Subjective Well-Being and Adaptation to Life Events: A Meta-Analysis

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Previous research has shown that major life events can have short- and long-term effects on subjective well-being (SWB). The present meta-analysis examines (a) whether life events have different effects on affective and cognitive well-being and (b) how the rate of adaptation varies across different life events. Longitudinal data from 188 publications (313 samples, $N = 65{,}911$) were integrated to describe the reaction and adaptation to 4 family events (marriage, divorce, bereavement, childbirth) and 4 work events (unemployment, reemployment, retirement, relocation/migration). The findings show that life events have very different effects on affective and cognitive well-being and that for most events the effects of life events on cognitive well-being are stronger and more consistent across samples. Different life events differ in their effects on SWB, but these effects are not a function of the alleged desirability of events. The results are discussed with respect to their theoretical implications, and recommendations for future studies on adaptation are given.

Keywords: life satisfaction, longitudinal meta-analysis, cognitive well-being, affective well-being, positive and negative affect

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In daily life, most people assume that major life events such as marriage or unemployment have tremendous effects on happiness. Yet for decades, many researchers claimed quite the opposite (e.g., Brickman & Campbell, 1971; Frederick & Loewenstein, 1999; Headey & Wearing, 1989, 1992; Lykken & Tellegen, 1996). Getting married or getting divorced, winning the lottery or losing a fortune in a financial crash, getting hired, getting fired, buying that convertible car or wrecking it—according to these researchers, none of these events should affect the level of subjective well-being (SWB) for more than a few months because people adapt quickly and inevitably to any life changes.

In one of the first studies on life events and SWB, the average SWB levels of recent lottery winners and paraplegics were compared with the average SWB level of a control group (Brickman, Coates, & Janoff-Bulman, 1978). The authors found the mean-level differences to be smaller than expected and concluded that both lottery winners and paraplegics had completely adapted to these major life events. This phenomenon has been labeled the hedonic treadmill (Brickman & Campbell, 1971), and it has become a fundamental assumption in theories such as adaptation-level theory (Brickman & Campbell, 1971; Helson, 1948, 1964), dynamic equilibrium theory (Headey & Wearing, 1989, 1992), and set-point theory (Diener, Lucas, & Scollon, 2006; Lykken & Tellegen, 1996).

Most cross-sectional studies that were conducted in the subsequent decades were interpreted as supporting the notion that life events have no lasting effects on SWB (Frederick & Loewenstein, 1999). Longitudinal studies, however, often yielded quite different results. Recently, Lucas and colleagues (Lucas, 2005, 2007b; Lucas, Clark, Georgellis, & Diener, 2003, 2004) examined the effects of major life events on SWB in a series of studies using large-scale panel data from the German Socio-Economic Panel (SOEP; Wagner, Frick, & Schupp, 2007) and the British Household Panel Study (BHPS; M. F. Taylor, Brice, Buck, & Prentice-Lane, 2009). They showed that the effects of major life events on SWB can persist over several years (for a review, see Lucas, 2007a). A notable finding was that the initial reaction and the rate of adaptation varied considerably between different life events. For instance, the initial reaction to marriage was positive, but subsequent adaptation was fast and completed after 2 years on average (Lucas et al., 2003). In contrast, the rate of adaptation was much slower for negative events such as the onset of

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disability (Lucas, 2007b), widowhood (Lucas et al., 2003; Specht, Egloff, & Schmukle, 2011), and divorce (Lucas, 2005). The findings were perhaps most striking for unemployment: After the beginning of unemployment, mean levels of SWB were significantly below baseline, even if people became reemployed (Lucas et al., 2004). Repeated unemployment spells aggravate this effect (Luhmann & Eid, 2009).

Together, these studies indicate that major life events can have strong effects on SWB and that the strength of these effects varies, depending on the life events considered. However, some important questions remain: First, do these findings generalize to other samples besides the SOEP and the BHPS? In other words, what is the initial reaction and the rate of adaptation in studies conducted in different cultures, within different time frames, and with different outcome measures? Second, do life events have similar effects on the two main components of SWB, namely, affective and cognitive well-being (AWB and CWB)? This question addresses a current debate concerning the degree to which AWB and CWB are differentially affected by external circumstances (e.g., Diener et al., 2006).

In the present article, we address these questions by reviewing and aggregating findings from previous studies on life events and SWB. The impact of life events on SWB has been a topic of many other studies in psychology and beyond. However, a comprehensive meta-analytic study evaluating these studies with respect to the questions raised above is still missing. The present article fills this gap by examining how SWB changes in the context of major family-related and work-related life events. With our meta-analysis, we intend to overcome three shortcomings of previous research on life events and SWB: First, for some studies, popular (mis)interpretations have prevailed because earlier studies often only reported inferential statistics, but no standardized effect sizes. A classic example is the lottery winner study by Brickman et al. (1978) described above: Although the standardized mean difference between the paraplegic and the control group was $d = 0.75$ and, therefore, quite strong (as reported by Diener et al., 2006), this study has very often been cited as evidence that life events do not have lasting effects on SWB (e.g., Diener, Suh, Lucas, & Smith, 1999; Filipp & Klauer, 1991). Second, a large part of the typically cited evidence stems from cross-sectional studies. As we discuss in more detail below, cross-sectional studies do not control for preexisting differences between people and are therefore hard to interpret with respect to adaptation. Therefore, only longitudinal studies are considered in our meta-analysis. Finally, studies published in nonpsychological journals (e.g., medical journals) are rarely considered in the SWB literature. The present meta-analysis therefore integrates studies on SWB and life events from various disciplines, including psychology, sociology, economics, and medicine.

In meta-analysis, it is particularly important to clearly define all constructs. In the remainder of the introduction, we offer definitions for SWB, life events, and adaptation, followed by an overview of the meta-analysis.

Subjective Well-Being (SWB)

SWB relates to how people feel and think about their lives (Diener, 1984). It is a broad concept that can be divided into two components (Busseri & Sadava, 2011; Diener, 1984; Eid & Larsen, 2008): Affective well-being (AWB) refers to the presence of pleasant affect (e.g., feelings of happiness) and the absence of unpleasant affect (e.g., depressed mood). Cognitive well-being (CWB) refers to the cognitive evaluation of life overall (i.e., global life satisfaction) as well as of specific life domains (e.g., job satisfaction or marital satisfaction). AWB and CWB are distinct constructs (Lucas, Diener, & Suh, 1996). They differ in their stability and variability over time (Eid & Diener, 2004) and in their relations with other variables (Schimmack, Schupp, & Wagner, 2008; Wiest, Schüz, Webster, & Wurm, 2011). For instance, three recent studies showed that the association between income and AWB is weaker than the association between income and CWB (Diener, Ng, Harter, & Arora, 2010; Kahneman & Deaton, 2010; Luhmann, Schimmack, & Eid, 2011). It is therefore plausible that other external life circumstances, such as life events, have differential effects on AWB and CWB and that adaptation of AWB and CWB does not occur at the same rate.

Adaptation of AWB and CWB

AWB comprises positive and negative emotions and moods. Common emotion theories posit that negative emotions trigger avoidance tendencies and positive emotions trigger approach tendencies (for reviews, see Fredrickson, 2001; Frijda, 1999). In contrast to emotions, moods are not directed at specific objects, but they nevertheless affect people's behavior. For instance, in many models of self-regulation, mood is considered as an important feedback source (e.g., Carver, 2011). Thus, emotions and moods function as an "online" monitoring system of people's progress toward their goals and strivings. This system might be highly reactive toward short-term changes of external circumstances (Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005), but to retain its informational functionality, it must adapt quickly to long-term changes. Therefore, it can be assumed that for AWB, adaptation is functional (Frederick & Loewenstein, 1999) because adaptation is an essential component of any homeostatic system (Cummins, 2010). Although it might be possible to modify (e.g., decelerate) the rate of adaptation to a certain degree (Larsen & Prizmic, 2008), it is rather unlikely that changing external circumstances will have a long-lasting effect on AWB.

Changes in CWB, by contrast, may be less automatic. CWB reflects people's life evaluations. For example, income should be an important criterion for this evaluation because making money is a central goal for most people (Diener et al., 2010). Similarly, major life events should have measurable and lasting effects on CWB if they threaten important family-related or work-related goals. Wilson and Gilbert (2008) proposed that people adapt as they find an explanation for the event (see S. E. Taylor, 1983, for a similar reasoning). Although their model is originally intended to explain adaptation of AWB, it is probably more useful to explain adaptation of CWB because of the proposed cognitive mechanisms.

Hence, we hypothesize that life events have more persistent effects on CWB than on AWB (see also Fujita & Diener, 2005). Recent evidence for this hypothesis comes from a study reporting that unemployed persons are significantly less satisfied with their lives than are employed persons, but they do not differ in their daily AWB (Knabe, Rätzel, Schöb, & Weimann, 2010).

Related Constructs

In the present meta-analysis, we defined AWB and CWB according to the definition of SWB by Diener (1984). Many studies, however, assessed constructs that were related to but potentially distinct from Diener's concept of SWB, and yet others assessed SWB but labeled it differently. For this reason, it is important to define and distinguish some related constructs. *Happiness* is used to describe a specific pleasant state ("happy") or used as a synonym for SWB. It is therefore important to determine its specific meaning in every publication where this term is used. *Psychological well-being* (Ryff, 1989), also known as eudaimonic well-being (Ryan & Deci, 2001), is a different concept of well-being, entailing facets such as autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Similarly to CWB, these facets are based on judgmental evaluations; however, a number of studies have shown that psychological well-being is distinct from CWB (e.g., Gallagher, Lopez, & Preacher, 2009; Keyes, Shmotkin, & Ryff, 2002). Finally, *mental health* is used in very diverse ways (Vaillant, 2003). In medical contexts, this term typically describes the absence of mental disorders. SWB is a much broader concept because negative and positive states are considered.

Life Events

Life events have been examined from two major perspectives (Filipp & Aymanns, 2009): a stress perspective and a developmental perspective. From the stress perspective, life events are viewed as specific types of stressors (e.g., Park, 2010; Segerstrom & Miller, 2004). Stressful life events are all events that significantly disturb the daily routine (Turner & Wheaton, 1997). This definition explicitly includes desirable events such as marriage or vacation (Holmes & Rahe, 1967). By contrast, minor stressors such as daily hassles and uplifts (Kanner, Coyne, Schaefer, & Lazarus, 1981) are distinct from stressful life events. From the developmental perspective, life events are viewed as specific transitions. Transitions are defined as a "discontinuity in a person's life space of which he is aware and which requires new behavioural responses" (Hopson & Adams, 1976, p. 24). The duration and course of the transition is not further specified in this definition, meaning that transitions can be slow and continuous (e.g., puberty) as well as fast and discrete (e.g., transition from middle school to high school).

Both the stress perspective and the developmental perspective offer rather broad definitions. For the purpose of this meta-analysis, we developed a narrower definition of life events that integrates elements from both perspectives. According to our working definition, life events are time-discrete transitions that mark the beginning or the end of a specific status. A status is a nominal variable with at least two levels. For instance, marital status can be single, married, separated, divorced, or widowed. Occupational status can be employed, unemployed, studying, and so on. The transition from one status to another is a specific life event, for instance, marriage (from single to married), divorce (from married to divorced), job loss (from employed to unemployed), or reemployment (from unemployed to employed). This narrow definition excludes minor life events such as daily hassles (which do not imply a status change) and slow transitions such as puberty (which are not time discrete). Also, nonevents (e.g., not finding a marital partner, involuntary childlessness) are not examined within this meta-analysis. Our definition also implies that most life events can be reversed. This phenomenon is common for events such as marriage (through separation) and job loss (through reemployment) and less common for events such as bereavement (through remarriage) and retirement (through reentry into job market). In this meta-analysis, we examine how reversing the life event affects adaptation.

As noted above, life events differ in their impact on SWB. In one of the first publications on differential effects of life events, Holmes and Rahe (1967) proposed a ranking of life events based on how much adjustment they required. In their ranking, the top three events requiring the most adjustment were widowhood, divorce, and marital separation. Subsequent authors described the differential effects of life events along more general dimensions. For instance, the impact of negative events on SWB seems to be stronger and more persistent than the impact of positive events (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Fredrickson & Losada, 2005; Larsen & Prizmic, 2008). One goal in the present meta-analysis is to compare various family-related and work-related life events with respect to their effects on SWB over time.

Adaptation

The term adaptation appears in different contexts in psychology and is often used interchangeably with related concepts such as adjustment and habituation. In its broadest sense, adaptation describes either a status or a process. In the *status perspective*, adaptation (or adjustment) is defined as a current state: Someone is well adapted (or well adjusted) when his or her individual level of SWB exceeds a specific criterion. This criterion can be absolute (e.g., above neutral on a life satisfaction scale; below a clinically relevant score on a depression scale) or relative with respect to a specific comparison group (e.g., the general population, a control group, or a comparison group not having experienced a specific event). Adaptation to life events within this perspective can be examined by means of a single assessment, as it is done in cross-sectional studies. Numerous studies used this perspective, from Brickman et al. (1978) to very recent publications (e.g., Srivastava, Tamir, McGonigal, John, & Gross, 2009).

The status perspective offers an economic approach to examining adaptation to life events, but it suffers from a number of serious shortcomings. The first is related to a general problem of research on life events: Major life events cannot be manipulated experimentally, so all empirical studies on life events necessarily suffer from reduced internal validity. In cross-sectional studies comparing different groups, it is impossible to know whether the observed differences in SWB are due to the occurrence (or nonoccurrence) of a specific life event, yet many authors have drawn this very inference. However, a cumulating body of research suggests that there are variables such as personality traits that predispose individuals to experience specific life events (Headey, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Further complicating the interpretation of cross-sectional studies, recent evidence suggests that the relation between life events and SWB may be bidirectional, as lower life satisfaction has been found to prospectively predict events such as unemployment, marital separation, and relocation, controlling for personality (Luhmann, Eid, Lucas, & Diener, 2010). In short, potential preexisting differences between individuals experiencing specific events and individuals not experiencing these events are completely neglected within the status perspective on adaptation, and it is therefore not valid to attribute any group differences to the occurrence or nonoccurrence of a specific event. A second limitation concerns the focus on interindividual differences. A person is considered to be well adjusted when her SWB score is on the positive side of an empirical or normative cutoff. However, neither an above-neutral SWB score nor the absence of psychopathology is a sufficient indicator of adaptation because these indicators do not reflect change processes that occurred within individuals (Bonanno, 2004; Diener et al., 2006).

Whereas the status perspective focuses on differences between individuals, the *process perspective* explicitly predicts the trajectory of SWB over time *within* individuals. The adaptation process is initiated by an external stimulus (e.g., a major life event) that causes a physiological or psychological response (e.g., decreased SWB). Over time, the responsiveness diminishes and the level of SWB returns to its preevent level. This broad concept can be applied to physiological (Helson, 1948, 1964) as well as to psychological phenomena (Frederick & Loewenstein, 1999; Wilson & Gilbert, 2008). For negative life events, adaptation is comparable with a recovery trajectory in which "normal functioning temporarily gives way to threshold or subthreshold psychopathology . . . usually for a period of at least several months, and then gradually returns to pre-event levels" (Bonanno, 2004, p. 20). In the present article, we define adaptation according to the process perspective. Since changes within persons can only be examined in studies with multiple measurements, the meta-analysis was restricted to longitudinal studies in which the first measurement occasion took place either before the event (prospective studies) or shortly after the event (post hoc studies).

At this point, it is crucial to point out the potential existence of anticipatory effects. Most major life events are—at least to some extent—controllable and predictable and can therefore be anticipated. This anticipation might cause a specific hedonic reaction even before the event occurred: If the spouse is terminally ill, the hedonic reaction to bereavement starts long before the spouse actually dies. These so-called anticipatory or lead effects can be observed months or even several years before the occurrence of the event (Clark, Diener, Georgellis, & Lucas, 2008) and need to be taken into account in the interpretation of the present meta-analytic findings. To account for this effect, we sought to estimate the population level that refers to the average level of SWB in normative populations. This estimated population level (EPL) is intended as a benchmark against which the effect sizes in this meta-analysis can be compared.

Overview of the Present Meta-Analysis

The goal of the present meta-analysis was to examine changes in SWB in the context of different life events in order to answer two major research questions:

1. Do life events have different effects on AWB and CWB?
2. How do different life events differ in their short- and long-term effects on SWB?

With respect to the first research question, we were interested in (a) differences in the reaction to events and (b) differences in the rate of adaptation to events. We did not have a directed hypothesis for differences in the reaction to events. With respect to adaptation to events, we hypothesized that the rate of adaptation of AWB is higher (i.e., faster) than the rate of adaptation of CWB. This hypothesis is tested separately for each life event. We summarize the results across the different events and answer the second research question in the General Discussion. The number of life events that have been studied is enormous. In this meta-analysis, we focused on specific events from two important life domains: family and work.

Method

Literature Search

Life events are investigated not only in psychology but also in related disciplines such as medicine, sociology, and economics. Therefore, we conducted a broad literature search in databases from various disciplines: *Academic Search Premier*, *ERIC*, *Medline*, *Psychology and Behavioral Sciences Collection*, *PsycINFO*, and *SocINDEX*. The literature search was conducted in the spring of 2008 and updated in the winter of 2009. We used broad search terms that sometimes, but not always, captured studies on SWB according to Diener's (1984) conceptualization. For SWB, we used the following keywords: *well-being*, *life satisfaction, positive affect, negative affect, happiness, quality of life,* and *depression*. Although we did not look for studies on clinical depression, we included depression as a keyword in order to find studies that used depression measures to assess depressed mood. To restrict the literature search to longitudinal studies, the keywords were combined with the additional terms *longitudinal, long-term, adjustment, follow-up,* and *adaptation*. The initial literature search was not restricted to specific life events; however, some studies were excluded at a later time because the event was too specific (see below). Based on the title and abstract, 2,330 publications were positively evaluated. Of these, 2,150 publications (92.5%) could be retrieved in electronic form, in print, or directly from the author. In addition to searching databases, we sent requests to the Society for Personality and Social Psychology (SPSP) listserv. Through this procedure, we retrieved nine additional manuscripts, resulting in a total of 2,159 publications.[1]

[1] Despite our attempts to retrieve unpublished data, most of the data analyzed in this meta-analysis were published in peer-reviewed journals. To assess the degree of publication bias (i.e., the notion that statistically significant results are more likely to be published), we regressed the effect sizes on the sample size (which is proportional to the statistical power, see Egger, Smith, Schneider, & Minder, 1997), controlling for the time since the event. For most events, sample size was not significantly related to the effect size (the detailed results can be obtained from Maike Luhmann). However, significant positive regression coefficients were found for marriage (prospective), childbirth (prospective), and unemployment (post hoc), and significant negative regression coefficients were found for other occupational transitions (prospective) and relocation/migration (post hoc). For these events, the magnitude of the effect sizes varied according to the sample size, and the estimates of the meta-analytic models might be biased.

Study Eligibility

Study eligibility was determined in a two-step procedure. In the first step, all 2,159 publications were coded for study-related characteristics only, and inclusion Criteria 1–6 were applied. After this partial coding, 1,796 publications were excluded. In the second step, the remaining 363 publications were fully coded (as described in the next section), and Criteria 7 and 8 were applied. Our inclusion criteria were as follows:

1. Quantitative data. Publications that were purely theoretical or that only reported qualitative data were excluded.

2. Longitudinal studies. Publications were excluded if one of the following criteria applied: (a) cross-sectional studies with only one time point, (b) only retrospective measurement of SWB, (c) multiple time points but no repeated assessment of SWB, and (d) measures (e.g., number of items in the scale) modified from one time point to another.

3. A single family-related or work-related life event must have been reported. We excluded all publications that did not report any life events. Moreover, studies reporting only aggregate measures of life events (i.e., the total number of life events experienced in a certain time frame) and studies reporting very specific life events for which less than five publications were found (e.g., death of grandparent) were excluded. Finally, we explicitly excluded health-related events (e.g., diagnosis of cancer) because in these studies, physical recovery and psychological adaptation are confounded.

4. Appropriate definition and measurement of SWB. We only included studies that assessed SWB as defined by Diener (1984). Related variables such as psychological well-being (Ryff, 1989) were excluded (see above). Moreover, we excluded studies focusing on specific emotions such as anxiety or anger. Studies on depressive symptoms were only included if the respective scale focused on affective symptoms (e.g., depressed mood) rather than on somatic symptoms (e.g., low appetite). This is the case for the most frequently used scale in our meta-analysis, the Center for Epidemiologic Studies—Depression Scale (CES–D; Radloff, 1977).

5. Information about the timing of the event and the measurement occasions must be available. Studies that allowed only a very imprecise estimate (precision of ±18 months or more) of when the event happened were excluded. For instance, several studies using data from the National Survey of Families and Households (NSFH; Sweet, Bumpass, & Call, 1988) were excluded because the event occurred anywhere within a time frame of 5–7 years.

6. No studies evaluating professional interventions of any kind. Interventions might affect the regular adaptation processes. An evaluation of different intervention methods in the context of adaptation is clearly an issue for a separate meta-analysis.

7. Unduplicated data. After coding, publications were checked for duplicate data sets because findings from longitudinal data sets are frequently reported in multiple publications. For each event, only one publication per data set was included. Priority was given to publications reporting (a) more time points, (b) larger sample sizes, and (c) more descriptive statistics.

8. Statistical sufficiency. Only studies with sufficient descriptive statistics could be considered. To calculate effect sizes, means and standard deviations for each time point were required. In addition, the retest correlation of the outcome variable (i.e., the correlation between SWB at Time 1 and SWB at Time 2), a *t* statistic, or the standard deviation of the pre–post difference variable is necessary in order to estimate the sampling variance for the effect sizes (see below). If the statistics reported in the study were insufficient, the authors were contacted via e-mail. In total, the authors of 170 publications published after 1989 (46.8% of all fully coded publications) were contacted. Of these, 135 (79.4%) responded, and 66 (38.8%) provided the missing information. Studies were excluded if means or standard deviations were missing. Missing correlation coefficients were replaced by plausible values (see below); therefore, publications not reporting this information did not have to be excluded.

After applying Criteria 7 and 8, 71 publications were excluded because of duplicate data, and 104 publications were excluded because of statistical insufficiency. Hence, this meta-analysis is based on a total of 188 publications. Since all publications that were excluded based on Criteria 7 and 8 were fully coded, it was possible to examine whether (a) studies that were excluded because of duplicated data, (b) studies that were excluded for statistical reasons, and (c) studies that were retained in the meta-analysis differed significantly in any characteristics.[2] Publications that were excluded because of insufficient statistics were significantly older than included publications and publications with duplicated data, $F(2, 362) = 21.45$, $p < .001$. Duplicate data sets were most frequently observed in publications on marriage (25 out of 57 publications, corresponding to an exclusion rate of 43.9%) and bereavement (23 out of 88 publications, corresponding to an exclusion rate of 26.1%). By contrast, only few publications on childbirth were excluded because of duplicate data (11 out of 144 publications, corresponding to an exclusion rate of 7.6%).

Coding

Coding was done by Maike Luhmann and a student assistant. The codes were recorded on a standardized coding sheet that was accompanied by a detailed coding manual. We coded characteristics of the publication (e.g., year of publication), the event (e.g., type of event), the sample (e.g., percentage of male participants), the outcome variable (e.g., AWB vs. CWB), and the single time points (e.g., means and standard deviations). A complete list of the coded characteristics is provided in Table 1. To evaluate the coding process and to estimate interrater agreement, 45 studies were double coded. For categorical variables (e.g., type of event), interrater agreement was estimated using coefficient kappa (κ; Cohen, 1960). Interrater agreement is acceptable for $\kappa > .60$ and good for $\kappa > .80$ (Nussbeck, 2006). For continuous variables (e.g., means, standard deviations), an intraclass correlation coefficient (ICC) that takes the agreement between the judges into account was computed (Shrout & Fleiss, 1979). Interrater agreement was acceptable for most characteristics (see Table 1) except for the data source ($\kappa = .11$). This discrepancy may have occurred because

[2] A detailed list of all excluded studies and the reason for exclusion can be obtained from Maike Luhmann.

Table 1
Summary of Coded Characteristics, Percentage of Missing Data, and Interrater Agreement

Level	Variable	Coding options	Missing %	IA
Publication	Year of publication	Metric	0.00%	1.00
Publication	Origin of first author	1 = United States 2 = Canada 3 = Germany 4 = Great Britain 5 = Netherlands 6 = Scandinavia 7 = Australia 8 = Other Western European countries 9 = Eastern Europe incl. Russia 99 = Other	1.60%	1.00
Publication	Discipline of first author	1 = Psychology 2 = Medicine / Psychiatry 3 = Sociology 4 = Economics 5 = Education 99 = Other	9.04%	.94
Event	Type of event	1 = Marriage 2 = Divorce 3 = Bereavement 4 = Childbirth 5 = Unemployment 6 = Reemployment 7 = Retirement 8 = Migration / relocation	0.00%	.93
Sample	Type of sample	1 = Representative panel 2 = Ad hoc adult sample 3 = Students 4 = Children and adolescents up to 18 years 99 = Other type of sample	0.00%	.72
Sample	Number of persons who participated at all time points	Metric	20.45%	.98
Sample	Attrition rate	Metric (range: 0 to 1)	46.33%	.55
Sample	Evidence for systematic dropout	0 = No 1 = Yes	73.16%	—
Sample	Data collected for this event	0 = no 1 = Yes	0.00%	—
Sample	Status reversal for some participants[a]	0 = No 1 = Yes	0.10%	—
Sample	Proportion of men in sample	Metric (range: 0 to 1)	8.95%	.95
Sample	Age of sample (*M*)	Metric	16.61%	1.00
Sample	Age of sample (*SD*)	Metric	41.53%	1.00
Sample	Predominant ethnicity of the sample	1 = White / Caucasian 2 = Black 3 = Hispanic 4 = Native American 5 = Asian 6 = Mixed 99 = Other	51.76%	.73
Variable	Outcome variable-general	1 = Cognitive well-being 2 = Affective well-being	0.26%	.77
Variable	Outcome variable-detailed	1 = Life satisfaction 2 = Domain satisfaction 3 = Positive affect 4 = Negative affect 5 = Affect balance	0.52%	1.00
Variable	Positive vs. negative coding	−1 = High values indicate low well-being 1 = High values indicate high well-being	0.00%	—

(*table continues*)

Table 1 (*continued*)

Level	Variable	Coding options	Missing %	IA
Variable	Data source	1 = Self-report questionnaire 2 = Self-report interview 3 = Self-report via ambulatory assessment 4 = Self-report day reconstruction method 5 = Observation 6 = Peer report 7 = Analysis of written reports 99 = Other data source	0.00%	.11
Variable	Scale used to measure the variable	Categorical	0.00%	.95
Variable	Source of reported reliability estimate	0 = Not reported 1 = Not reported, but reference to another publication 2 = Reported and calculated for sample of this study 3 = Reported and calculated for sample of another study	1.82%	.74
Variable	Reliability estimate	Metric	34.64%	1.00
Variable	Number of items in measure	Metric	25.26%	1.00
Variable	Time frame of measure	1 = General SWB 2 = Momentary SWB 3 = SWB with respect to the event 4 = Precise time frame (e.g., last month)	56.77%	.92
Variable	Number of time points	Metric	0.00%	.99
Variable	Year of first data collection	Metric	60.94%	1.00
Variable	Prospective vs. post hoc design	1 = Prospective (baseline assessment occurred before the event) 2 = Post hoc (baseline assessment occurred after the event)	0.00%	1.00
Time point	Time between event and measurement occasion in months[a]	Metric	0.00%	.98
Time point	Sample size	Metric	0.00%	1.00
Time point	Descriptive statistics: Mean	Metric	0.00%	1.00
Time point	Descriptive statistics: Standard deviation of raw scores	Metric	0.50%	1.00
Time point	Descriptive statistics: Correlation with baseline	Metric	38.90%	1.00
Time point	Descriptive statistics: Standard deviation of difference score between two time points	Metric	94.39%	1.00
Time point	t value for the mean-level difference between two time points	Metric	95.39%	.94

Note. Reported values are coefficient kappa for categorical variables and intraclass correlation coefficients for continuous variables. Dash indicates that coding was done only by Maike Luhmann. IA = Interrater agreement; SWB = subjective well-being.
[a] Status reversal was only coded for marriage (separation), childbirth (second child), and unemployment (reemployment). [b] If the time lag between the time point and the event varied within the sample, the average time lag was coded.

many studies do not clearly report whether the participants were interviewed or whether they completed the questionnaires themselves. Due to the low interrater agreement, the data source was not included in any of the following analyses. For the other characteristics, discrepancies between raters were resolved through discussion.

Computation of Effect Sizes

Our research questions center on mean-level changes of SWB in the context of life events. Therefore, we calculated pairwise effect sizes that express the mean-level difference between the first time point (baseline) and each subsequent time point. For each sample, we calculated $t - 1$ effect sizes, t being the total number of time points. The timing of the baseline varied between studies: In prospective studies, the baseline assessment occurred before the event, whereas in post hoc studies, it occurred after the event. These different designs warrant some consideration in the interpretation of the effect sizes (see below).

In general, two alternative standardized effect sizes can be calculated for these types of repeated measures: the standardized mean difference and the standardized mean gain (Morris & DeShon, 2002). The numerator of these effect sizes is identical and is calculated by subtracting the unconditional posttest mean (e.g., Time 2) from the unconditional pretest mean (e.g., Time 1). However, the effect sizes differ in the denominator: The standardized mean difference is calculated by dividing the mean difference by the standard deviation of the raw scores (i.e., the standard deviation of the pretest scores, the standard deviation of the posttest scores, or the pooled standard deviation of the pretest and posttest scores), whereas the standardized mean gain is calculated by dividing the mean difference by the standard deviation of the change scores. Since standard statistical procedures such as the t test for paired samples or repeated measures analysis of variance rely on change scores, the standardized mean gain is more frequently reported in empirical studies than the standardized mean difference. It is therefore important to note that the standardized mean gain confounds mean-level differences and individual variation in change (Morris & DeShon, 2002). Consequently, we chose the standardized mean difference that reflects pure mean-level differences. For instance, an effect size of $d = 0.5$ indicates a mean-level change of half a standard deviation of the baseline scores (for a similar meta-analysis, see Roberts, Walton, & Viechtbauer, 2006). Note that the standardized mean difference tends to be more conservative than the standardized mean gain because the standard deviation of change scores is typically smaller than the standard deviation of raw scores.

Positive versus negative coding of SWB. In contrast to measures of positive components of SWB (e.g., life satisfaction) where high scores reflect high well-being, measures of negative components of SWB (e.g., depressed mood) are usually coded such as that high scores reflect low SWB. To correct for this, we multiplied all effect sizes of negative components of SWB by –1. Consequently, positive effect sizes reflect an increase in SWB, and negative effect sizes reflect a decrease in SWB, regardless of the original coding of the variables.

Adjusted effect sizes. Effect size estimates can be biased due to sampling error and measurement error. To control for potential sampling bias, the effect sizes were adjusted as proposed by Hedges and Olkin (1985; also Morris, 2000). To control for measurement error, Hunter and Schmidt (1990) proposed a formula that is based on the reported reliability coefficients. In our database, sample-specific reliability estimates were reported for only 64% of all measures. Therefore, we refrained from adjusting the effect sizes for measurement error. Hence, the present findings may somewhat underestimate true population effect sizes; on the other hand, they yield a clear image of the observed findings in adaptation research.

Sampling variance. The estimated sampling variance (i.e., the squared standard error) of each effect size is needed for its weighting in the meta-analysis. By weighting effect sizes with the inverse of the sampling variance (or by its square root), effect sizes from large samples gain more weight in the calculation of the summary effect than effect sizes from small samples (Lipsey & Wilson, 2001). We calculated the sampling variance according to the formula reported by Morris and DeShon (2002, Table 2). Among other parameters, the sample size and the retest correlation is required to compute the sampling variance. In longitudinal studies, the sample size often varies between different time points. If unequal sample sizes for two time points were reported, the smaller of these sample sizes was used. The retest correlation is often not reported in longitudinal studies, but it can be estimated if the standard deviation of the difference scores or a t value is reported (see Morris & DeShon, 2002). If neither of these statistics was reported, the authors of the studies were contacted and asked to provide the missing correlation. After this procedure, observed or estimated retest correlations were available for 61.1% of all effect sizes. For the remaining effect sizes, we followed Borenstein, Hedges, Higgins, and Rothstein (2009) and replaced all missing coefficients with the median correlation ($r = .48$).

EPL of SWB. As discussed in the introduction, the preevent level of SWB in prospective studies might diverge from the habitual level of SWB due to anticipatory effects. To gauge the extent to which these anticipatory effects affect our findings, we selected a subsample of prospective studies (32%) that used an SWB scale that has also been used in at least one representative sample.[3] For these studies, we calculated the estimated population level (EPL) of SWB that quantified the deviation of the preevent score from the mean score reported for the representative sample. Specifically, the difference between the preevent score and the corresponding representative mean score was divided by the preevent standard deviation. Positive effect sizes reflected that the EPL was higher than the preevent scores, and negative effect sizes reflected that the EPL was lower than the preevent scores. Since this effect size is in the same metric as the event-specific effect sizes, these effect sizes can be compared with each other. For each event and each component of SWB, the effect sizes were then aggregated to estimate the average deviation from the EPL. Note that the average EPL is not a representative estimate of the habitual level because it is only based on a subsample of the studies. The EPL was not used in the analyses, but it is displayed in the event-specific plots to facilitate the interpretation. Only estimates that were based on at least three single effect sizes are displayed.

Meta-Analytic Procedure

Separate analyses. The sampled publications provided data on eight different categories of life events. These life events were analyzed separately because the events differed in their desirability, including desirable events (e.g., marriage), undesirable events (e.g., unemployment), and ambigous or potentially neutral events (e.g., retirement). We expected that some of the events should decrease SWB (quantified by negative effect sizes), whereas others should increase SWB (quantified by positive effect sizes) or have no effects on SWB at all (quantified by effect sizes of zero). Furthermore, we know from previous research that even life events that presumably are comparable in terms of hedonic valence (e.g., unemployment and divorce) have differential effects on SWB (e.g., Lucas, 2007a; Luhmann & Eid, 2009).

In addition, prospective and post hoc designs were analyzed separately. For all studies, the effect sizes were computed in reference to the first time point. However, the interpretation of the effect size depends on the specific study design. For prospective designs, the effect size quantifies the degree to which postevent SWB differs from preevent SWB. For post hoc designs, the interpretation of the effect size is quite different: It quantifies the difference of two SWB scores that were both assessed after the event. Hence, post hoc studies are useful to assess changes in SWB that occurred after the initial hedonic

[3] The reference articles, the single EPLs, and details about the computation can be obtained from Maike Luhmann.

Table 2
Descriptive Statistics

Variable	All	Marriage	Divorce	Bereavement	Childbirth	Unemployment	Reemployment	Retirement	Relocation & migration
Study characteristics									
Number of samples[a]	313	38	12	49	152	21	16	14	11
Number of effects	802	160	41	130	345	36	29	38	23
Median publication year	2002	2003	2006	2002	2002	1995	1999	2000	2007
Affiliation in USA (%)	54.1	86.4	81.8	61.1	48.3	35.3	33.3	30.8	30.0
Psychological research (%)	45.6	85.0	55.6	38.2	44.1	43.8	44.4	41.7	55.6
Medical research (%)	34.5	10.0	11.1	55.9	40.5	12.5	0.0	0.0	22.2
Cited per year since publication (*M*)	2.1	2.9	1.9	2.5	2.0	2.5	1.3	1.9	0.9
Design characteristics									
Mean number of time points	3.1	4.9	4.2	3.4	2.7	2.5	2.5	2.9	2.8
Studies with only 2 time points (%)	53.4	22.0	53.9	41.8	58.1	83.3	75.0	45.0	53.9
Prospective studies (%)	70.6	51.2	69.2	45.5	76.3	79.2	95.0	95.0	61.5
Timing of T1 in months (prospective studies)	−4.4	−4.4	−12.7	−6.7	−2.4	−6.9	−6.2	−6.7	−10.1
Timing of T1 in months (post hoc studies)	3.8	4.0	4.6	3.3	1.8	15.0	3.0	2.0	14.7
Sample characteristics									
Total number of participants[b]	65,911	9,292	1,828	5,345	35,426	4,186	1,597	5,274	2,964
Ad hoc samples (%)	83.1	92.1	66.7	79.6	93.4	47.6	56.3	71.4	63.6
Data collected for the event (%)	72.2	84.2	25.0	67.4	88.8	19.1	25.0	42.9	81.8
Mean attrition rate	72.5	68.1	64.3	68.2	75.2	68.5	71.0	69.4	74.5
Systematic dropout (%)	1.3	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0
No systematic dropout (%)	25.6	31.6	16.7	24.5	29.0	9.5	0.0	14.3	54.6
Men (%)	34.6	48.6	27.9	23.7	30.9	41.5	42.9	65.9	32.1
Mean age	34.8	26.4	39.9	55.4	29.0	29.7	28.9	58.6	44.5
Ethnicity: Majority White (%)	44.4	79.0	41.7	55.1	42.1	14.3	6.3	28.6	45.5
Measures									
Affective well-being (%)	60.7	7.3	61.5	78.2	61.1	83.3	85.0	60.0	69.2
Positively coded (%)	47.7	92.7	53.9	36.4	48.0	16.7	20.0	55.0	30.8
Sample-specific reliability estimate reported (%)	52.3	56.1	46.2	58.2	46.0	66.7	80.0	40.0	69.2
Mean number of items in measure	14.4	16.3	9.6	11.8	16.7	14.0	11.2	9.1	10.9

Note. T1 = Time 1.
[a] Some samples delivered effect sizes for multiple events. Therefore, the total number of independent samples is lower than the summed number of samples for the single events. [b] If the sample size varied within independent samples, the median sample size across all time points was reported.

reaction to the event has passed. However, post hoc studies do not allow for estimating the initial reaction itself, nor do they indicate whether SWB returns to its preevent level.

Meta-analytic computations. The data were analyzed with a random-effects structural equation model (SEM) for meta-analysis (Cheung, 2008). Many samples in this meta-analysis provided multiple effect sizes, either because different outcome variables were assessed or because data on more than two time points were reported. We controlled for the statistical dependency of the effect sizes by using the clustering function in Mplus (Muthén & Muthén, 2007) that is available within the COMPLEX procedure.[4]

In the SEM approach, the effect sizes are treated as dependent variables, and meta-analytic moderators are included in the model as predictors (see Appendix for model equations). In contrast to some meta-analyses, in which researchers are mainly interested in a summary effect size, the present meta-analysis focuses on how the effect sizes change as a function of time. In our longitudinal studies, three time periods can be distinguished (see Figure 1): (a) the time between the event and the first measurement occasion (Time 1), (b) the time between the event and the second measurement occasion (Time 2), and (c) the time between Time 1 and Time 2. In the present meta-analysis, the time since the event was of central interest. Thus, Time Since Event was included in all meta-analytic models. It was expected that if the effect sizes change as a function of time at all, most change should be observed shortly after the event. As the time since the event increases, the effect sizes should asymptote to a value characterizing

[4] To evaluate the degree to which the replacement of missing correlation coefficients with plausible values, use of the clustering procedure in Mplus to account for statistically dependent effect sizes, and the bias correction of the effect sizes affected the reported results, we conducted a series of sensitivity analyses in which these procedures were varied systematically. The sensitivity analyses indicated that the decisions listed above did not affect the estimates of the meta-analytic model. The tables for these sensitivity analyses can be obtained from Maike Luhmann.

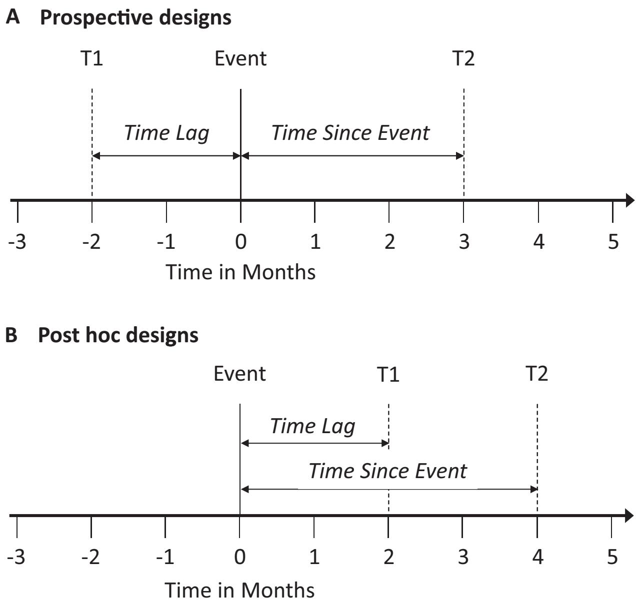

Figure 1. Meaning of Time Lag and Time Since Event in prospective and post hoc designs. T1 = Time 1; T2 = Time 2.

the habitual postevent well-being. This trajectory corresponds to a logarithmic curve. Therefore, Time Since Event was logarithmically transformed.[5] In addition to this central variable, we also included the time lag between the event and the first measurement occasion as a covariate. The effects of this control variable were not of central interest in this meta-analysis and are therefore reported in the supplemental material but not in this article.

Just as in ordinary regression analysis, the intercept of this model reflects the expected effect size when all predictors are zero, and the slope coefficients reflect how much the expected effect sizes change when the respective predictor (e.g., Time Since Event) increases by one unit (e.g., 1 month). To distinguish coefficients of prospective and post hoc models, prospective coefficients are denoted with *b* and post hoc coefficients are denoted with *c*. To clarify the interpretation of the model parameters, a prototypical course of prospective effect sizes is depicted in Figure 2. The preevent level is the average level of SWB before the event. The magnitude of the effect sizes reflects the mean-level difference between the preevent level and later time points. The intercept b_0 is the expected effect size at the time of the event, that is, the initial hedonic reaction to the event. A positive intercept b_0 indicates an average positive initial reaction, and a negative intercept indicates an average negative initial reaction. Note that in post hoc designs, the intercept must be interpreted differently: It does *not* reflect the initial hedonic reaction to the event as in prospective studies but rather, the predicted difference between SWB at the time of the event and SWB shortly after the event. The slope of Time Since Event is the average rate of logarithmic change per month. If this parameter is nonzero, SWB at later time points differs from SWB immediately after the event. In the example in Figure 2, the initial hedonic reaction to the event is positive, as indicated by a positive intercept. The slope b_1 is negative: The effect sizes decrease over time, indicating adaptation.

To examine differences between AWB and CWB, a dummy variable (0 = CWB, 1 = AWB) was added to the model. In the full model, both the main effect of AWB (b_2) and the interaction effect with Time Since Event (b_3) were examined. In the prospective full model, the intercept b_0 is the predicted initial impact of the event on CWB, and the regression coefficient b_1 is the rate of logarithmic change of CWB. The parameters b_2 and b_3 must always be interpreted in reference to the intercept b_0 and the rate of change of CWB b_1. For instance, a positive main effect of AWB b_2 does not mean that the initial impact of the event on AWB was positive but rather, the initial impact was more positive than the initial impact on CWB. Likewise, a positive interaction effect b_3 does not mean that the rate of change was positive for AWB but rather, the rate of change was more positive for AWB than for CWB. If the interaction was not significant, only the estimates for the *reduced model* that included the main effect but not the interaction effect for AWB were reported. In this model, AWB and CWB only differ in the intercept, not in the rate of adaptation.

Additional moderator analyses. For each event, we conducted a series of moderator analyses to examine the effects of age, age^2, and percentage of men. Some of the events examined in this article are reversible, for instance, marriage (can be reversed through separation) and unemployment (can be reversed through reemployment). For these events, we examined whether samples in which the status was reversed for at least some people differed from samples that remained completely unchanged.

For most events, the number of effect sizes was too low to allow the simultaneous inclusion of two or more moderators. For this reason, all of these moderators were examined in separate models that did not contain the AWB dummy variable. For each moderator, a reduced model (only main effects) and a full model (interaction with Time Since Event) were estimated. For the prospective studies, the coefficients of these moderators were denoted with b_4 (main effect of age), b_5 (main effect of age^2), b_6 (interaction of age and Time Since Event), b_7 (interaction of age^2 and Time Since Event), b_8 (main effect of men), b_9 (interaction of men and Time Since Event), b_{10} (main effect of reversed status), and b_{11} (interaction of reversed status and Time Since Event). For post hoc studies, the respective coefficients were denoted with c_4 to c_{11}. In this article, only significant results of these analyses are reported. The complete model estimates are provided as supplemental material.

Results

Five or more samples were found for the following family-related and work-related events: marriage, divorce, bereavement, childbirth, unemployment, reemployment, retirement, and relocation/migration. A complete list of all studies and the respective effect sizes is offered as supplemental material. This section begins with basic descriptive findings across all events, followed by the results of the event-specific analyses.

[5] For each event, we also fitted linear-change models and compared these with the logarithmic change by examining the Akaike information criterion and the Bayesian information criterion. In most cases, Akaike information criterion and Bayesian information criterion were lower for the logarithmic-change models, indicating better fit. The parameters for the linear-change model are available from Maike Luhmann.

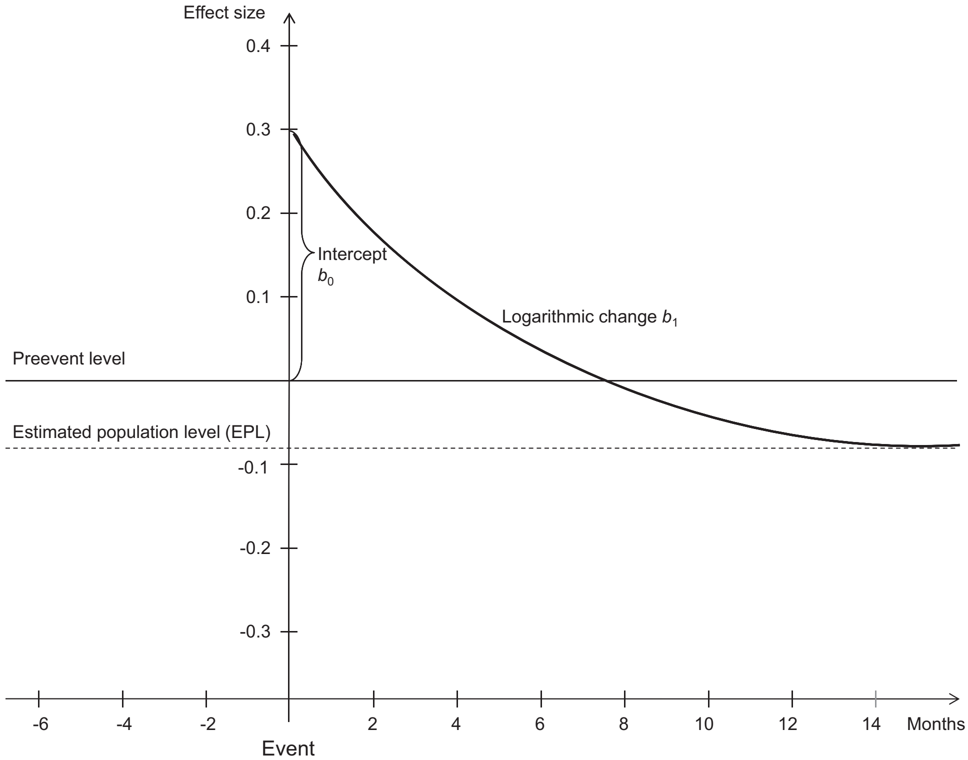

Figure 2. Example for a prospective adaptation pattern. The solid horizontal line represents the average preevent level of subjective well-being. The dashed horizontal line represents the estimated population level. The immediate hedonic reaction to the event is reflected in the intercept b_0 of the change curve. The rate of change over time is reflected in the logarithmic change parameter b_1. The time lag between the first measurement occasion and the event is not depicted but is fixed to a value of zero.

Descriptive Findings

In total, 313 samples (65,911 persons) yielding 802 effect sizes were analyzed. The number of effect sizes varied considerably across the different events. Childbirth was the most frequently investigated event, with 152 samples, whereas less than 20 samples were found for divorce, reemployment, retirement, and relocation/migration, respectively. We now describe selected characteristics of the publications, designs, samples, and measures. A full description of the studies is provided in Table 2.

Publication characteristics. The majority of the studies in our meta-analysis were published in the past decade (median publication year: 2002). On average, the publications were cited 2.1 times per year since publication, which reflects a rather high impact of these articles. More than half of the first authors (54.1%) were affiliated in the United States at the time of publication.

Design characteristics. Across all events, 70.6% of the studies were prospective. In these prospective studies, the first measurement took place on average 4.4 months before the event. For the specific events, this number varied substantively. For instance, the average time lag between the baseline assessment and divorce was 12.7 months, whereas the average time lag between the baseline assessment and childbirth was only 2.4 months. For the post hoc studies, the first measurement occurred 3.8 months after the event on average.

Sample characteristics. Most of the samples were ad hoc samples of adults (83.1% across all events) who were purposefully recruited to study a specific life event (72.2% across all events). The mean percentage of men in the samples was quite low, with 34.6% across all events. The mean age across all samples was 34.8. Mean age was higher for events that typically happen later in life, for instance, bereavement and retirement. The predominant ethnicity of the sample was either unknown (51.76%) or White/Caucasian (44.4%), suggesting that ethnic differences in adaptation to life events have not been a prominent line of research. In longitudinal studies, sample attrition is usually a concern. The mean attrition rate was similar across all events, with an average of 72.5%. In most studies, no information about systematic differences between dropouts and participants was given (see Table 1). If any information was available, it usually suggested that no systematic dropout occurred. This finding raises the question of whether comparisons between dropouts and participants were only reported if these groups did not differ significantly.

Measures. For most events, measures of AWB were somewhat more frequently used than were measures of CWB. Marriage was a clear exception: Only 7.3% of the measures assessed AWB. AWB and CWB measures differed in their temporal instruction: In 79.1% of the AWB measures, participants were asked to rate their well-being in a specific time frame, such as the past week or the past 4 weeks. An additional 19.8% of the AWB measures assessed momentary well-being. In contrast, 91.1% of the CWB measures used general instructions not referring to any specific time frame. Furthermore, AWB and CWB measures also differed in their focus on positive or negative aspects of well-being: 85.8% of the AWB measures were negatively coded (i.e., higher scores reflect lower SWB), and 99.3% of the CWB measures were positively coded (i.e., higher scores reflect higher SWB).

Marriage

For marriage, 18 independent prospective samples yielding 74 effect sizes and 20 independent post hoc samples yielding 86 effect sizes were found. Two samples included participants who separated during their participation in the study. For seven samples, it was unclear whether any status change had occurred. The samples were predominantly ad hoc samples (92.1%) and recruited specifically to study marriage as a life event (84.2%), especially in the post hoc studies (99.2%). The percentage of men and women in these samples was about equal, as would be expected in studies on marriage. The mean age of the samples was 26.4 years (SD = 2.91). Compared with other events, the average number of time points in these studies was quite high (M = 5.2, SD = 2.74, in prospective studies, and M = 5.71, SD = 2.65, in post hoc studies). The average time lag between the first measurement occasion and the event was −4.37 months (SD = 5.23) for prospective studies and 3.63 months (SD = 3.41) for post hoc studies.

Prospective studies. For prospective studies, two different measures of CWB were available: global life satisfaction and relationship satisfaction. Therefore, two dummy variables reflecting AWB and relationship satisfaction were included in the model. Life satisfaction was the reference category. The results showed that life satisfaction right after the event was higher than before the event (b_0 = 0.26), 95% CI [0.17, 0.35], and decreased over the following months (b_1 = −0.11), 95% CI [−0.13, −0.08]. The effect of AWB was negative (b_2 = −0.30), 95% CI [−0.38, −0.22]. As this parameter reflects the difference between the intercepts of AWB and life satisfaction, the intercept for AWB was therefore close to zero. As can be seen in the curve of AWB in the top panel of Figure 3, this means that AWB shortly after the wedding was similar to AWB before the wedding. The positive interaction effect of AWB with Time Since Event b_3 reflects the difference between the slope for AWB and the slope for life satisfaction b_1. The parameter of the interaction was positive (b_3 = 0.12), 95% CI [0.09, 0.15]. In absolute values, the coefficient b_3 was almost as large as the coefficient b_1, which means that AWB did not change over time. Thus, neither a significant initial hedonic reaction nor a significant adaptation trajectory was observed for AWB. It has to be kept in mind, however, that these estimates were based on three effect sizes only.

Similarly to AWB, the parameters for relationship satisfaction must also be interpreted in relation to the parameters for life satisfaction. Hence, the main effect of relationship satisfaction (b_{2a} = −0.35) 95% CI [−0.58, −0.13] needs to interpreted with respect to b_0 = 0.26. It indicates that the initial hedonic reaction of relationship satisfaction was negative, and the corresponding curve starts in the negative range (Figure 3, top panel). The interaction effect of relationship satisfaction and time was not significant (b_{3a} = −0.04), 95% CI [−0.11, 0.03], meaning the rate of change in relationship satisfaction is similar to the rate of change in life satisfaction after marriage.

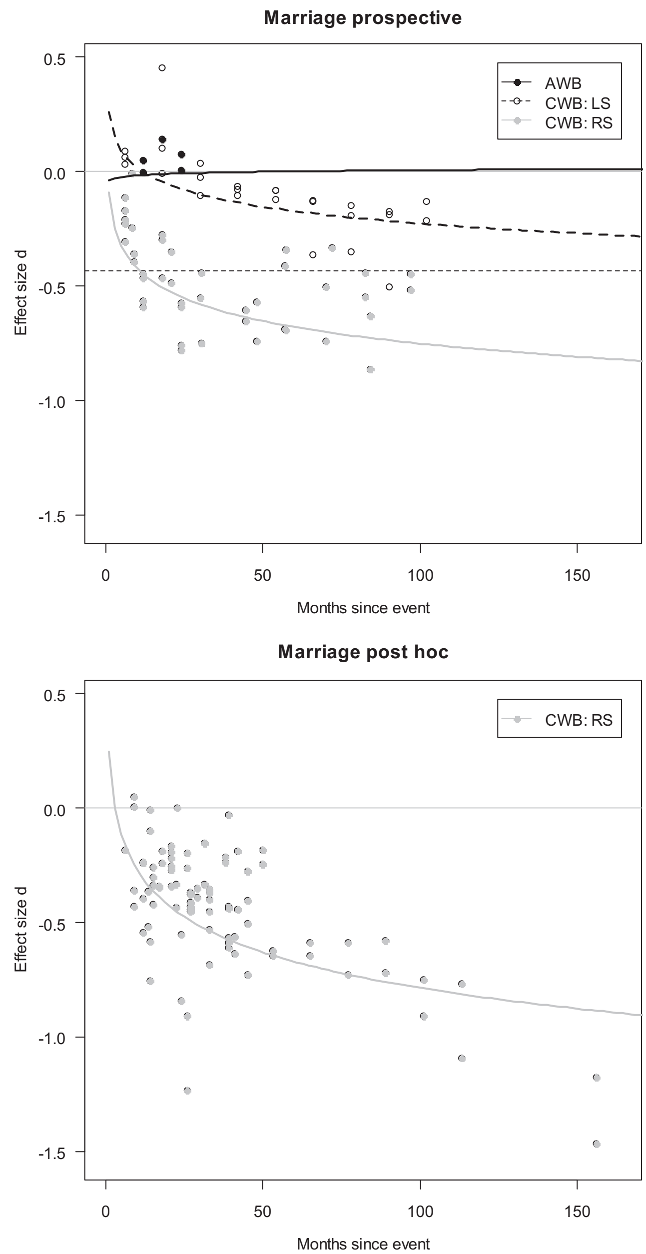

Figure 3. Observed effect sizes and predicted adaptation curves for marriage. The dashed horizontal line in the top panel represents the estimated population level (EPL) of CWB (based on three effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being; LS = life satisfaction; RS = relationship satisfaction.

Post hoc studies. In post hoc studies, relationship satisfaction was the only outcome. Similarly to the prospective findings on relationship satisfaction, a significant downward trend in relationship satisfaction was found (c_1 = −0.22), 95% CI [−0.29, −0.16] (Figure 3, bottom panel).

Additional moderator analyses. In both prospective and post hoc studies, a positive main effect was found for age (but not for age^2; b_4 = 0.03), 95% CI [0.01, 0.06], and c_4 = 0.03, 95% CI [0.01, 0.06], respectively. These effects indicate that marriage might have more positive effects for couples who are older when they get married. Age did not, however, significantly moderate the rate of adaptation after marriage. No significant gender effects were detected. Finally, we compared samples where all participants remained married throughout the study to samples where at least some participants separated. These samples did not differ in the initial reaction; however, the rate of adaptation was significantly less negative in samples without any separations in both prospective studies (b_{11} = 0.10), 95% CI [0.02, 0.19], and post hoc studies (c_{11} = 0.40), 95% CI [0.22, 0.59].

Summary. How does getting married affect SWB? Our findings show that the answer depends on which component of SWB is considered (see Research Question 1). The initial reaction to getting married is positive for life satisfaction but not for relationship satisfaction or AWB. Over time, both life and relationship satisfaction decline. This does not necessarily mean that getting married makes people unhappier than they were before. Rather, the comparison with the EPL of CWB (dashed horizontal line in Figure 3) indicates that CWB is higher than usual right before the marriage (Lucas et al., 2003), and the observed decline reflects a return to premarital levels of SWB. Our findings show that this "honeymoon effect" is short-lived—adaptation starts quickly, especially if relationship satisfaction is considered. For AWB, in contrast, no changes over time were observed. This does not necessarily contradict our assumption that the rate of adaptation is higher for AWB than for CWB. Rather, the weak initial reaction suggests that marriage does not affect AWB at all, and consequently, no adaptation is required. However, given the low number of effect sizes for AWB, more studies focusing on the effects of marriage on AWB are needed.

Divorce

Although scientific interest in divorce is not new (e.g., Krumrei, Coit, Martin, Fogo, & Mahoney, 2007), only few longitudinal studies assessing SWB have been published: Overall, eight independent prospective samples yielding 32 effect sizes and four independent post hoc samples yielding nine effect sizes were found. In contrast to the studies on marriage, most divorce studies (75.0%) were based on data that were originally collected for other purposes. The average percentage of men in these samples was rather low (27.9%; women, 72.1%). The mean age of the samples was 39.9 years (*SD* = 3.51). The average number of time points was 4.56 (*SD* = 3.84) for the prospective studies and 3.25 (*SD* = 0.96) for the post hoc studies. The average time lag between the first measurement occasion and the event was –12.72 months (*SD* = 7.51) for prospective studies and 4.58 months (*SD* = 2.32) for post hoc studies.

Prospective studies. Due to the low number of effect sizes, the usual statistical models did not converge. For this reason, we report the results for a less complex model that contains neither main effects nor interaction effects for AWB. The intercept of this model reflects the initial hedonic reaction of SWB overall. It was b_0 = −0.07, 95% CI [−0.13, −0.01], indicating that SWB is significantly lower at the time of divorce than approximately one year before divorce. An inspection of the effect sizes in the top panel of Figure 4 revealed that negative effect sizes were observed for AWB only, not for CWB. The trajectory of the prospective effect sizes was positive (b_1 = 0.07), 95% CI [0.05, 0.08], which means that SWB increases after divorce.

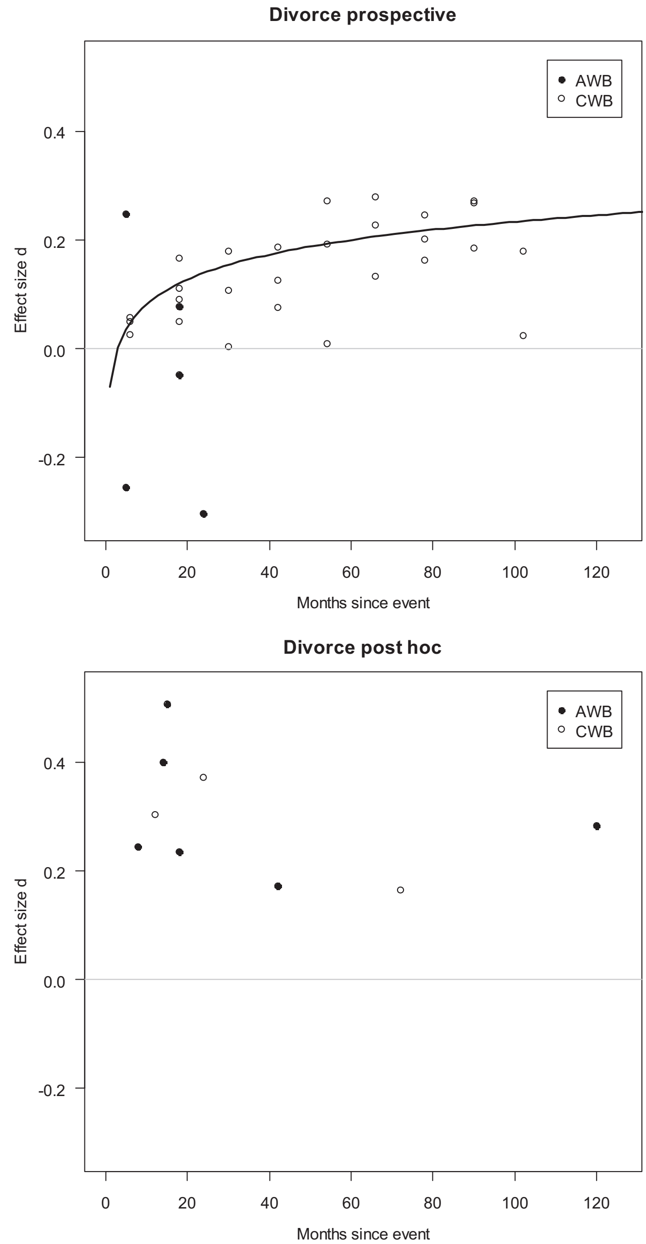

Figure 4. Observed effect sizes and predicted adaptation curve for divorce. The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being.

Post hoc studies. The number of effect sizes was too low to estimate the model. As can be seen in the bottom panel of Figure 4, all post hoc effect sizes were in the positive range.

Additional moderator analyses. Due to the low number of both prospective and post hoc effect sizes, it was not possible to conduct additional moderator analyses.

Summary. Divorce is typically seen as a negative life event. Our findings, however, indicate that after a relatively mild negative reaction, SWB increases after divorce. However, just as the decline in SWB after marriage does not imply that marriage is inherently negative, this increase in SWB after divorce does not imply that divorce is inherently positive. It is plausible that the level of SWB in the months prior to divorce might be lower than the habitual level, for instance because people anticipate the divorce and react to it before it actually occurs (see General Discussion). Unfortunately, this assumption could not be further explored with our data because it was not possible to estimate the EPL for this event. In sum, our findings indicate that the legal act of divorce itself (though not necessarily the whole process) may actually be beneficial for peoples' SWB, at least for those who perceive it as a relief from a bad marriage.

Bereavement

For bereavement, 22 independent prospective samples yielding 69 effect sizes and 27 independent post hoc samples yielding 61 effect sizes were found. The average percentage of men in these samples was the lowest of all events (23.7%; women, 76.3%). This is not unexpected because in most Western countries, wives outlive their husbands more often than vice versa. The mean age of the samples was 55.35 years (*SD* = 14.65). AWB was the predominant outcome variable (78.2%). The average number of time points was 3.76 (*SD* = 2.54) for prospective and 3.03 (*SD* = 1.13) for post hoc studies. The average time lag between the first measurement occasion and the event was −6.66 months (*SD* = 4.65) for prospective studies and 3.25 months (*SD* = 2.63) for post hoc studies.

Prospective studies. Since the interaction effect between Time Since Event and AWB was not significant, we only interpreted the reduced model without the interaction effect. The intercept was $b_0 = -0.48$, 95% CI [−0.68, −0.27], indicating that CWB drops by almost half a standard deviation at the time of the bereavement. Over time, both AWB and CWB increase significantly ($b_1 = 0.16$), 95% CI [0.10, 0.21]. Compared with CWB, the effect sizes for AWB were more positive ($b_2 = 0.36$), 95% CI [0.19, 0.54], suggesting that the initial impact of bereavement is worse on CWB than on AWB. In the top panel of Figure 5, it can be seen that the effect sizes for AWB varied considerably. For instance, the most negative effect size for prospective studies was $d = -0.94$ at 0.5 months after the event, and one of the most positive effect sizes ($d = 0.52$) was observed only 5 months later.

Post hoc studies. Since the interaction between Time Since Event and AWB was not significant, we only interpreted the reduced model. Over time, SWB tends to increase after bereavement ($c_1 = 0.13$), 95% CI [0.07, 0.19]. Similarly to the prospective studies, the main effect of AWB was positive ($c_2 = 0.22$), 95% CI [0.04, 0.39], indicating that bereavement has less negative effects on AWB than on CWB (Figure 5, bottom panel).

Additional moderator analyses. In the prospective studies, samples with higher mean age tended to have more negative effect sizes ($b_4 = -0.02$), 95% CI [−0.03, −0.00], indicating that older people experience a more dramatic drop in SWB when becoming bereaved. There were no age differences with respect to the rate of adaptation. However, the rate of adaptation was significantly more negative in samples with a high proportion of men ($b_9 = -0.49$), 95% CI [−0.92, −0.06], suggesting that women adapt faster than men to bereavement. No significant moderator effects were found for the post hoc studies.

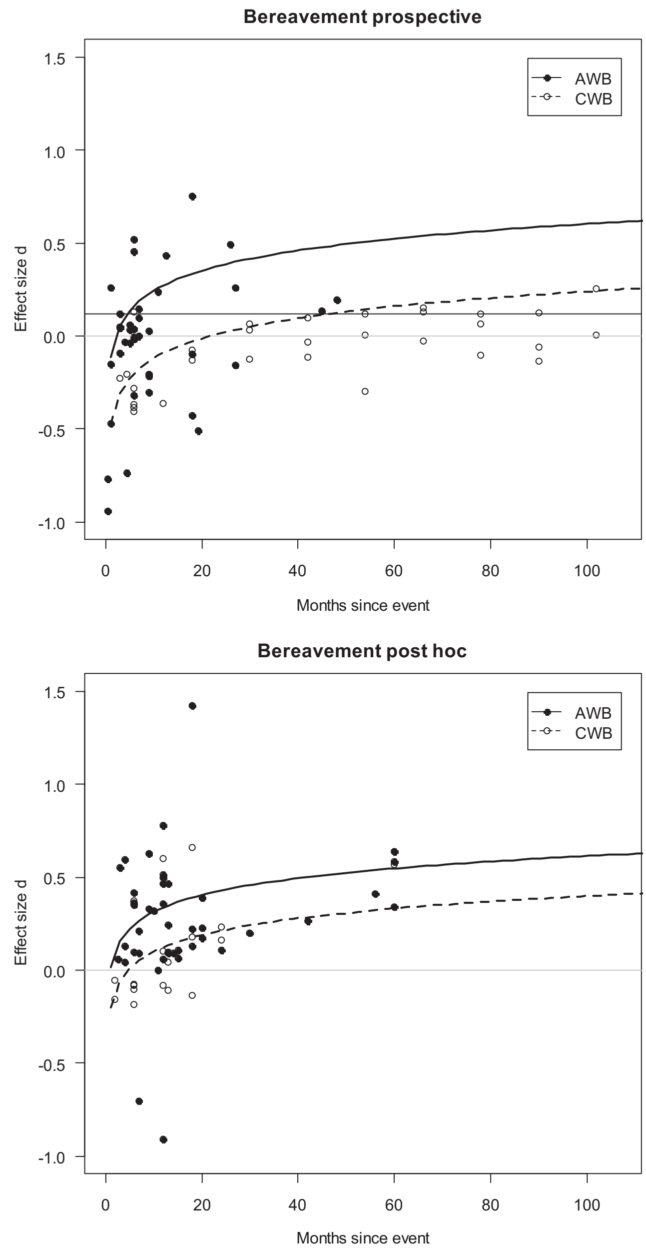

Figure 5. Observed effect sizes and predicted adaptation curves for bereavement. The black horizontal line represents the estimated population level (EPL) of AWB (based on seven effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being.

Summary. Bereavement is usually seen as one of the worst life events (Holmes & Rahe, 1967) associated with lasting negative effects on SWB (Lucas et al., 2003). In our data, the initial impact of bereavement on SWB was very negative, especially for CWB. Interestingly, however, the rate of adaptation was higher than the one observed for divorce. The reason why it takes the bereaved so much longer to regain their preevent levels of SWB (Lucas et al., 2003; Lucas, 2005) is that bereavement is associated with a greater initial shock than divorce, as indicated by the intercepts of the prospective models. With respect to our first research question, we found significant differences in the reaction to the event but not in the rate of adaptation. Our hypothesis that adaptation is faster for AWB than for CWB was not supported for bereavement, although we did find that bereavement has stronger and therefore more persistent effects on CWB.

Childbirth

Longitudinal studies on childbirth are much more frequent than longitudinal studies on any of the other events included in our meta-analysis: 113 independent prospective samples yielding 270 effect sizes and 39 independent post hoc samples yielding 84 effect sizes were found. The samples were predominantly ad hoc samples (93.4%) and recruited specifically to study childbirth as a life event (88.8%). The average percentage of men in these samples was 30.9% (women, 69.1%), the average reported mean age was 29.03 years (SD = 3.31). The average number of time points was 2.75 (SD = 1.10) for prospective and 2.79 (SD = 1.04) for post hoc studies. The average time lag between the first measurement occasion and the event was –2.47 months (SD = 2.38) for prospective studies and 1.74 months (SD = 1.71) for post hoc studies.

Prospective studies. Measures of life satisfaction, relationship satisfaction, and AWB were available for the prospective studies. To assess the differences between these components, dummy-coded AWB and dummy-coded relationship satisfaction as well as their interactions with time were included in the model (similarly to marriage, see above). The intercept shows that the initial reaction of life satisfaction was positive (b_0 = 0.50), 95% CI [0.17, 0.84]. However, the slope for life satisfaction was negative (b_1 = −0.19), 95% CI [−0.27, −0.11] indicating that life satisfaction decreases after the initial positive reaction has passed (Figure 6, top panel). The intercept of the relationship satisfaction curve was significantly less positive than the intercept for life satisfaction (b_{2a} = −0.56), 95% CI [−0.88, −0.25]. In absolute terms, this value is close to the value of the intercept b_0, which means that the birth of a child has almost no immediate effect on relationship satisfaction. The rate of adaptation did not differ between life satisfaction and relationship satisfaction (b_{3a} = 0.00), 95% CI [−0.00, 0.01]. Thus, relationship satisfaction right after childbirth is similar to its prebirth level, but it then decreases over the subsequent months. Finally, the intercept for AWB was also less positive than the intercept for life satisfaction (b_2 = −0.43), 95% CI [−0.77, −0.09]. The slope of the adaptation curve for AWB, however, was significantly less negative, compared with the slope for life satisfaction (b_3 = 0.25), 95% CI [0.15, 0.34].

Post hoc studies. Since no measures of life satisfaction were available, the parameter of time reflects the change of relationship satisfaction over time, and the interaction parameter for dummy-coded AWB and time reflects how the trajectory of AWB differs from the trajectory of relationship satisfaction. Relationship satisfaction decreased over time (c_1 = −0.26), 95% CI [−0.39, −0.13], whereas the rate of adaptation for AWB was significantly more positive (c_3 = 0.26), 95% CI [0.12, 0.41] (Figure 6, bottom panel).

Additional moderator analyses. The effects of age and gender were inconsistent across designs. For age, we found significant effects in the prospective studies but not in the post hoc studies. Specifically, we detected significant main effects for both age (b_4 = 0.04), 95% CI [0.01, 0.08], and age^2 (b_5 = 0.01), 95% CI [0.00, 0.01]; a marginally significant interaction between age and the rate of adaptation (b_6 = −0.02), 95% CI [−0.04, 0.00]; and a significant interaction between age^2 and the rate of adaptation (b_7 = −0.00), 95% CI [−0.01, −0.00]. Together, these results indicate that higher age is associated with a more positive reaction

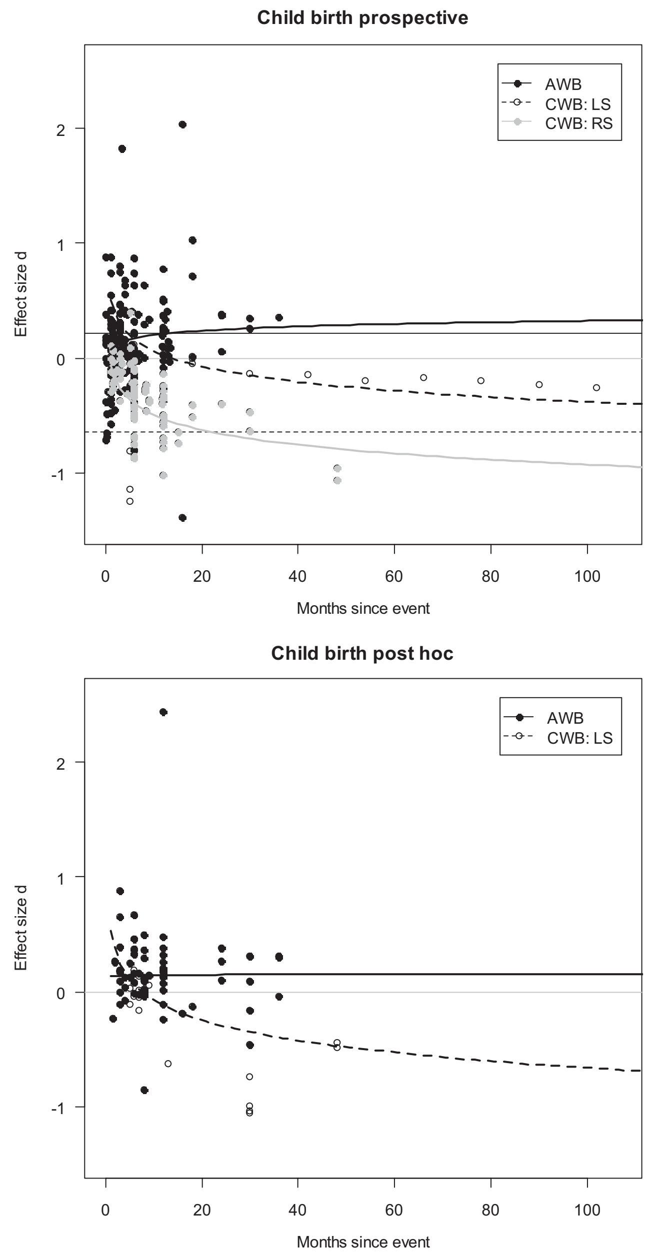

Figure 6. Observed effect sizes and predicted adaptation curves for childbirth. The dashed horizontal line in the top panel represents the estimated population level (EPL) of AWB (based on 32 effect sizes). The black horizontal line in the top panel represents the EPL of CWB (based on 12 effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being; LS = life satisfaction; RS = relationship satisfaction.

to childbirth and a slightly faster rate of adaptation. Gender did not explain differences in the prospective effect sizes. For the post hoc effect sizes, however, a higher percentage of men in the sample was associated with a steeper decline in SWB (c_9 = −0.33), 95% CI [−0.49, −0.17]. As a final moderator, we examined whether samples that included at least some participants who gave birth to a second child differed from samples in which no second children were born during the time of the data collection. We found no significant effects.

Summary. The birth of a child affects its parents' SWB in very diverse ways. Life satisfaction and relationship satisfaction tend to decrease after childbirth. The effects are most pronounced for relationship satisfaction: Contrary to life satisfaction, childbirth does not even have an initial positive effect on relationship satisfaction. Due to the continuing decrease in the subsequent years, relationship satisfaction after childbirth is permanently below its prebirth level. This finding shows that the birth of a child is a serious challenge for couples. The long-term effects of childbirth on life satisfaction are also negative but not quite as severe. Bottom-up theories of SWB (e.g., Schimmack, 2008) posit that global life satisfaction is an aggregate of satisfaction with various life domains. Against this background, our finding suggests that the decreased relationship satisfaction has some negative effects on life satisfaction, but these effects are partially compensated by other life domains. Despite these detrimental effects on the CWB of the parents, the birth of a child is not an entirely negative life event. The effects on AWB are small but clearly positive. Although parents tend to be less satisfied after childbirth (e.g., because they have less quality time with their spouses), they *feel* more positive affect in daily life (e.g., because the baby is a source of positive affect). With respect to our first research question, we can therefore conclude that childbirth has very different effects on CWB and AWB. Contrary to our hypothesis, however, it is CWB, not AWB, for which adaptation is faster.

Unemployment

For many people, unemployment is a transitory state that ends after some months or years. In the present meta-analysis, the beginning and the end of unemployment were treated as two distinct life events. In the present section, we examine the effects of the transition into unemployment on SWB. In some studies on unemployment, the participants were reemployed during the data collection. If data on the exact timing of this event were available, these samples were also included in the meta-analysis on reemployment (see next section).

For unemployment, 17 independent prospective samples yielding 30 effect sizes and four independent post hoc samples yielding six effect sizes were found. Although unemployment has been studied extensively in cross-sectional studies (McKee-Ryan, Song, Wanberg, & Kinicki, 2005), only few longitudinal studies assessing SWB have been conducted. Compared with other studies in this meta-analysis, publications on unemployment were rather old (median publication year: 1995). Most of the data came from samples that were originally recruited for other purposes. Only 19.1% of the samples were recruited to study unemployment. Three samples included at least some participants who found a new job during their study participation. For one sample, it was unclear from the publication whether any participants had become reemployed during the study. The average percentage of men in all samples was 41.5% (women, 58.5), mean age of the samples was 29.67 years (*SD* = 11.90). The average number of time points was 2.58 (*SD* = 1.87) for prospective and 2.20 (*SD* = 0.45) for post hoc studies. The average time lag between the first measurement occasion and the event was −6.92 months (*SD* = 5.16) for prospective studies and 15.00 months (*SD* = 16.50) for post hoc studies.

Prospective studies. The intercept was negative (b_0 = −0.43), 95% CI [−0.48, −0.38]. The main effect of AWB was positive but not significant (b_2 = 0.18), 95% CI [−0.08, 0.45], which means that the negative initial impact of unemployment on AWB does not differ from the initial impact on CWB. After this initial shock, CWB increased over time (b_1 = 0.12), 95% CI [0.10, 0.13]. The interaction parameter for AWB and time was negative (b_3 = −0.11), 95% CI [−0.20, −0.01], indicating that AWB does not change over time. A graphical inspection of the effect sizes (Figure 7, top panel) shows that the effect sizes for CWB are relatively close to the preunemployment level, whereas the effect sizes for AWB vary extremely, with a range of d = −1.09 to d = 0.66. This great variability in the AWB effect sizes has been observed before (e.g., for bereavement) and is discussed in the General Discussion below.

Post hoc studies. Due to the small number of effect sizes, it was not possible to estimate the adaptation model for the post hoc unemployment studies, nor was it possible to conduct any additional moderator analyses. As can be seen in the bottom panel of Figure 7, however, all effect sizes were in the negative range.

Additional moderator analyses. Age had a nonlinear effect on the effect sizes: The linear parameter was positive and significant (b_4 = 0.03), 95% CI [0.02, 0.04], and the quadratic parameter was negative and significant (b_5 = −0.001), 95% CI [−0.001, −0.000], indicating that age is negatively associated with the reaction to unemployment, but only among younger age groups. No age differences were found with respect to the rate of adaptation. The percentage of male participants had not significant effects. Unemployment is a reversible event. Some of the samples that were analyzed here included participants who became reemployed at some point of time. However, the effect sizes of these samples did not differ significantly from those of samples that stayed unemployed over the whole course of the study.

Summary. Unemployment has differential effects on AWB and CWB. For AWB, the initial reaction was on average negative but was also very diverse across studies, ranging from strong negative to moderate positive effect sizes. Over time, the effect sizes did not change significantly. For CWB, in contrast, a significant, negative initial reaction was followed by an increase in CWB, suggesting that people adapt to unemployment. However, because the initial reaction was so negative, the preevent level of CWB was only reached at approximately three years after the event. Hence, unemployment has very persistent negative effects on CWB. Our hypothesis that the rate of adaptation is higher for AWB than for CWB was not supported for unemployment.

Reemployment

Reemployment describes the transition from nonemployment to employment. Most of the reemployment studies were prospective: 15 independent samples yielded 27 effect sizes. Only one post hoc

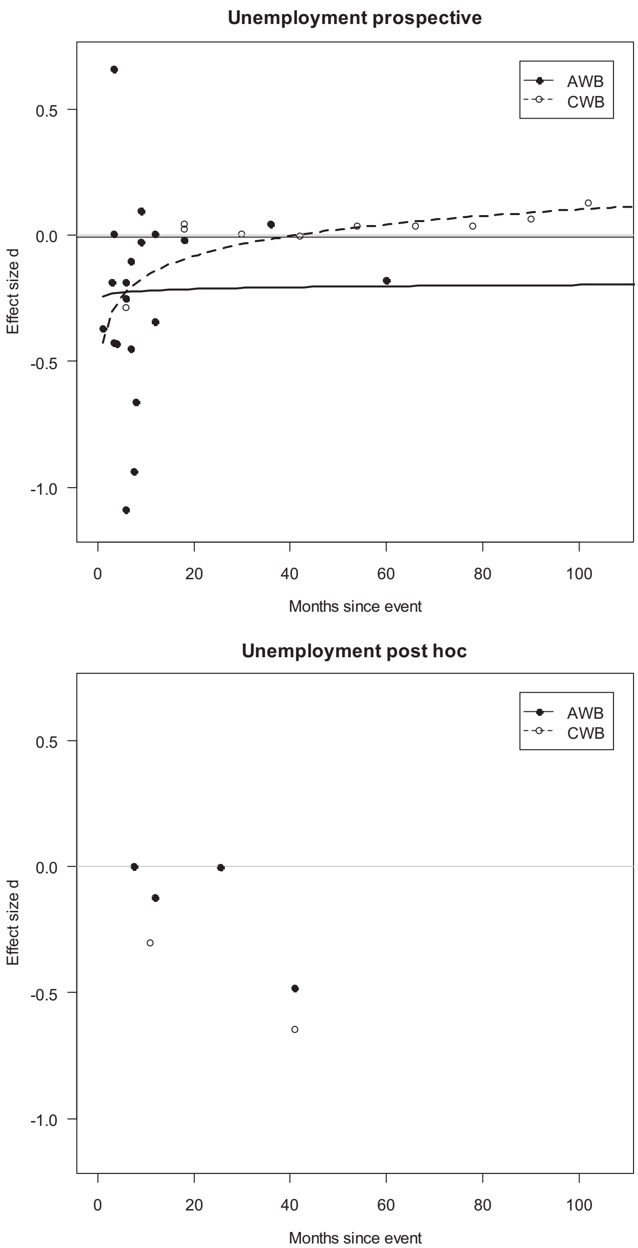

Figure 7. Observed effect sizes and predicted adaptation curves for unemployment. The black horizontal line in the top panel represents the estimated population level (EPL) of AWB (based on 10 effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being.

sample with two effect sizes was found. These effect sizes were not further analyzed. The average percentage of men was 42.9% (women, 57.1%), mean age was 28.93 years (SD = 9.43). The average number of time points in the prospective studies was 2.42 (SD = 0.84). The average time lag between the first measurement occasion and the event was −6.24 months (SD = 4.10).

Prospective studies. The initial hedonic reaction of CWB was negative (b_0 = −0.21), 95% CI [−0.22, −0.19]. The change parameter for CWB was positive (b_1 = 0.09), 95% CI [0.08, 0.10], which means that after this initial negative reaction, CWB increases over time (Figure 8). The trajectory for AWB was significantly different: The initial hedonic reaction was more positive than for CWB (b_2 = 0.28), 95% CI [0.12, 0.45]. As this parameter reflects the difference between the initial reactions of AWB and CWB, the initial impact on AWB was therefore neutral. The interaction effect was negative (b_3 = −0.05), 95% CI [−0.10, −0.00], indicating that AWB does not increase at the same rate as CWB.

Additional moderator analyses. Higher age and age^2 were associated with a more positive reaction (b_4 = 0.50), 95% CI [0.42, 0.57], and (b_5 = 0.05), 95% CI [0.04, 0.06], and with a less positive rate of adaptation (b_6 = −0.23), 95% CI [−0.26, −0.19], and (b_7 = −0.02), 95% CI [−0.03, −0.02]. This pattern suggests that reemployment has a more variable effect on younger people than on older people and that the trajectories of older people tend to be flatter. Male gender was associated with more positive effect sizes (b_8 = 0.63), 95% CI [0.29, 0.96].

Summary. In parallel to unemployment, reemployment has differential effects on CWB and AWB. AWB is not much affected by reemployment: The initial reaction is close to neutral, and AWB increases relatively little over time. The EPL of AWB (black horizontal line in Figure 8) was below zero, which suggests that AWB was higher than usual both before and after the event, possibly because reemployment might be anticipated and therefore affect the preevent scores of AWB in a positive direction. Anticipation could also be the mechanism that underlies the somewhat surprising finding that the initial impact of reemployment on CWB was negative: The actual experience of reemployment might be less positive than anticipated and therefore lead to a short-term decrease of SWB. A similar explanation for this finding might be

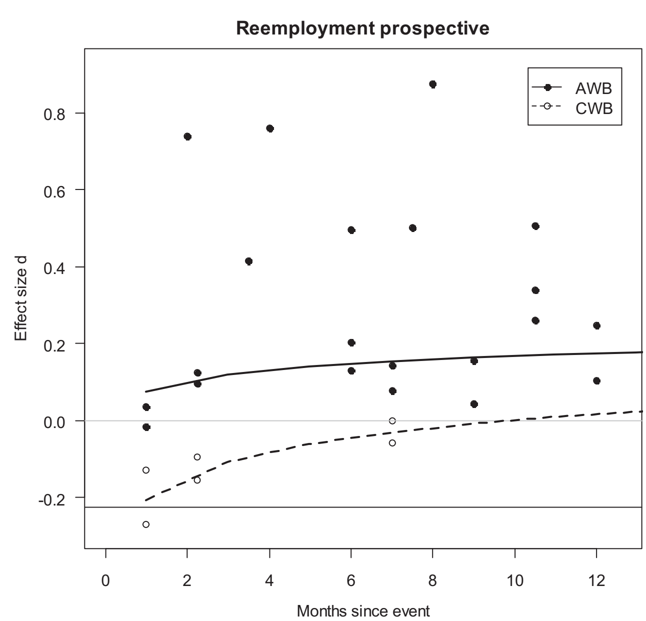

Figure 8. Observed effect sizes and predicted adaptation curves for reemployment. The black horizontal line represents the estimated population level (EPL) of AWB (based on 11 effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being.

that in the first months after reemployment, the positive effects of having a new job (e.g., higher income, feeling useful, etc.) are outweighed by the negative effects (e.g., less time for leisure, less time for family). Unfortunately, no estimate for the EPL of CWB for this event was available, so these explanations could not be explored any further. To sum up: With respect to our first research question, we found a significant difference between AWB and CWB in the rate of adaptation, but this difference was contrary to our hypothesis, according to which the rate of adaptation should be higher for AWB than for CWB.

Retirement

Most of the retirement studies were prospective: 13 independent samples yielded 35 effect sizes. Only one post hoc sample with three effect sizes was found. These effect sizes were not further analyzed. Of all events examined in the present article, retirement was the only one in which the samples were predominantly male. The average percentage of men was 65.9% (women, 34.1%), mean age was 58.61 years (SD = 10.39). The average number of time points in the prospective studies was 2.84 (SD = 1.21). The average time lag between the first measurement occasion and the event was −6.66 months (SD = 5.04).

Prospective studies. Since the interaction between Time Since Event and AWB was nonsignificant, we only report the results of the reduced model. The intercept of this model was negative ($b_0 = -0.29$), 95% CI [−0.54, −0.04], and the parameter for AWB was positive ($b_2 = 0.24$), 95% CI [0.06, 0.41], indicating an initial negative reaction for CWB but not for AWB. The value of the change parameter was positive ($b_1 = 0.07$), 95% CI [0.01, 0.13], indicating that people adapt over time (Figure 9).

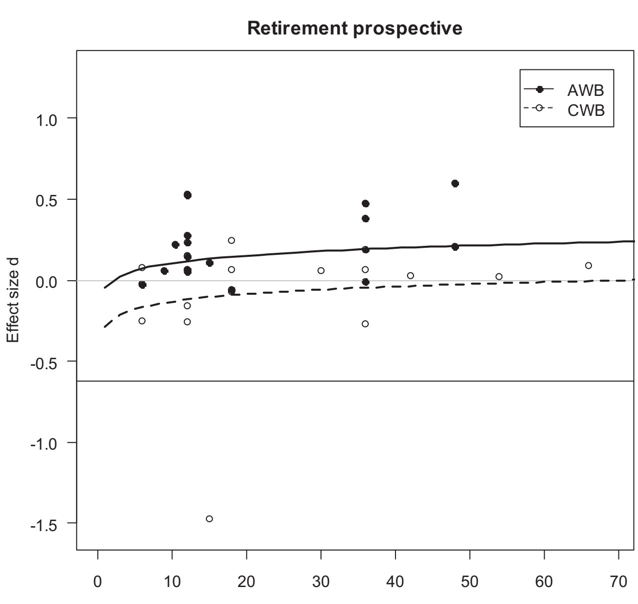

Figure 9. Observed effect sizes and predicted adaptation curves for retirement. The black horizontal line represents the estimated population level (EPL) of AWB (based on five effect sizes). The time lag between the baseline and the event is held constant at zero months. AWB = affective well-being; CWB = cognitive well-being.

Additional moderator analyses. We found a nonlinear association between age and the reaction to retirement: The linear parameter was not significant ($b_4 = -0.03$), 95% CI [−0.08, 0.03]; however, the quadratic parameter was positive ($b_5 = 0.009$), 95% CI [0.002, 0.015], indicating that the reaction to retirement is more positive for people who retire earlier or later than usual. There were no significant interactions of age with the rate of adaptation and no significant gender effects.

Summary. Retirement is a typical example of a "neutral" event that comes with costs and benefits. On the one hand, most retirees are probably less stressed and have more time for family, friends, and nonprofessional activities. On the other hand, it is accompanied by reduced income, less structured days, less work-related activities, and less social contact. In addition, health problems are more likely in retirees simply because of their age, and in the case of early retirement, this event might be a direct consequence of reduced health. Our analyses show that the initial reaction to retirement is negative for CWB, but not for AWB. This finding might reflect exaggerated expectations toward retirement that are disappointed in the first months (see reemployment). Both AWB and CWB increase in the following months. Our hypothesis that the rate of adaptation is higher for AWB than for CWB was not supported for retirement.

Relocation and Migration

Relocation and (voluntary) migration were analyzed together because both events are associated with moving from one place to another. Migration is evidently a more extreme case of relocation because it comes with a change of culture. We found five independent prospective samples yielding 10 effect sizes for relocation and one prospective sample yielding three effect sizes for migration. All of the five post hoc samples were migration samples. They yielded 10 effect sizes. The majority of the samples were ad hoc samples (63.6%) recruited explicitly to study relocation or migration (81.8%). The average number of time points was 2.63 (SD = 0.92) for prospective and 3.00 (SD = 1.23) for post hoc studies. The average percentage of men in these samples was 32.1% (women, 67.9%), the mean age across all samples was 44.52 years (SD = 24.15). The average time lag between the first measurement occasion and the event was –10.12 months (SD = 8.58) for prospective studies and 14.66 months (SD = 12.25) for post hoc studies.

Prospective studies. Due to the low number of effect sizes, only differences in the intercepts of AWB and CWB could be tested (reduced model). The intercept for CWB was positive (b_0 = 0.50), 95% CI [−4.35, 5.35] and the effect of AWB was negative ($b_2 = -0.27$), 95% CI [–3.71, 3.17]. However, the confidence intervals of these estimates were very large, probably reflecting the low statistical power, and the estimates were therefore not significantly different from zero. For this reason, only the adaptation curve for SWB overall is shown in the top panel of Figure 10.

Post hoc studies. Due to the small number of effect sizes, it was not possible to estimate the adaptation model for the post hoc studies. An inspection of the effect sizes (Figure 10, bottom panel) shows that most effect sizes are in the positive range, indicating that SWB is higher at later time points than shortly after the event.

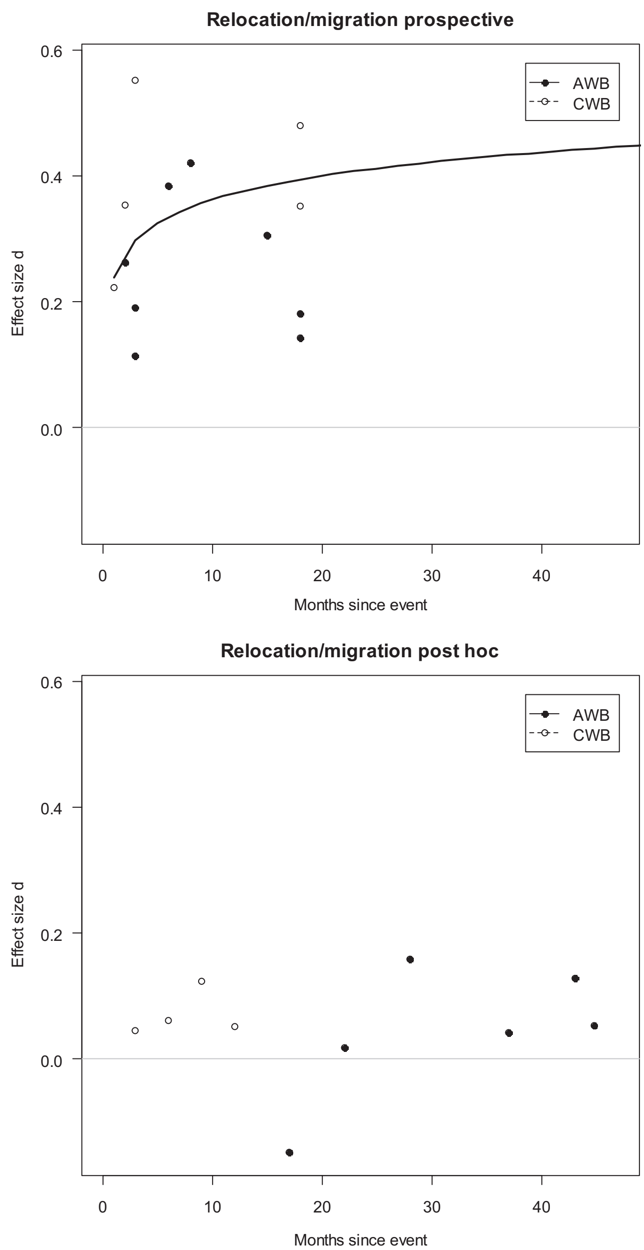

Figure 10. Observed effect sizes and predicted adaptation curves for relocation/migration. The time lag between the baseline and the event is held constant at zero months. The depicted adaptation curve in the top panel reflects adaptation for both AWB and CWB. AWB = affective well-being; CWB = cognitive well-being.

Additional moderator analyses. Due to the low number of both prospective and post hoc effect sizes, it was not possible to conduct additional moderator analyses.

Summary. Relocation and migration are stressful events that require people to adjust to new circumstances of their daily lives. The number of studies was too low to draw any final conclusions, and more research on the effects of relocation and migration on SWB is clearly needed. Interestingly, our results suggest that the effects of relocation and migration on SWB are rather positive: Overall, SWB is higher after the event than before the event, especially if CWB is considered. This effect can be explained in several ways: First, relocation and migration might be genuinely positive experiences that have persistent positive effects on SWB. Second, as everyone who has ever moved will admit, relocating is associated with a lot of work and stress that typically starts well before the actual moving date. Thus, the baseline assessments of SWB might be decreased because of this momentary stress, and the increase in SWB after the event reflects a return to the baseline level. Finally, in the months before relocating, people might overestimate the negative effects of relocation. When this event is less negative than feared, SWB increases.

General Discussion

In the present meta-analysis, changes in AWB and CWB after eight major life events were examined. The main findings were as follows: (a) Life events affect AWB and CWB differentially. Specifically, most events had more negative effects on CWB than on AWB. (b) The direction and the magnitude of the initial hedonic reaction as well as the rate of adaptation varied substantively between different life events. We now discuss these findings in more detail.

AWB Versus CWB

Almost all of the life events in this meta-analysis affected AWB and CWB differentially (see Table 3 for a concise summary). For some events, the effects on AWB and CWB were in the same direction, but differed in their strength. For instance, bereavement had negative initial effects on both AWB and CWB, but they were stronger for CWB. Other events only changed one component of SWB and did not affect the other at all. One example is unemployment, for which a positive increase could be observed only for CWB, not for AWB. Finally, divergent effects were found for childbirth: This event had a positive initial impact on CWB, followed by a rather quick decrease, especially if relationship satisfaction was examined. In contrast, the initial reaction of AWB was negative, but AWB increased in the following months. Thus, childbirth may lead to increased AWB and, in the long run, decreased CWB.

In the introduction, we hypothesized that the rate of adaptation is faster for AWB than for CWB. A central result of our meta-analysis is that this hypothesis is not generally true. Instead, it strongly depends on the event considered. The hypothesis was partially confirmed for marriage, bereavement, reemployment, and retirement: These events had much weaker effects on AWB than on CWB in the first place. Thus, most events had stronger effects on CWB than on AWB. There were some exceptions, however: After unemployment, CWB tended to increase (although quite slowly), whereas AWB remained below its preevent level. The effects of childbirth on AWB and CWB diverged so much that it was difficult to examine this hypothesis for this event. Finally, for relocation/migration, no significant differences between AWB and CWB could be detected.

An additional interesting finding was that the variance of the effect sizes was often much greater for AWB than for CWB (as, for instance, in the case of bereavement), indicating that the effects of life events on CWB are more consistent across different samples

Table 3
Summary of the Meta-Analytic Findings on Affective and Cognitive Well-Being

	Reaction (prospective studies)		Adaptation (prospective studies)		Adaptation (post hoc studies)	
Life event	Reaction CWB[a]	CWB vs. AWB[b]	Change in CWB[a]	CWB vs. AWB[b]	Change in CWB[a]	CWB vs. AWB[b]
Marriage	+	CWB > AWB	−	CWB < AWB	−	
Divorce	−		+			
Bereavement	−	CWB < AWB	+	CWB = AWB	+	CWB = AWB
Childbirth	+	CWB > AWB	−	CWB < AWB	−	CWB < AWB
Unemployment	−	CWB = AWB	+	CWB > AWB		
Reemployment	−	CWB < AWB	+	CWB > AWB		
Retirement	−	CWB < AWB	+	CWB = AWB		
Relocation/migration	0	CWB = AWB	0	CWB = AWB		

Note. For marriage and childbirth, CWB only refers to life satisfaction, not to relationship satisfaction. The findings on divorce are presented as CWB because the model estimates were based on a greater number of CWB effect sizes than AWB effect sizes. Blank cells indicate that this effect was not tested. AWB = affective well-being; CWB = cognitive well-being.
[a] These columns summarize the direction of the effects for CWB. A minus (−) indicates a negative reaction or a decrease of CWB. A plus (+) indicates a positive reaction or an increase of CWB. The 0 indicates a neutral reaction or no significant changes in subjective well-being. [b] These columns refer to the differences between CWB and AWB in reaction and adaptation. CWB > AWB indicates that the parameter was significantly ($p < .05$) more positive for CWB than for AWB. CWB < AWB indicates that the parameter was significantly ($p < .05$) more negative for CWB than for AWB. CWB = AWB indicates that AWB and CWB did not differ significantly.

than the effects of life events on AWB. A possible explanation for this effect is that AWB is much more influenced by other variables, such as personality, coping strategies, mood regulation, or social support. It is likely that these variables account not only for individual differences in habitual levels of AWB but also for individual differences in reaction and adaptation to life events (Diener et al., 2006). Alternatively, the greater variability of AWB effect sizes could also have methodological reasons, for instance, differences in the measures that were used. Scales assessing CWB typically instruct persons to rate their general well-being and focus on positive aspects of well-being (e.g., SWLS; Diener et al., 1985). In contrast, scales assessing AWB typically focus on the level of well-being within a specific time frame, such as the past 2 weeks, and focus on negative aspects of well-being (e.g., CES–D; Radloff, 1977). Finally, 60% of the measures for AWB were measures for depression that presumably are sensitive to changes at low levels of SWB but that might fail to detect changes on higher levels of SWB. In future studies, SWB researchers should strive to identify the most important psychological and methodological moderators of individual differences, describe their differential effects on AWB and CWB, and explain the mechanisms that account for these differences.

In sum, the findings on AWB and CWB show that it is important to distinguish between these components of SWB. In extreme cases (e.g., after childbirth), people may even cognitively appraise their lives as more negatively than before (e.g., because they have less quality time with their spouses) and still feel better in emotional terms at the same time (e.g., because the baby is a source of positive affect). The differences in change patterns have important implications for future research as well as for interventions that aim at accelerating or decelerating the process of adaptation. As AWB and CWB differ in their responsiveness to life events (and possibly, other external circumstances), different interventions may be necessary to influence these components (Larsen & Prizmic, 2008). In this context, two additional questions need to be raised. The first is a scientific one: Which interventions are effective to increase AWB and CWB, respectively? We propose that individual interventions that change people's activities (Lyubomirsky, Sheldon, & Schkade, 2005) could be more relevant for AWB, whereas public policy interventions that focus on changing people's life circumstances could be more relevant for CWB. The second question has a normative dimension: What is more important, increasing AWB or increasing CWB? This is a philosophical problem that can turn into a political issue as soon as public policy interventions are affected.

Comparison of Different Life Events

The second objective of this meta-analysis was to compare the effects of different life events on SWB. A comparative illustration of the adaptation curves across events is provided as supplemental material. The meta-analysis revealed some notable differences and some surprising similarities between different life events. For instance, unemployment and bereavement had much more negative initial effects on SWB than divorce or retirement, but the rate of adaptation was also much higher. To explain these findings systematically, it is necessary to identify those event features that distinguish the events and that account for their differential effects on SWB.

Many researchers classified life events according to their hedonic valence or desirability by distinguishing negative, positive, and neutral events (e.g., Filipp & Aymanns, 2009; S. E. Taylor, 1991) and proposed that negative events should have stronger effects on SWB than positive events (e.g., Baumeister et al., 2001; Frederick & Loewenstein, 1999). In our meta-analysis, however, desirability does not seem to be a very useful category to examine the differential effects of life events on SWB, for two reasons: First, it is not obvious for all events whether they are desirable or undesirable. For instance, the initial reaction to divorce was weaker than the initial reaction to presumably neutral events, such as retirement, and presumably positive events, such as reemployment. Second, we do not find that adaptation is slower for events that are typically considered as undesirable (e.g., bereavement, unemployment) than for events that are typically considered as desirable (e.g., marriage, childbirth). As expected, we find that CWB declines after the positive events, and it increases after the negative events. However, the values of the respective slope coefficients suggest that the rate of decline for the supposedly positive events is not systematically higher than the rate of growth for the supposedly negative events. In conclusion, our findings suggest that events cannot generally be classified as desirable or undesirable. On a cautionary note, this finding is based on a very small sample of life events and needs to be replicated for other positive and negative events.

An alternative approach to explain the differential impact of life events was presented by Wilson and Gilbert (2008). They proposed that people adapt as soon as they find an explanation for the event and provided a list of event features that might impede this explanation: novelty, surprise, variability, certainty, explanatory coherence, and explanatory content. Surprise and certainty depend at least partially on whether the event was actively initiated or whether it was entirely out of control. These features were not assessed in the studies included in this meta-analysis and can therefore not be examined at this point. However, it is plausible to assume that events such as marriage, childbirth, and possibly divorce are more likely to be actively initiated than events such as bereavement and unemployment. Indeed, we find that in absolute terms, the initial reaction to the former is weaker than the initial reaction to the latter events, but there were no systematic differences in the rate of adaptation. Again, we need to point out that the number of different events was too small to reach any final conclusions about which event features might be relevant in predicting reaction and adaptation. Overall, the framework by Wilson and Gilbert (2008) is a promising framework for future studies that attempt to explain differences between life events.

Anticipatory Effects

Some life events affected SWB in a direction that might seem counterintuitive at first glance. For instance, SWB decreases after marriage and increases after divorce, relative to its preevent level. To understand these findings, it is necessary to consider that the preevent level does not necessarily correspond to the habitual level of well-being. In fact, the EPL was different from the preevent scores of almost all events. A plausible explanation for this effect is that the life event is to some extent anticipated. Anticipation could increase or decrease SWB even before the actual occurrence of the life event (e.g., Lucas et al., 2003). If, however, SWB is higher than usual shortly before a positive event (as was found for marriage), a decrease in SWB after the event does not indicate that this event has permanent negative effects on SWB, but simply that the positive effects do not last.

A prominent topic in the past years was whether and after how many years people adapt "completely" to a life event, as defined by a return to the habitual level or set point of SWB (e.g., Diener et al., 2006; Lucas et al., 2003). In this meta-analysis, we attempted to estimate the habitual level of SWB, but due to two limitations of these estimates, strong conclusions should be avoided. First, the EPL and the event-specific effect sizes stem from different samples that might differ systematically in ways that we cannot assess with the current database. Second, the estimation was based on those studies that happened to use well-validated scales, which only applied to a third of all studies. Hence, the present meta-analysis provides data on the rate of adaptation after major life events, but we cannot confidently answer at what point adaptation was completed.

To avoid this problem in future studies on adaptation, the first measurement occasion should be early enough so that no anticipation effects can occur. At best, multiple measurements before the event should be taken so that the trajectory of the anticipatory effects can be analyzed. This is of course very difficult to achieve in practice, particularly for rare events such as bereavement. One way to deal with this problem is to use archival data sets that are similar to the SOEP or the BHPS. But these kinds of data sets have their limitations as well; for instance, they lack a number of psychological moderator variables that might be of interest for the researcher. At the very minimum, researchers should try to control for anticipatory effects by directly asking participants whether they had anticipated the event.

An important venue for future research concerns the anticipatory effects themselves. Empirical data on these anticipatory effects are extremely rare as of today, as became apparent in the current meta-analysis. To fully understand the effects of life events on SWB, however, it is absolutely mandatory to examine the extent to which the anticipation affects SWB, how long these anticipatory effects last, and for whom and under which circumstances they occur. Future research should therefore focus not only on the psychological consequences of experiencing an event but also on the psychological consequences of anticipating a major life event.

Overcoming Constraints of Previous Research

Meta-analyses are always influenced by the scope and the quality of the included studies. In the remainder, we discuss the most important constraints and gaps of previous research and provide directions for future studies on life events and SWB.

The analyses in this meta-analysis were restricted to eight specific family-related and work-related events. For many other interesting life events, the number of longitudinal studies was simply too low to include them in the meta-analysis. For instance, cosmetic surgery is sometimes named as the only positive event people do not adapt to (Frederick & Loewenstein, 1999). Are less wrinkles and bigger breasts really the way to happiness? We were not able to examine this question because only cross-sectional studies were available. Clearly, more longitudinal research on less conventional life events is needed.

In addition, our descriptive findings revealed trends for research on specific life events. For instance, the longitudinal studies on unemployment were comparatively old, whereas the longitudinal studies on divorce were published recently. Does this mean that we already know everything about unemployment? Certainly not, as indicated by the low number of longitudinal studies that studied the impact of this event on SWB. Thus, even for the events included in this meta-analysis, more longitudinal studies are required.

Finally, it is illuminative to point out a number of methodological gaps in previous adaptation studies. In most studies (97.9%), SWB was assessed with self-reports. Self-reports are the gold standard to assess SWB, but multimethod approaches (Eid & Diener, 2006) such as using peer reports or psychophysiological data (e.g., salivary cortisol levels) might nonetheless stimulate research on adaptation to life events. Furthermore, experience sampling (Hektner, Schmidt, & Csikszentmihalyi, 2007; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) has rarely been used in studies on adaptation to life events. Experience sampling, while still relying on self-report, has the advantage of tapping into real-time changes in SWB after an event has occurred.

We hope that this summary will inspire new research on life events and SWB. We conclude this article with some general recommendations for these future studies.

1. Adaptation can only be studied adequately in longitudinal studies. These studies should consist of multiple measurements that take place not only after the event but, if possible, also before the event, to account for potential anticipatory effects.

2. The intervals between the measurements must be chosen with respect to the predicted rate of adaptation: As can be seen in our findings, the trajectories of SWB after the event can often be described with a logarithmic function. A logarithmic-change model can be estimated most accurately if the intervals between measurements are shorter right after the event and longer toward the end of the study.

3. Researchers should routinely examine several components of SWB. This may include measures of positive and negative affect (AWB) as well as measures of global life satisfaction and more specific domain satisfaction (CWB).

4. Because we believe that identifying the sources of individual differences in adaptation is a major research goal for the next years, potential moderator variables should always be examined, including psychological moderators (e.g., personality), demographic moderators (e.g., gender), and methodological moderators (e.g., specific scales).

With more studies that are designed according to these recommendations, it will eventually be possible to gain a full understanding of the mechanisms, functions, and boundary conditions of adaptation.

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References marked with an asterisk indicate studies included in the meta-analysis that are discussed in the text. For a complete list, go to http://dx.doi.org/10.1037/a0025948.supp

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Appendix

Meta-Analytic Model Equations

In the structural equation modeling approach for meta-analysis (Cheung, 2008), the random-effects model is expressed as

$$\mathbf{y}^* = \mathbf{X}_0^* \cdot \mathbf{u} + \mathbf{e}^*, \tag{1}$$

where $\mathbf{y}^*$ is the vector of effect sizes weighted by the inverse standard error of the effect size, $\mathbf{X}_0^*$ is a transformed identity matrix containing the inverse standard error of the effect sizes on the diagonal and 0 in all other cells, $\mathbf{u}$ is the vector of study-specific random effects, and $\mathbf{e}^*$ is the vector of standard errors of the effect size weighted by the inverse of the standard errors (cf. Cheung, 2008, formula 21, p. 188). Because the standard errors are weighted by the inverse standard errors, their variances equal 1. The expected value of the random intercept variable u is notated by b_0. It can be estimated by the mean of the weighted estimated effect sizes. The variance of the random intercept variable reflects the degree of heterogeneity between the studies. This model can be extended to include covariates such as Time Since Event or AWB versus CWB (cf. Cheung, 2008, Formula 22, p. 189):

$$\mathbf{y}^* = \mathbf{X}_0^* \cdot \mathbf{u} + b_1 \cdot \mathbf{X}_1^* + \mathbf{e}^*, \tag{2}$$

where $\mathbf{X}_1^*$ is a vector containing the values of the moderator variable that are multiplied by the inverse standard error of the effect size, and b_1 is the regression coefficient of the moderator variable. Note that the interpretation of the random intercept variable has changed: The expected value b_0 of the random intercept variable u is now the expected effect size for $\mathbf{X}_1^* = 0$. In the article, we call b_0 the intercept. This model was extended to include multiple covariates.

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