

**From a Hedonic Perspective on Good Life
to an Analysis of Underlying Adaptive Principles**

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Running head: Good life depends on adaptive regulation

Author Note: The work underlying the present article was supported by a grant provided by the Deutsche Forschungsgemeinschaft to the first author (FI 294/23-1). Email correspondence can be addressed to either kf@psychologie.uni-heidelberg.de or to chris.harris@psychologie.uni-heidelberg.de

Introduction

The topic of this volume – good life – is as old and prominent as Stoic and Aristotelian ethics. It is also ideally suited to illustrate the often neglected role of theorizing in the current debate about the quality of behavioral science. While the literature on appropriate significance testing, statistical power, good practices, and transparency of research data is growing rapidly, the scientific community seems to show little interest in stringent theorizing and in the logic of science (cf. Earp & Trafimow, 2015; Fiedler, 2017; Meehl, 1990; Platt, 1964). Although the most sophisticated statistics are worth nothing, if they are applied to a biased study design, and the most representative design is wasted when the underling theory is flawed, there is little work on proper theorizing. The lessons gained from Wason's (1960) about Popperian hypothesis testing continue to be neglected (Fiedler, Kutzner & Krueger, 2012). Critical notes on statistical model fitting are commonly ignored (Roberts & Pashler, 2000; Fiedler, Schott & Meiser, 2011; Fiedler & Harris, 2017). What Reichenbach (1952/1938) once called the context of discovery is virtually excluded from methodology. And, there is hardly any journal or internet forum for in-depth discussions of fundamental theoretical issues.

With regard to the notion of good life, we believe that three symptoms of this neglected-theory syndrome must be dealt with. They might be named the symptoms of unwarranted reification, aggregation error, and reverse inference of the modus tollens. The literature on behavioral science in general, and on the good-life issue in particular, is replete with all three symptoms, which can be explained as follows: (a) The reification symptom consists in the presupposition that if there is a common verbal label, it must have a truly existing reference object. This presupposition is deeply entrenched in lay people's as well as scientists' reasoning. The mere existence of the term “student ability” is equated with the assumption of a theoretical

construct, student ability, which is supposed to exist independently of the observed the students' observed performance, just as "self-enhancement" in risk judgments is commonly equated with an optimistic bias in social judgment (Shepperd, Waters, Weinstein & Klein, 2015; Harris & Hahn, 2011), or just as the term "short-term memory" seems to imply the existence of a corresponding memory system. By analogy, a real reference object of "good life" must exist because scientists and readers of the feuilleton part of a newspaper all refer to the sonorous word.

As to the second symptom, (b) aggregation errors are evident in the assumption that empirical laws (correlations, established experimental effects) hold at all levels of aggregation. It is commonly assumed, and actually shared by many scientists, that the same causal factors that facilitate phylogenetic learning (across 1000 generations) must also support ontogenetic learning (within a single generation), that rich people live in rich countries, or that average research findings obtained at group level must hold for the majority of individual participants. By analogy, any answer about the good life of the human kind must apply to the good life of individuals.

And thirdly, although scientists have all learned in their beginning semesters (and allegedly understood) that logical implications of the form *If p, then q* do not imply *If q, then p*, they readily accept reverse inferences (from *q* to *p*) when it is more convenient, more ethically feasibly, or simply easier to manipulate the consequent (*q*) than the antecedent condition (*p*). Thus, when studying causes (*p*) of accidents, diseases, or outstanding professional success (*q*), it is hardly possible to manipulate hundreds of causal factors *p* and to wait for existential outcomes *q*. In these cases, researchers readily engage in a reverse strategy, basing causal analyses on reverse inferences from samples of accidents, diseases and outstanding success. By analogy, as it is virtually impossible to investigate the conditions of good life experimentally, in the appropriate causal direction, researchers readily resort to reverse inferences from success versus failure on good-life tasks to antecedent causal conditions (traits, life styles, ethical rule).

We do not want to be killjoys or grippers, and we do not want to forbid our colleagues to study the social psychology of good life. Still, although we know that playing a dissenter's role is rarely socially desirable, we dare to spell out the almost insurmountable limitations imposed by all three symptoms on the psychological study of good life. Specifically, (a) it is almost impossible to find an invariant meaning or reference object behind the sonorous term; and (b) if a meaning is enforced through definition, different measures of good life obtained at different aggregation (past vs. present vs. future within individuals vs. groups vs. nations vs. species) can diverge dramatically (Diener, Diener & Diener, 1995). Moreover, (c) retrograde inferences to the life styles and social conditions that seem to account for personal or historical cases of good life from a hindsight perspective are as weak as many other instances of reverse inferences (Fiedler, 2008; Wason, 1960).

The Relativity of Positive and Negative Valence

Let us start with the question of whether there is evidence to postulate a construct called good life that can be defined clearly enough to warrant its scientific study. All human beings (and presumably even sub-human animals) notoriously evaluate persons and outcomes as good or bad, approaching the former and avoiding the latter (Denrell, 2005; Thorndike, 1927). It seems obvious that the hedonic notion of good and bad is real, so we do not want to call this basic hedonic distinction in question. Despite strong interpersonal differences in the evaluation of specific objects (food items; hobbies; other people), and despite the existence of ambivalent blends of positive and negative stimuli and situations, the distinction between pleasant and unpleasant experience appears to be easy to manipulate experimentally or to measure reliably.

However, the superficial hedonic experience of the momentary positive or negative valence associated with delicious food and intense pain, love and hate, disgust and attraction, is one thing. Understanding its systemic psychological function and consequence is typically subject to a

dialectic principle: What is pleasant and comfortable in the short run is often unhealthy and demotivating in the long run. Using one's own car or a convenient bus connection every morning is much more pleasant than having to walk three miles every morning in rain and snow, but the latter experience may be extremely good for one's physical and mental health. Receiving extra reward for learning and performance may be greatly enjoyed, but may undermine intrinsic motivation (Gallus & Frey, 2016; Lepper, Greene & Nisbett, 1973). Being always protected and never ill is nice but prevents the immune system from producing anti-bodies. Rich people cannot enjoy small monetary gains; overly attractive people cannot appreciate social approval; being full-up with delicious food is incompatible with further food enjoyment.

Thus, the simple and seemingly unproblematic distinction of hedonically pleasant or unpleasant experience is not at all clear from the beginning. And, the underlying dialectical principle of valence regulation is not the exception but rather the rule. That bad things are inherent in good things, and vice versa, can be the result of several regulatory mechanisms, three of which may be termed relativity, deprivation, and self-generated reinforcement.

The relativity of pleasant experience and well-being. The principle of relativity is by no means restricted to modern physics; it is ubiquitous in the psychology of affective experience and life satisfaction (Heck, 2016; Lyubomirsky, 2013; Parducci, 1968). The effective reward value of any food item, birthday present, salary, holiday trip, verbal reinforcement, or outcome in a sports competition is not fully inherent in the obtained outcome; it also depends on the aspiration level or comparison standard, that is on the value of the outcomes forgone. A ten-dollar tip is generous but it is frustrating if other waiters get twenty dollars for similar service or if a waiter in a fancy gourmet restaurant is used to tips of over fifty dollars. A silver medal in an Olympic competition is a big success, but not if an athlete was strongly expected to receive the gold medal. Even animals who greatly like carrots may get angry if neighboring animals get more delicious grapes.

To repeat, there are no exceptional evaluation biases or symptoms of ungrateful and fastidious individuals who have been pampered by overly easily life conditions. Rather, the relativity of well-being is a normal consequence of the Weber-Fechner law applied to evaluative judgment. Just as a discrimination threshold, or just-noticeable difference, in weight, loudness, brightness or any other sensory dimensions increases with the absolute level of the magnitude in question, the threshold for a pleasant increment (or unpleasant decrement) is relative to the current status quo, or comparison standard. As a consequence, the reward value of an experience is not inherent in the stimulus; it rather lies in the eye of the beholder. Although a hundred dollars is the same amount of money that can be exchanged into the same goods (books, wine, movie tickets etc.) by a homeless person and by a millionaire, it is worth very much for the former but almost nothing for the latter.

As impressively explained in Parducci's (1965, 1968) seminal work on the range-frequency principle, the relativity principle extends to even extreme intensities of experience. Accordingly, even the poorest people imprisoned in a concentration camp can feel happiness and joy, relative to their extremely modest comparison level. Conversely, the most blessed people who have never felt poverty or serious illness may be dissatisfied when they do not live up to the same superlative on every day. Parducci's (1968) psychological explanation of relativity is built on the range-frequency principle, which quantifies psychophysical judgments relative to the distribution of all stimuli in a reference set. In a right-skewed distribution of mostly lower grades, the same student grade gets a higher position than in a left-skewed distribution of mostly high grades.

Again, this must not be discarded as an egocentric bias and as a cognitive illusion; it is rather an almost necessary consequence of natural regulation processes. Students who earn regularly good grades are likely to be grouped together in high-performing classes or elite schools, just as rich people move into more expensive neighborhoods, or successful sports teams

rise into a higher league. The natural consequence of such regulation is the big-fish-little pond effect (Marsh, 1987). The same student achievement is worth much less in an elite school than in an ordinary school, and this may affect not only the students' self-concept (Marsh, 2016) but also the admission decisions of educational authorities (Moore, Swift, Sharek & Gino, 2010). Thus, the relativity of good and bad experience is real and consequential; and it is the rule rather than the exception. Because positive or negative experience not only affects the evaluation of the focal stimulus object (e.g., student) but also the standard of comparison (e.g., school aspiration level), the psychological consequences depend on the relative strength of both influences.

The relativity principle even applies to such a fundamental paradigm as conditioning, which has been traditionally treated like an epitome of automatic and biologically determined behavior. In classical conditioning, the crucial determinant of learning is not the positive (appetitive) or negative (aversive) value of unconditioned stimuli (US) per se; what counts is rather the surprise value of the US, that is, whether it is more positive or negative than could be expected based on previous learning (cf., Rescorla & Wagner, 1972).

A similar rule underlies Mellers, Schwartz, and Ritov's (1999) decision affect theory. Accordingly, the reward value R_{obtained} of an obtained decision outcome is not solely a function of the utility u_{obtained} of the obtained outcome but also of the regret or disappointment function $d(u_{\text{obtained}} - u_{\text{forgone}})$, which specifies the relative utility difference between obtained and the forgone options. To the extent that the utility of the forgone option exceeds the utility of the chosen and obtained option, the resulting reward value will be reduced. A closer look at this intriguing model reveals its resemblance to Parducci's (1965) range-frequency model. It not only predicts that the effective reward value will shrink when disappointment d increases. It also predicts that disappointment is strongest if chosen options are rare and uncommon, as evident in a

small subjective probability s_{obtained} of the chosen outcome in the model: $R_{\text{obtained}} = u_{\text{obtained}} + d(u_{\text{obtained}} - u_{\text{forgone}})(1-s_{\text{obtained}})$.

Recent evidence from our own lab on evaluative conditioning (Unkelbach & Fiedler, 2017) highlights the relational nature of positive and negative US stimulation. In these experiments, we used neutral faces as CSs and faces selected to be clearly unlikeable or likeable as USs. Contrary to the common assumption that CSs take on the valence of the USs with which they are paired repeatedly, we aimed to demonstrate that the mere association of CS and US does not determine the result of evaluative learning. Rather, taking a relational or propositional learning perspective (Mitchell, DeHouwer & Lovibond, 2009), we hypothesized that the impact of US valence on the learned CS evaluation is moderated by a relational predicate RP linking CS and US in the context of an encoding task of the type CS – RP – US. Thus, an encoding task during acquisition that imposes a competitive relation or forced choice on the CS-US pair, such as the task to decide whether either CS or US is more likeable, the resulting CS valence should be opposite to the valence of the rival US.

Indeed, when participants were asked to make forced choices between all pairs of six neutral CS faces and six clearly negative faces, the neutral faces “won the comparisons” and were subsequently evaluated positively, despite the fact that they had been consistently paired with negatively experienced faces. Conversely, in another condition, when participants had to make forced choices between all pairs of six neutral faces and six positive faces, the CSs lost the comparisons, leading to more negative subsequent evaluations, despite the repeated association with positive USs. Thus, the originally neutral CS faces took on the valence opposite to the valence of the faces they had been paired with.

Apparently, then, the allegedly automatic and biologically anchored process of conditioning is not determined by the pleasant or unpleasant US experience. It is rather subject to strong

(disordinal) interactions regulated by the relational predicate RP between CS and US. If RP implies mutual exclusion and opposition between CS and US, as in a forced-choice task during acquisition, the evaluative learning effect of pleasant versus unpleasant US is reversed.

To cross-validate this interpretation, Unkelbach and Fiedler (2017) also tested the inverse implication that it is possible to obtain a “normal” (i.e., congruent) conditioning effect when the same CSs paired with the same USs and only the relational predicate RP imposed by the acquisition task is manipulated. Indeed, when participants in different experimental conditions were either asked to make competitive evaluations of CS against US or joint evaluations of CS and US together, the evaluative learning influence on CS was incongruent (opposite to the US valence) in the former condition but congruent (same as US valence) in the latter condition.

Deprivation Creates the Potential for Satisfaction

A special case of the relativity principle introduced so far is deprivation; it deserves to be mentioned separately because it has a long tradition in animal learning and in existentialist philosophy. Whenever behavioral goals depend on drives, such as hunger, curiosity, or sexuality, the strength of the drive (i.e., the positive motivation to achieve the respective goal) increases with increasing deprivation. In other words, negative deprivation experience creates the potential for positive motivation and satisfying goal attainment. Conversely, saturation after excessive goal consumption (e.g., over-eating, excessive exploration, frequent sexual activities) reduces motivation and the pleasure resulting from goal attainment.

Again, it is needless to say that this dialectic regulation of deprivation and fulfillment, frustration and satisfaction, blocking and empowerment of drives, is neither peculiar to artificial experimental paradigms nor is it confined to the realm of animal behavior. It is rather ubiquitous in daily life and at the heart of existential conflicts and crucial developmental tasks; it is of course crucial for the regulation of subjective well-being and life satisfaction. This wisdom is

implemented in social psychology's most prominent theoretical framework, that is, in Festinger's (1957) theory of cognitive dissonance. Accordingly, strong intrinsic motivation and positive attitudes originate in under-justification, reflecting deprivation and lack of reinforcement in a given action domain. In contrast, abundant reinforcement and frequent prior satisfaction cause over-justification and thereby undermine the resulting motivation and attitude towards the action goal. Thus, providing students with extra rewards for intrinsically enjoyed learning achievement may undermine the students' motivation, due to over-justification (Deci, 1971; Gallus & Frey, 2016; Lepper et al., 1973). In contrast, students will be strongly motivated and develop the most positive attitude toward their subject major when they had to wait and struggle a long time (and maybe pay a very high student fee) before they were allowed to study, due to under-justification.

The internal and external validity (Campbell, 1957) of this important regulation principle was demonstrated in a monograph by Lawrence and Festinger (1962), who basically applied dissonance theory to animal learning. They explained a number of well-established laws of animal learning and performance in analogy to the phenomena of under-justification and over-justification in human behavior. For instance, the well-known learning advantage of partial reinforcement schedules reflects under-justification. If animals have to overcome many obstacles, to struggle a lot, and to expend much effort until they are rewarded on only a small part of the trials, their motivation is maximal and the learning effects are most durable. If the animals receive full and abundant reinforcement on every trial, in contrast, their performance and the persistence of their learning will be lower due to over-justification. Thus, animal research highlights the same insight as dissonance research with human participants, namely, that good life does not perpetuate. What creates success and satisfaction in the long run is not any constant life style or steady state called good life. It is rather the permanent deviation from, and deprivation of, that alleged ideal of good life.

This ironic state of affairs is reflective of a general principle of system regulation, not just a weird aberration of human nature. In economics, high prices of precious goods reflect their scarcity, whereas low prices reflect over-production and abundant supply and availability. As explained in a remarkable article by Pleskac and Hertwig (2014), the same principle seems to hold for the relationship between the value of an object and its frequency (probability) of occurrence in the environment in general. Rare objects tend to be highly valued relative to frequent and abundant objects, which are worth little or even experienced as a plague.

Notwithstanding the existence of cross-sectional statistics telling that people's happiness increases on average with economic wealth or with social support, a plethora of empirical and historical evidence testifies to optimal motivation, ultimate satisfaction, strongest immune system, and lowest depression rates experienced after marked periods of deprivation (such as wars, threatening disease, natural disaster). There is no logical contradiction at all between cross-sectional evidence for happiness under fortunate conditions and longitudinal evidence for happiness after unfortunate conditions. The co-existence of both phenomena is actually quite essential from a behavior-regulation perspective. It is however hard to reconcile with any psychological attempt to specify a recipe for good life. The ultimate purpose of behavior regulation is to understand the acquisition of wisdom and personal growth and the attainment of equilibrium states conceived as emergent (not plannable) consequences of contrast experience, conflict resolution, and dealing with ups and down in the social and physical environment. From this perspective, it is unnecessary, and actually unlikely and unwarranted, to assume that an equilibrium of good life can be specified positively or prescribed in terms of injunctive norms.

Constructing Self-Generated Reinforcement

The relativity and malleability of good and bad experience is even more impressive. The reward value and the behavioral consequences of positive and negative experience depend not

only on the relative frequency of obtained and forgone outcomes, on expectations and comparison standards, and on relational predicates between environmental stimuli (such as CS-US pairs). Rather, the effective reward value of real life experience is even subject to internally generated inferences and subjective interpretations that go way beyond externally provided outcomes. Thus, it is well known that psycho-somatic diseases are not so much determined by the objective degree of stressors but by the subjective attribution of stress as avoidable or unavoidable, personal or impersonal, intentional and predictable or incidental and unwanted. Depressives' online diary entries are less negative than their biased retrospective memory reports. Or, impressions and evaluation of the same target persons or groups can vary dramatically as a function of the manner in which social hypotheses are tested during interaction (Fiedler & Walther, 2004; Snyder, 1984).

However, let us go beyond such common-place arguments and try to understand the full power of constructive memory and judgment. To get a glimpse of the general importance of self-generated information, beyond externally provided stimulus information, let us consider another piece of evidence from evaluative conditioning (Fiedler & Unkelbach, 2011). All participants were repeatedly observed several neutral CS faces part of which were paired with positive, negative or neutral US faces. In different experimental conditions, participants were either asked to estimate the likelihood that the two persons (behind a CS and a US face) are friends or the likelihood that they are enemies. The idea was that the effective stimulus is always a joint function of a passively received stimulus and what the learner actively does with the offered stimulus. Just as the notion of preparedness emphasizes the fact that organisms are internally prepared to link particular CSs to different sorts or modalities of USs (Davey, 1992), we expected that, as a matter of principle, the same link between CS and US can be construed in essentially different ways and that this active construal process can even override the valence of the US.

To understand the basic psychological idea, assume that you are presented with series of faces paired with wicked terrorist guys like Bin Laden. By default, you may encode stimulus pairs as faces belonging to temporally and spatially co-occurring individuals, and this default predicate will probably produce a standard conditioning effect: originally neutral faces will take on the same negative valence of aversive US faces. This seemingly normal conditioning effect may be strengthened when the encoding task refers to paired faces as friends. Clearly, persons paired with Bin Laden conceived as a friend are particularly likely to be charged with negative valence. However, now assume that the same experiment refers to CSs as victims of Bin Laden's inhuman torture regime, thus imposing an inverse relational predicate on the construal of stimulus pairs. Would it not be possible, and even plausible and psychologically predictable, that victims of Bin Laden will be construed in a benevolent manner, charged with empathy, compassion, and maybe with respect and admiration for somebody who dared to be Bin Laden's antagonist?

Indeed, the empirical findings supported this possibility. CS₊ faces that had been paired with positive US₊ faces were liked in the posttest when the encoding task during learning asked participants to estimate the probability that the persons represented by CS and US might be friends. In contrast, when participants estimated the probability that the same CS faces and the same US faces were enemies in another, then CS₊ faces took on negative value (unless the estimated probability was not too low). An analogous reversal was obtained for CS₋ faces paired with negative US₋ faces. More precisely, the impact of the relational predicate (is friend of vs. is enemy of) was restricted to subjective likelihood estimates of no less than about 20%. That is, when participants believed it was highly unlikely (i.e., < 20%) that CS and US can be friends then the evaluative learning effect did not conform to the predicate. However, over a wide range of probability estimates, CS valence was assimilated to the US valence in the friendship condition

but contrasted away from the US valence in the enemy condition. Moreover, to rule out any problems of self-selected likelihood estimates (which are not under experimental control), convergent evidence was obtained in an additional experiment in which the encoding task asked participants to indicate reasons why CS and US were either friends or enemies. Thus, in this experiment, friendship versus enmity was presupposed as a given property to be explained in the encoding task.

The plasticity of hedonic experience that can be framed and construed in different and even opposite ways was already demonstrated in an old study by Strack, Schwarz, and Gscheiderger (1985) on the impact of prior life experiences on current life satisfaction. Prior to evaluating the satisfaction with their life as a whole, participants were asked to think of something in their biography that was either very pleasant and positive or very unpleasant and negative. In different experimental conditions, they were instructed either to remember *how* that earlier life experience felt or to provide an explanation *why* that experience occurred. How question elicited an assimilation effect – positive memories produced higher life satisfaction than negative memories. In contrast, why questions led participants to construe life experiences in a way that elicited contrast effects – explaining prior positive episodes made one's current life appear more negative than explaining negative episodes.

The opposite effects of how and why questions are presumably related to the fact that, as a principle, every affective experience exerts a twofold influence: (a) Affective experiences may be included in the construal of the current judgment object (i.e., one's life satisfaction). And, at the same time, (b) they influence the construal of the comparison standard or aspiration level (cf. Bless & Schwarz, 2010). Apparently, how-questions induce an affective mindset that strongly influences (a) the construal of one's life satisfaction, whereas why-questions induce an analytic mindset that has a relatively stronger influence on the construction of a comparison standard, or

reference scale. In any case, the evidence provided by Schwarz et al. (1985) nicely demonstrates that subtle manipulations of the mindset or of the framing used for a judgment task can strongly moderate the manner in which autobiographical memories shape one's current satisfaction.****

Elated and Depressed Mood States, Promotion and Prevention Focus

The same relativity that characterizes the hedonic value of positive versus negative stimuli or life experiences holds for the functional value and for the performance triggered by positive versus negative affective states within the person (Fiedler, 1988). The impact of different mood states on behavior can be explained as a self-corrective regulatory cycle. The behavioral style triggered by euphoric mood states entails the potential for outcomes inducing negative mood, whereas the style triggered by dysphoric mood carries the potential for mood repair. Positive mood supports adaptive strategies of the assimilation type, encouraging intuitive decisions based on small samples of information, self-confident risk taking, curiosity, creativity, non-conformity, and constructive inferences beyond the information given (Fiedler & Hütter, 2013). While this style serves important adaptive functions – such as exploring novel behaviors and testing the limits – it is only a matter of time that the resulting social conflicts, transgressions, and accidents will cause a shift from positive to negative mood. Conversely, the adaptive style triggered by negative mood states supports adaptive functions of the accommodation type. Depressed or dysphoric people resort to cautious and very careful behavior, conservative strategies, sticking to the facts and to their well-learned repertoire, conforming to norms of politeness and compliance, and refraining from creative inferences beyond the information given. Inherent in this adaptive style is the potential for mood repair; it is only a matter of time that such accommodative strategies will reduce the rate of mischief and transgressions and more benevolent social feedback will re-establish better mood states.

Because of this dialectic circle, there is no unequivocal answer to the often asked question of whether good or bad mood induces higher performance or success (Fiedler & Beier, 2014; Fiedler & Hütter, 2013). Again, the regulatory cycle produces strong and disordinal interactions, with negative mood leader to better performance on accommodative tasks but positive mood facilitating performance on other tasks of the assimilative type. For example, depressed mood reduces the prevalence of false memories (Storbeck & Clore, 2005), erroneous eyewitness reports (Forgas, Laham & Vargas, 2005), or impoliteness in social communication (Forgas, 1999). Elated mood states, in contrast, facilitate creativity (Rowe et al., 2007), flexible decision making (Fiedler, Renn & Kareev, 2009), and self-efficacy (Kavanagh & Bower, 1985).

Again, one cannot expect to find an overall main effect of good or bad mood (or good or bad life) on success, health, or personal well-being. Mood states are not only self-correcting (i.e., entailing the potential to induce opponent states) and differentially suited for different types of tasks. The co-existence of virtues and vices of either mood state is even visible at the same moment within the same task. Let us illustrate this memorable insight with reference to a sequential decision making task developed by Fiedler et al. (2009).

On every trial, participants were asked to make a choice between a pair of job candidates, each one described by a binary sample of juror opinions represented on the screen by smileys (☺) of frowneys (☹). If candidates did not differ sufficiently, they could also decide not to choose and pass on to the next pair. Participants were told that these opinions were randomly sampled from the universe of all evaluations obtained during an assessment center. Instructions reminded participants of a speed-accuracy tradeoff: gathering as many observations as necessary to identify the better candidate (according to the records in the assessment center) but also making as many personnel selection choices as possible in the given time. Decision accuracy was analyzed as a function of task difficulty (i.e., closeness of positivity proportions of the two candidates in a pair)

and thoroughness of decision strategies (i.e., self-determined sample size), which were in turn expected to depend on the participants' positive versus negative mood (induced by film clips at the beginning of the experimental session).

How would decision accuracy depend on thoroughness, that is, on self-determined sample size? On one hand, of course, expending more effort in collecting larger samples should reduce sampling error and thereby lead to better decisions. On the other hand, however, in self-truncated information search, a characteristic primacy effect will produce a small-sample advantage. Thus, when the first few observations in a choice task happen to show a clear-cut difference between candidates, information search will be truncated early and small samples will lead to quick and confident decisions, which will be accurate most of the time. In contrast, when early observations happen to produce a mixed and equivocal picture on other trials, then larger samples will lead to less confident choices that are not always correct. Thus, low effort expenditure or laziness (i.e., the tendency to make do with small samples) might either reduce or improve decision accuracy.

Indeed, an expected finding was that participants in positive mood were less reluctant to make quick and intuitive decisions; they relied on smaller samples, expending lesser effort than participants in negative mood. However, the primacy effect prevented such less thorough strategies in good mood from reducing decision accuracy. Apparently, making quick and effortless decisions on easy trials, when the first few observations happened to reveal a clear-cut difference between candidates, was adaptive. Exploiting the primacy advantage for quick and effortless decision – a strategy supported by positive mood – and exploiting the thoroughness of large and laborious samples – a strategy induced by negative mood – are just different ways of improving decision performance.

Both strategies were actually shown in the same study to foster decision performance, though at different aggregation levels: Within most individual participant, the correlation across

all decision trials between sample size and the size of the observed sample difference was negative; smaller samples exhibited stronger differences (due to the depicted primacy advantage). However, at the same time, the correlation across participants between their average sample size (i.e., thoroughness) and their decision accuracy (averaged across trials) was clearly positive. Thus, sufficient thoroughness was a precondition for an individual participant's exploitation of the small sample advantage across trials (resulting from the primacy effect). These findings highlight, once more, that advantages and disadvantages of positive and negative mood, or lazy or laborious strategies, are likely to co-occur in the same problem context – a common insight from the analysis of behavior regulation in a world that is often characterized by tradeoffs rather than by simple main effects.

Recent research by Arslan and Fiedler (2017) illustrates still another aspect of the dialectic relation between opposite affective or motivational states, which can potentiate each other. To investigate the relationship between regulatory focus and creativity, participants were asked to think and write either about their hopes and desires or about their duties and obligations. Note that such a manipulation of promotion focus versus prevention focus refers to motives and imaginations rather than emotions and mood states, but it clearly taps into another central aspect of good versus bad life. Orthogonal to this regulatory-focus state manipulation, we also manipulated the presence versus absence of a shift in regulatory focus. That is, a promotion or a prevention focus was either induced after a neutral task or after participants had been induced an opposite regulatory focus (i.e., writing about hopes after writing about obligations or vice versa). We expected the contrasting experience to intensify the regulatory focus manipulation. The dependent measure consisted of a battery of four different tests of creativity.

As expected, creativity was enhanced in a promotion focus state relative to a prevention-focus state induced immediately before the creativity tests. However, this difference was clearly

amplified after a shift in regulatory focus. That is, participants were most creative when a current promotion focus followed a preceding prevention focus, and creativity was lowest after a shift from promotion to prevention focus. Indeed, a separate manipulation check (i.e., an accessibility measure for promotion- versus prevention related word meanings) showed that the current regulatory-focus state was strongest after a shift from an opposite state. Apparently, a negative motive at t_1 energizes a positive motive at t_2 , and vice versa. It is thus justified to conclude that, indirectly, a prevention focus is also helpful for the mobilization of creative performance, in addition to the direct impact of a promotion focus.

Thus, upon closer inspection, the simplifying idea of a main effect of positive affective or motivational states on creativity is subject to regulatory interactions. The same relativity that characterizes the hedonic experience of happiness and sadness also holds for the functional consequences of positive or negative states. Creativity is not just a reflection of pleasant states; it is rather influenced by a regulatory cycle of creativity that entails both loosening and tightening (Kelly, 1955), relaxation and persistence. This dualism is evident in the co-existence of the two Latin verbs *crear* (expressing innovation) and *crescere* (expressing effortful growth; personal communication by Rainer Holm-Hadulla).

Similarly, the tendency of positive affective states to release people from conformity and social norms can have different consequences for moral and ethical behavior. Using a commons-dilemma game, Hertel and Fiedler (1994) have shown that good mood enhances cooperative behavior, freeing people from egoistic profit maximization. At the same time, however, good mood also enhances the rate of playful transgressions and teasing provocations, much in line with the finding that good mood makes people impolite and coquettish (Forgas, 1999).

One-sided main effects of negative affective states, such as the hot-stove effect (Denrell & March, 2001) or ego depletion (Ainsworth, Baumeister, Ariely & Vohs, 2014; Baumeister, Vohs

& Tice, 2007), are subject to similar interactions. Thus, it has been argued that a hot-stove effect after aversive experience (e.g., sickness after eating in a restaurant) causes a negativity bias, because the subsequent avoidance of the negative stimulus prevents one from revising transitory negative evaluations (Denrell, 2005; Denrell & Le Mens, 2012; Fazio, Eiser & Shook, 2004). However, the hot-stove effect only works when negative stimuli are avoided radically. When avoidance is not absolute, the tendency to sample more from pleasant than from unpleasant sources will produce a polarization of positive evaluations (i.e., more extreme evaluations of positive than negative stimuli), as demonstrated byForgas (1990) or by Fiedler et al. (2013).

In the same vein, although self-control tasks have been shown to cause ego-depletion effects (Baumeister et al., 2007), we have recently found that ego-depletion will not result from effortful cognitive processing if self-determined and assimilative, rather than other-determined and accommodative (Arslan, Vohs & Fiedler, 2017).

Concluding Remarks

Thus, the relativity effects and the regulatory interactions we have discussed throughout this chapter have obvious implications for the psychology of the good life. Although this is certainly a fascinating topic for the feuilleton part of a newspaper, the conceptual and empirical issues we have reviewed here suggest that it may not be suited for a psychological research topic. Thus, with regard to the first symptom of insufficient theorizing that we had identified at the outset, the reification symptom, we have seen (a) that it is virtually impossible to define good life either intensionally or extensionally, due to the relativity of good and bad. With regard to the second symptom, related to the problem of aggregation levels, we have referred (b) the divergence of hedonic and even moral values in the short run and in the long run or well-being at the individual and at the national level. And, last but not least, with regard to the logical falsehood of reverse inferences, even when there is some family resemblance (Wittgenstein, 1958) between good-life

phenomena, (c) these phenomena represent the consequence rather than the antecedent (causal) conditions of a psychological mechanisms leading to that consequence. Because it is ethically, legally, and pragmatically impossible to randomize and manipulate the causal conditions under experimental control, there is no logically sound rationale for backward inferences from consequences to antecedent conditions of good life.

Being dissatisfied with such a disclaimer, one might conjecture that the ultimate purpose of “positive psychology” or the “psychology of good life” is to highlight the relativity of good and bad, the prevalence of tradeoffs rather than optimal solutions, and the importance of dynamic regulation as distinguished from static equilibrium. While this might be well in the spirit of the findings reviewed in this chapter, it does not afford a solution of the ultimate problem of every scientific endeavor, the search for invariant laws or valid insights that inform social, political and therapeutic interventions, conflict resolutions, and rational action. Simply pointing out that well-being is relative, that contrast experience is the key to happiness, that delay of gratification problems call for wise regulation, or that aggregation levels exist is just the beginning of a truly scientific approach to going beyond the feuilleton meaning of good life. A truly compelling theoretical approach leading to practical success would have to offer functional recipes for optimal solutions (if only heuristic ones) for delay-of-gratification problems, foraging conflicts, and aggregation gaps. We believe that a precondition for such ultimate progress is to develop theoretical frameworks that take the social and physical environment into account and that allow us to understand the adaptive interplay of the individual and the environment.

References

- Ainsworth, S. E., Baumeister, R. F., Ariely, D., & Vohs, K. D. (2014). Ego depletion decreases trust in economic decision making. *Journal of Experimental Social Psychology*, 54, 40-49. doi:10.1016/j.jesp.2014.04.004
- Arslan, P., & Fiedler, K. (2017). *Creativity depends on regulatory focus and, more strongly, on regulatory-focus shift*. Manuscript submitted for publication.
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science*, 16(6), 351-355.
- Bless, H., & Schwarz, N. (2010). Mental construal and the emergence of assimilation and contrast effects: The inclusion/exclusion model. In M. P. Zanna, M. P. Zanna (Eds.), *Advances in experimental social psychology*, Vol 42 (pp. 319-373). San Diego, CA, US: Academic Press.
- Campbell, D. T. (1957). Factors relevant to the validity of experiments in social settings. *Psychological Bulletin*, 54(4), 297-312.
- Davey, G. L. (1992). An expectancy model of laboratory preparedness effects. *Journal of Experimental Psychology: General*, 121(1), 24-40.
- Davey, G. C. L. (1989). *Ecological learning theory*. London: Routledge & Kegan Paul.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105–115.
- Denrell, J. (2005). Why most people disapprove of me: Experience sampling in impression formation. *Psychological Review*, 112(4), 951-978.
- Denrell, J., & Le Mens, G. (2012). Social judgments from adaptive samples. In J. I. Krueger (Ed.) *Social judgment and decision making* (pp. 151-169). New York, NY US: Psychology Press.

Denrell, J., & March, J. G. (2001). Adaptation as information restriction: The hot stove effect.

Organization Science, 12(5), 523-538.

Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology, 69*(5), 851.

Earp, B. D., & Trafimow, D. (2015). Replication, falsification, and the crisis of confidence in social psychology. *Frontiers in Psychology, 6*.

Fazio, R., Eiser, J., & Shook, N. (2004). Attitude formation through exploration: Valence asymmetries. *Journal of Personality and Social Psychology, 87*(3), 293-311.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Fiedler, K. (1988). Emotional mood, cognitive style, and behavior regulation. In K. Fiedler & J.P. Forgas (Eds.), *Affect, cognition, and social behavior* (pp. 100-119). Toronto: Hogrefe.

Fiedler, K. (2011). Voodoo correlations are everywhere – Not only in neuroscience. *Perspectives on Psychological Science, 6*, 163-171.

Fiedler, K. (2008). The ultimate sampling dilemma in experience-based decision making. *Journal of Experimental Psychology: Learning, Memory & Cognition, 34*, 186-203.

Fiedler, K. (2017). What constitutes strong psychological science? The (neglected) role of diagnosticity and a-priori theorizing. *Perspectives on Psychological Science*.

Fiedler, K., & Beier, S. (2014). Affect and cognitive processes in educational contexts. In R. Pekrun, L. Linnenbrink-Garcia, R. Pekrun, L. Linnenbrink-Garcia (Eds.) , *International handbook of emotions in education* (pp. 36-55). New York, NY, US: Routledge/Taylor & Francis Group.

Fiedler, K., & Harris, C. (2017). *Unwarranted inferences from statistical mediation tests – An analysis of articles published in 2015*. Manuscript submitted for publication.

- Fiedler, K., & Hütter, M. (2013). Memory and emotion. In T. Perfect and S. Lindsay (Eds.), Sage *Handbook of applied memory* (pp. 145-161). London: Sage Publications.
- Fiedler, K., Renn, S., & Kareev, Y. (2010). Mood and judgments based on sequential sampling. *Journal of Behavioral Decision Making*, 23(5), 483-495.
- Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology*, 47(6), 1231-1236.
- Fiedler, K., & Unkelbach, C. (2011). Evaluative conditioning depends on higher order encoding processes. *Cognition & Emotion*, 25, 639-656.
- Fiedler, K., & Walther, E. (2004). *Stereotyping as inductive hypothesis testing*. New York, NY, US: Psychology Press.
- Fiedler, K., Wöllert, F., Tauber, B., & Hess, P. (2013). Applying sampling theories to attitude learning in a virtual school class environment. *Organizational Behavior and Human Decision Processes*, 122, 222-231.
- Forgas, J. P. (1990). Affective influences on individual and group judgments. *European Journal of Social Psychology*, 20(5), 441-453.
- Forgas, J. P. (1999). On feeling good and being rude: Affective influences on language use and request formulations. *Journal of Personality and Social Psychology*, 76(6), 928-939.
- Forgas, J. P. (2013). Don't worry, be sad! On the cognitive, motivational, and interpersonal benefits of negative mood. *Current Directions in Psychological Science*, 22(3), 225-232.
- Forgas, J. P., Laham, S. M., & Vargas, P. T. (2005). Mood effects on eyewitness memory: Affective influences on susceptibility to misinformation. *Journal of Experimental Social Psychology*, 41(6), 574-588.
- Gallus, J., & Frey, B. S. (2016). Awards: A strategic management perspective. *Strategic Management Journal*, 37(8), 1699-1714.

- Harris, A. L., & Hahn, U. (2011). Unrealistic optimism about future life events: A cautionary note. *Psychological Review, 118*(1), 135-154.
- Heck, P. R. (2016). Happiness: A Theory of Relativity. *The American Journal of Psychology, 129*(2), 197-200.
- Hertel, G., & Fiedler, K. (1994). Affective and cognitive influences in a social dilemma game. *European Journal of Social Psychology, 24*(1), 131-145
- Hofmann, W., De Houwer, J., Perugini, M., Baeyens, F., & Crombez, G. (2010). Evaluative conditioning in humans: A meta-analysis. *Psychological Bulletin, 136*, 390-421.
- Kavanagh, D. J., & Bower, G. H. (1985). Mood and self-efficacy: Impact of joy and sadness on perceived capabilities. *Cognitive Therapy and Research, 9*(5), 507-525.
- Kelly, G. A. (1955). *The psychology of personal constructs. Vol. 1. A theory of personality. Vol. 2. Clinical diagnosis and psychotherapy*. Oxford, England: W. W. Norton.
- Klayman, J., & Ha, Y. (1987). Confirmation, disconfirmation, and information in hypothesis testing. *Psychological Review, 94*(2), 211-228.
- Kuppens, T., & Pollet, T. V. (2014). Mind the level: Problems with two recent nation-level analyses in psychology. *Frontiers in Psychology, 5*
- Lawrence, D. H., & Festinger, L. (1962). *Deterrents and reinforcement: The psychology of insufficient reward*. Palo Alto, CA, US: Stanford Univ. Press.
- Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology, 28*, 129–137.
- Lyubomirsky, S. (2013). *The myths of happiness: What should make you happy, but doesn't, what shouldn't make you happy, but does*. Penguin.

- Marsh, H. W. (1987). The big-fish-little-pond effect on academic self- concept. *Journal of Educational Psychology, 79*(3), 280– 295.
- Marsh, H. W. (2016). Cross-cultural generalizability of year in school effects: Negative effects of acceleration and positive effects of retention on academic self-concept. *Journal of Educational Psychology, 108*(2), 256-273.
- Meehl, P. E. (1990). Appraising and amending theories: The strategy of Lakatosian defense and two principles that warrant it. *Psychological Inquiry, 1*(2), 108-141.
- Mitchell, C. J., de Houwer, J., & Lovibond, P. F. (2009). The propositional nature of human associative learning. *Behavioral and Brain Sciences, 32*, 183-198.
- Moore, D. A., Swift, S. A., Sharek, Z. S., & Gino, F. (2010). Correspondence bias in performance evaluation: Why grade inflation works. *Personality and Social Psychology Bulletin, 36*(6), 843-852.
- Myers, D. G., & Diener, E. (1995). Who is happy? *Psychological Science, 6*, 10-19.
- Oishi, S. (2012). *The psychological wealth of nations: Do happy people make a happy society?* Wiley-Blackwell.
- Parducci, A. (1965). Category judgment: a range-frequency model. *Psychological Review, 72*(6), 407.
- Parducci, A. (1968). The relativism of absolute judgments. *Scientific American, 219*, 84-90.
- Platt, J. R. (1964). Strong inference. *Science, 146*, 347-353.
- Pleskac, T. J., & Hertwig, R. (2014). Ecologically rational choice and the structure of the environment. *Journal of Experimental Psychology: General, 143*(5), 2000-2019.
- Popper, K. R. (1959). *The logic of scientific discovery*. New York: Basic books.
- Reichenbach, H. (1952/1938). *Experience and prediction*. Chicago, Ill.: University of Chicago Press.

- Roberts, S., & Pashler, H. (2000). How persuasive is a good fit? A comment on theory testing. *Psychological Review, 107*, 358-367.
- Rowe, G., Hirsh, J. B., Anderson, A. K., & Smith, E. E. (2007). Positive affect increases the breadth of attentional selection. *PNAS Proceedings of The National Academy of Sciences of The United States of America, 104*(1), 383-388.
- Shepperd, J. A., Waters, E. A., Weinstein, N. D., & Klein, W. P. (2015). A primer on unrealistic optimism. *Current Directions In Psychological Science, 24*(3), 232-237.
- Snyder, M. (1984). When belief creates reality. *Advances in Experimental Social Psychology, 18*, 247-305.
- Stewart, N., Chater, N., & Brown, G. A. (2006). Decision by sampling. *Cognitive Psychology, 53*(1), 1-26.
- Storbeck, J., & Clore, G. L. (2005). With Sadness Comes Accuracy; With Happiness, False Memory: Mood and the False Memory Effect. *Psychological Science, 16*(10), 785-791.
- Strack, F., Schwarz, N., & Gschneidinger, E. (1985). Happiness and reminiscing: The role of time perspective, affect, and mode of thinking. *Journal of Personality and Social Psychology, 49*(6), 1460-1469.
- Thorndike, E. L. (1927). The law of effect. *The American Journal of Psychology, 39*(1/4), 212-222.
- Unkelbach, C., & Fiedler, K. (2017). Contrastive CS-US relations reverse evaluative conditioning effects. *Social Cognition*, in press.
- Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *The Quarterly Journal of Experimental Psychology, 12*, 129-140.
- Wittgenstein, L. (1958). *The Blue and Brown books: Preliminary studies for the "Philosophical Investigations"*. Oxford: Basil Blackwood.