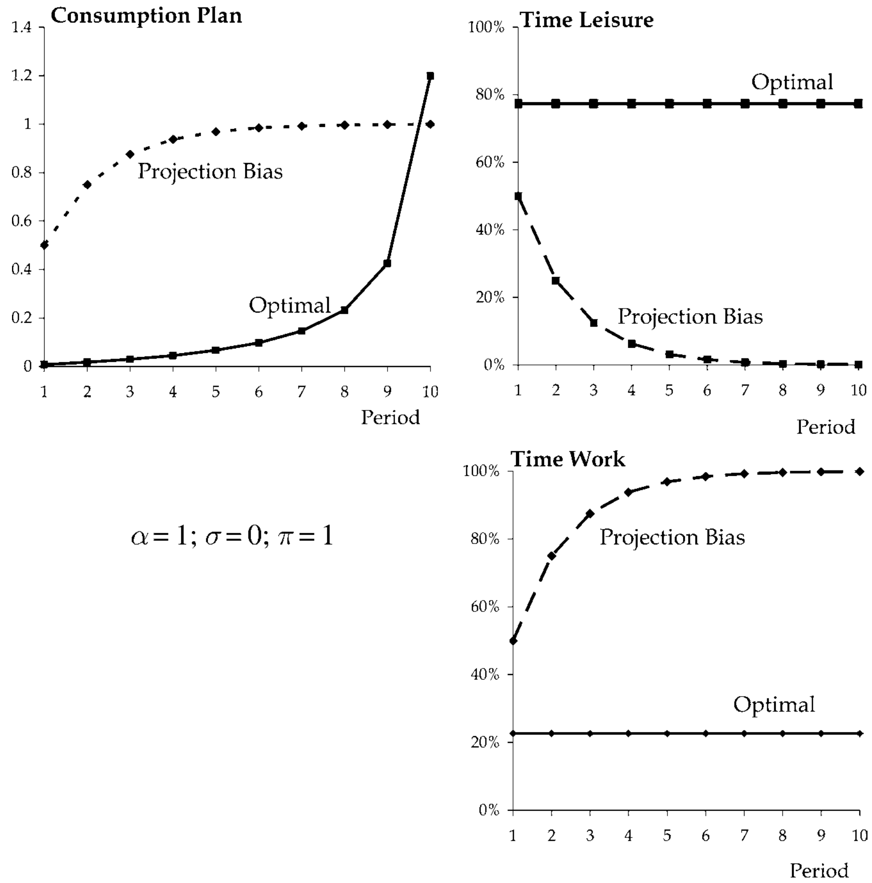

Fig. 14.4 Impact of projection bias on time allocation $[\alpha = 1, \pi = 1, \mu = 1]$

future reference level will be the same as the current reference level of 0.5 units. The individual, therefore, hopes that by increasing consumption above 0.5 units, he can obtain higher utility. But to do so, he needs to expand the budget, which is not a problem because he can work for 0.75 units, instead of 0.5. The additional units of time are taken from leisure time, which now decreases to 0.25 units. In period 3, the same process repeats itself. The gap between the actual and the predicted reference level may motivate the person to work even harder to increase income in the hopes of improving happiness. But this chase for happiness through higher and higher consumption is futile as the reference level keeps on increasing. Actual happiness associated with higher levels of consumption may be much lower than what was hoped for.

The degree of misallocation of time between work and leisure depends on both the adaptation factor, α, and the projection bias parameter, π. In our example, percentage time allocations to work for various combinations of α and π are shown

Table 14.1 Percent of time allocated to work [$\mu = 1$]

	Optimal	Projection Bias		
Adaptation Factor	$\pi = 0$	$\pi = 0.1$	$\pi = 0.5$	$\pi = 1.0$
$\alpha = 0.1$	42	43	50	60
$\alpha = 0.5$	28	32	54	81
$\alpha = 1.0$	23	28	64	90

in Table 14.1. For the optimal plan, as the adaptation rate increases, the percentage of time allocated to work decreases. Similarly, for a given α, as projection bias increases, the individual works harder. In all cases, the actual total utility under projection bias will be lower than that given by the optimal plan because of the misallocation of time and the excessive consumption in early periods.

14.5 Higher Pay—Less Satisfaction

So far we have demonstrated that projection bias could induce people to work harder and therefore be left with less leisure time compared to the rational plan. We now examine the effects of increases in wage rate on total utility. A rational individual will always experience a higher total utility with a higher wage rate by judiciously allocating time between work and leisure. Individuals, however, do not always make sensible tradeoffs between work and leisure. Average sleep hours in the United States fell from 9 h per night in 1910 to 7.5 h per night in 1975 with a further decline to 6.9 h per night between 1975 and 2002. A *USA Today* report on May 4, 2007 titled "U.S. Workers Feel Burn of Long Hours, Less Leisure" reports that US workers put in an average of 1,815 h in 2002 compared to European workers who ranged from 1,300 to 1,800 h (see also [32, p. 50]). Schor [49] argues that Americans are overworked. In some professions in which the relationship between income and hours worked is transparent (e.g., billable hours for lawyers and consultant), there is a tendency to allocate relatively more time to work due to peer pressure.

A theory in anthropology holds that the rise of civilization is the consequence of the increased availability of leisure time [23]; Sahlins [46, pp. 85–89] argues that the quantity of leisure time proxies for well-being. Putnam [43] observed in his book, *Bowling Alone*, that people who engage in leisurely activities with others were, on average, happier than those who spent their leisure time alone. Aguiar and Hurst [2], who document an increase in leisure time for less educated people, observe that there has been a substantial increase in time spent watching television (passive leisure) and a significant decline in socializing (active leisure) for people of all education levels from 1965 to 2003.

It is possible that experienced utility in a given period $u_t + v_t$ may be lower if one disproportionately allocates more time to work at the expense of leisure. Budding entrepreneurs, investment bankers, and executives of technology companies may complain about their "all work and no play" lifestyle, but many of them do retire early or change careers and it is hard to argue that their excessive work in the early part of their careers was not rational. All work and no play may make Jack a dull boy, but if that is what Jack desires then there can be no disputing his taste. We show that in the presence of projection bias, an individual may reduce his actual *total* utility by choosing a higher wage option. A simple, two-period example will suffice to illustrate this paradoxical result.

Consider a two-period example with $\alpha = 1$ and $\pi = 1$. In period 1, an individual maximizes predicted utility over the two periods by planning to work $w_{1,1}$ in period 1 and $w_{1,2}$ in period 2. Because leisure is a basic good, the individual plans an equal amount of leisure in each period. Consequently, the amount of work in each period is also equal, i.e., $w_{1,1} = w_{1,2}$. Under extreme projection bias, $\pi = 1$, the individual considers that consumption also behaves as a basic good. Hence, the per-period consumption corresponds to the budget generated for that period, namely, $\mu w_{1,1}$. Finally, $w_{1,1}$ is found by optimizing the predicted total utility given by

$$V(\ell, w) = 2[u(1 - w_{1,1}) + v(\mu w_{1,1})]. \tag{14.20}$$

The first-order condition is given by

$$u'(1 - w_{1,1}) = \mu v'(\mu w_{1,1}). \tag{14.21}$$

The individual solves this problem and decides on his allocation of budget to leisure and consumption.[2] During the second period, the adaptation level takes the value $r_2 = \mu w_{1,1}$.[3] The individual then realizes that the utility of consumption in period 2 will be zero if he stays with the original plan. He therefore revises the plan by maximizing the utility in period 2:

$$V(w, \ell) = u(1 - w_{2,2}) + v(\mu(w_{2,2} - w_{1,1})). \tag{14.22}$$

The optimal time spent working in period 2, $w_{2,2}$, is the solution to the first-order condition:

$$u'(1 - w_{2,2}) = \mu v'(\mu(w_{2,2} - w_{1,1})). \tag{14.23}$$

Inspecting (14.21) and (14.23), we observe that if $v'(0^+) > u'(1)$, then $w_{1,1}$ is strictly positive *and* $w_{2,2}$ is strictly larger than $w_{1,1}$. Therefore, the individual always revises the plan in favor of increasing work and reducing leisure for the second period. The increase in work in the second period is bounded, as $w_{2,2} - w_{1,1} \leq w_{1,1}$, with strict inequality if u is strictly concave.[4] Thus, the utility from consumption

[2] Applying the implicit function theorem to the first-order condition (14.21), it follows that $w_{1,1}$ increases with μ if and only if the Arrow–Pratt measure of relative risk aversion of v is less than 1. This same condition also applies to $w_{2,2}$, the time that the individual decides to work in period 2 after re-optimizing the predicted utility.

[3] The conclusions and insights are the same if we use the full model and let $r_2 = \sigma s_2 + (1-\sigma)\alpha\mu w_{1,1}$.

[4] If $w_{2,2} > w_{1,1}$, then using (14.21) and (14.23) yields $\mu v'(\mu w_{1,1}) = u'(1 - w_{2,2}) \geq u'(w_{1,1}) = \mu v'(\mu(w_{2,2} - w_{1,1}))$. As v' is non-increasing, it follows that $w_{2,2} - w_{1,1} \leq w_{1,1}$.

obtained in period 2, in spite of revising the plan, is less than or equal to the predicted utility $v(\mu w_{1,1})$.

The actual total utility is given by

$$u(1-w_{1,1})+v(\mu w_{1,1})+u(1-w_{2,2})+v(\mu(w_{2,2}-w_{1,1})). \tag{14.24}$$

It is clear that the actual total utility (14.24) is lower than the predicted total utility (14.20). In period 1, actual and predicted utilities coincide. However, in period 2, the actual utility of leisure is lower than the predicted utility of leisure ($w_{2,2} > w_{1,1}$). Similarly, in period 2, the actual utility of consumption is lower than the predicted utility of consumption ($w_{2,2} - w_{1,1} < w_{1,1}$). We now show that the misallocation of time between work and leisure could lower actual total utility when the wage rate increases.

In the particular case that u is linear and $v(x) = x^\beta$, $x \geq 0$, the actual utility is *increasing* in μ if $\beta < 2/3$ and is *decreasing* in μ if $\beta > 2/3$. That actual utility may be decreasing with wage rate is puzzling. To see this, notice that planned work is given by

$$w_{1,1} = \mu^{\beta/(1-\beta)}\beta^{1/(1-\beta)} \quad \text{and} \quad w_{2,2} = 2w_{1,1},$$

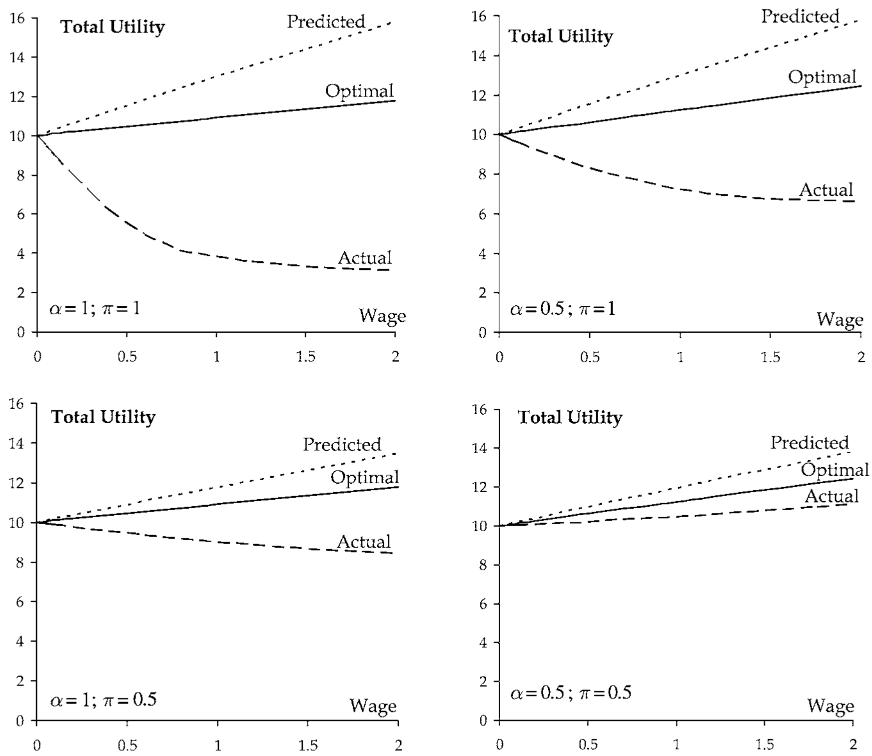

Fig. 14.5 Impact of wage rate on total utility under projection bias [$T = 10$, $u(\ell) = \ell^{0.8}$, $v(z) = z^{0.5}$, $\sigma = 0$]

which, when plugged into the equation for actual utility, yields

$$2+(2-3\beta)(\mu\beta)^{\beta/(1-\beta)}. \tag{14.25}$$

The puzzling result that total utility can be decreasing with wage rate holds more generally. Figure 14.5 shows the relationship between total utility and wage rate for a 10-period case ($T = 10$) in which both u and v are strictly concave (taking power forms with exponents 0.8 and 0.5, respectively). Optimal total utility is, of course, always increasing with wage rate, but projection bias may decrease the actual total utility as shown in the upper left panel of Figure 14.5.

One must therefore be deliberate in choosing a high wage career (e.g., consulting or investment banking) and be mindful of Veblen's [58] observation: "But as fast as a person makes new acquisitions, and becomes accustomed to the resulting new standard of wealth, the new standard forthwith ceases to afford appreciably greater satisfaction than the earlier standard did."

14.6 Social Comparison

Adam Smith [50] stated "With the greater part of rich people, the chief enjoyment of riches consists in the parade of riches." Veblen [58] echoes a similar sentiment: "The tendency in any case is constantly to make the present pecuniary standard the point of departure for a fresh increase of wealth; and this in turn gives rise to a new standard of sufficiency and a new pecuniary classification of one's self as compared with one's neighbors." Meaning, because most rich people pursue comparative ends, they will ultimately fail to become happier.

An immediate question arises whether one can improve one's happiness simply by imagining less fortunate people. However, Kahneman and Miller [27] assert that to influence our hedonic state, counterfactuals must be plausible, not just possible, alternatives to reality. The all too common tactic of a parent coaxing a child to appreciate food by reminding them of starving children in third world countries does not work. There seems to be a tendency to want conspicuous success. In many professions, income has become that measure of success; therefore, people pursue higher income not just for consumption, but as a scorecard of their progress. Conspicuous success also seems to have no end. Russell [44] wrote, "If you desire glory, you may envy Napoleon. But Napoleon envied Caesar, Caesar envied Alexander, and Alexander, I dare say, envied Hercules, who never existed."

Social comparison levels in our model are exogenous, though a theory in which the appropriate peer group and social comparison level is endogenous would be useful. Nevertheless, we can provide some insight into the influence of social comparison on happiness. Consider, for example, three groups of people: those in the highest quintile, in the lowest quintile, and at the median level of income ($83,500, $17,970, and $42,228, respectively, for the United States in 2001). By and large, richer people have a favorable evaluation of their own situation compared to others. In contrast, the economically disadvantaged will have an unfavorable evaluation of their relative position in society. Assume that the social comparison level, S, is equal to the median income. For simplicity, we assume constant consumption around the annual income for each group. If we focus only on the utility of consumption, then without social comparison ($\sigma = 0$) each of the three groups will converge to the neutral level of happiness as each becomes adapted to their own past consumption levels. By including social comparison, the happiness levels are pulled toward, but do not converge on, the neutral level. The long run experienced utility is given by $v(\sigma(x-m))$, which is the median income. This heuristic argument is consistent with the empirical finding that richer people are happier than poorer people.

Now consider two individuals: Average Joe and Fantastic Sam. Average Joe is a highly paid stockbroker ($\mu = 10$), but his peer group also has high incomes ($S = 8$). Assume that $u(x) = v(x) = \sqrt{x}$, $\alpha = 1$, $\sigma = 0.5$, and $a_1 = 0$. In an optimal plan, Average Joe would devote 96% of his available time to work and 4% to leisure. His total consumption would be 96 units and his total utility would be 13.8. In contrast, Fantastic Sam is an above average journalist who earns half as much as Joe ($\mu = 5$), but compares favorably with his peer group ($S = 1$). Planning optimally, Sam would devote 80% of his time to work and 20% to leisure. His total consumption would be 40 units and his total utility would be 17.89. Sam would be happier than Joe in spite of his lower income and lower consumption because his position relative to his peers is superior to that of Joe's.

Projection bias could induce Sam to chase the prosperous life of a stockbroker if offered the opportunity. In this case, projection bias would affect him through his underestimation of the upcoming change in social comparison level. Sam could indeed be happier as a stockbroker, but he should put some thought into forecasting his relative position amongst stockbrokers and how that would impact his future utility. If he concludes that he would be an average stockbroker, then journalism might indeed be the right pond for Fantastic Sam [17].

14.7 Reframing

> One does not become happy overnight, but with patient labor day after day. Happiness is constructed, and that requires effort and time. In order to become happy, we have to learn how to change ourselves.
>
> — Luca and Francesco Cavalli-Sforza (1998)

In our model, the dynamics of adaptation and social comparison are not part of an individual's choices. This implies that an individual does not have control over adaptation to consumption or over one's own expectations determined by his peer group. It is possible to have heterogeneous individuals with different speeds of adaptation and weights given to social comparison. However, for a given individual, both α and

σ are fixed, and there is nothing this individual can do to change his speed of adaptation or intensity of social comparison. The same can be said about π, the inability to accurately predict future reference levels.

While adaptation and social comparison are unavoidable to a certain extent, we believe that individuals do have some tools available to moderate these factors. It is possible that through reframing activities such as spiritual practices, meditation, or prayer, one might gain a better perspective on life and reduce the harmful effects of comparison. Such practices, however, require considerable time, effort, and discipline. An admiring fan congratulated a violinist for playing so beautifully and said "I would love to play like you." The violinist answered: "Yes, but would you love it even if you had to practice 10,000 h?"

We now attempt to introduce the impact of reframing and perspective seeking into our model. We assume that a new decision variable is available to the individual, namely the time that he sets aside in each period for "reframing activities." To keep things simple, we assume that this time is constant throughout the planning horizon, which we denote by q.

The choice of q is made in period 1, and after this choice is made the time available for work and leisure is reduced to $1-q$ in all periods. In other words, an individual commits in period 1 to set aside a fixed amount of time to such practices. Reframing activities contribute to gaining perspective on life, appreciating all received goods as if had been received for the first time, encountering ways to suppress or avoid (unfavorable) social comparison and finding inner happiness. Lama and Cutler [31] explain "The actual secrets of the path to happiness are determination, effort, and time." Neuroscience confirms that repetition is essential for the brain to be retrained. Cellists have more developed brain areas for the fingers of their left hand, mechanics for their sense of touch, and monks for the activity in the left prefrontal cortex, which is associated with cheerfulness.

Devoting time to reframing activities has an opportunity cost (less time available for work or leisure). We assume that the benefit of reframing activities is in lowering the reference level. Specifically, we modify the time allocation model by replacing and updating (14.2) with

$$r_t = e^{-\rho q}[\sigma s_t + (1-\sigma)a_t], \quad t = 1,\ldots,T,$$

where ρ measures the effectiveness of reframing activities (e.g., competent teacher, seriousness of commitment) and q is the time devoted to such activities. The modification simply multiplies the previous reference level by a reduction factor, $e^{-\rho q}$. This reduction factor is 1 if the time spent in reframing activities is 0; however, if $q > 0$, then the factor is strictly less than 1. The value of q is now part of the set of decision variables.

It is possible that unless ρ is larger than a certain threshold value, the individual may find that it is not worth spending any time in reframing activities. This is illustrated in Figure 14.6. Note that the optimal time spent in reframing activities is non-monotonic with ρ. This is to be expected. If ρ is sufficiently high, then a little time devoted to reframing can do a lot to reduce reference levels. Of course, total

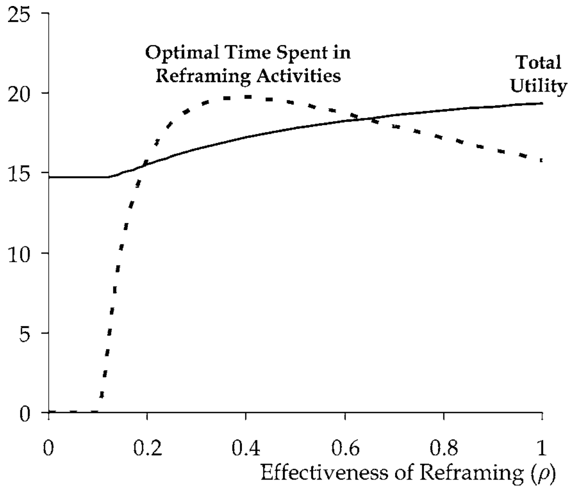

Fig. 14.6 Total optimal time spent on spiritual practices and total utility as a function of the effectiveness of these practices [$S = 5$, $\sigma = 0.5$, $\alpha = 1$]

utility is monotonic with ρ, as the per-period utility of consumption increases as reference levels decrease.

14.8 Conclusions

> No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable.
>
> — Adam Smith (1776)

A rational individual chooses an appropriate trade-off between work and leisure, thereby maximizing happiness. In this chapter, we have proposed a simple adaptation and social comparison model of time allocation, which predicts that happiness increases with income at a diminishing rate. Furthermore, the optimal consumption path is increasing over time, as is relative consumption over the reference level.

Our model is consistent with the empirical findings that richer people are happier than poorer people, but that happiness scores have remained flat over time in spite of astonishing increases in real income. Perhaps, the most interesting implications of our model are obtained under the assumption that people underestimate the rise in their reference level (due to projection bias) and thus overestimate the utility of consumption. Projection bias may lead an individual to devote too much time to work at the expense of leisure. Their predicted utility under projection bias is higher than the actual realized utility. This is why we believe that more money will buy us more happiness when in fact it may not. Because of their misallocation of time between work and leisure, the actual realized utility may even decline at higher wage rates.

In a preliminary attempt, we show that reframing activities, such as meditation or other spiritual practices, may improve happiness, but these activities require a commitment of time. Davidson and Harrington [10] find that the happiness level of Buddhist monks is higher than the average population in spite of their frugal lifestyle. Additional empirical and theoretical work is needed to understand the influence of reframing activities on moderation of reference levels.

Projection bias diverts resources from leisure toward adaptive consumption. Great discipline is therefore required to give adequate attention to the importance of leisure (e.g., time spent with family and friends, sleep, and exercise). We are reluctant to venture into policy prescriptions without a thorough analysis. However, if there is no awareness of projection bias, then a judicious application of policies like mandatory leave (2 weeks in the United States versus 6 weeks in France), restrictions on work hours within limits (recent reforms for medical residents), having higher sales taxes for adaptive goods than for basic goods, and family friendly practices, such as flexible hours, could improve happiness. Time is the ultimate finite resource; therefore, its allocation between work and leisure to improve happiness needs further empirical and theoretical inquiry. Restoring a harmonious balance between work and leisure is a precondition to "catching" the elusive goal of happiness.

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