

# Concentration of critical events over the life course and life satisfaction later in life

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## ABSTRACT

Critical events create turning points, disrupt individuals' life courses, and affect wellbeing. Periods of life densely populated with critical events may translate into an acute resource drain, affecting long-term wellbeing more strongly than if the same events were sparsely distributed. We investigate how the co-occurrence of critical events and their concentration in time influence life satisfaction in later life. To do so, we construct a novel indicator, the Concentration Index, based not only on the number but also on the time lag between occurrences. Using retrospective information on critical events in family, work, health, and residential trajectories in Switzerland, we show that the higher the concentration in time of critical events is, the stronger their negative long-term relation to wellbeing, net of sociodemographic characteristics, the total number of events ever experienced, and the time since the last event. Furthermore, relevant gender and social origin differences emerged with a stronger negative association with wellbeing among men and respondents from low socioeconomic backgrounds. Our work clearly shows that simply counting the number of events gives only a partial and potentially inaccurate measure of the complexity of the life course and its relationship with quality of life. Not only how many events experienced matter but also the spacing between them.

## 1. Introduction

Critical events or stressors induce readjustments in people's behaviors and routines (Dohrenwend, 2006) or adaptations to new social roles (Hopson & Adams, 1976). These events do not necessarily represent traumas or negative events *stricto sensu*, but events that force individuals to adjust to new circumstances or statuses (Dohrenwend et al., 1978), such as becoming a parent or going into retirement. In this study, we investigate how the co-occurrence of critical events and, in particular, the concentration in time of events across the life course relates to wellbeing in later life, introducing a novel indicator of event concentration. Here we conceptualize subjective wellbeing through its more global and cognitive component, life satisfaction.

A voluminous and long-standing literature has documented the extent to which critical events influence subjective wellbeing (SWB; Dohrenwend & Dohrenwend, 1974; Hentschel et al., 2017). Most studies have focused on the wellbeing consequences of one event in isolation or multiple events in one given life domain. However, a central principle of

life course theory (Elder, 1998) is the multidimensionality of biographies: Life domains are interdependent, and life events occur not in isolation but in a configuration of related trajectories (Diewald & Mayer, 2009). Critical events from different domains often co-occur (Thomas, 2018), making it difficult to isolate the impact of single events, especially over a lifetime (Seery et al., 2010). The focus on responses to single events, although it allows for a deeper investigation of an event's impact, gives a decontextualized view of each event within its biographical context, and obscures the fact that the accumulation and concentration of multiple events may have important additional effects (Comolli et al., 2021). In addition, as the cumulative advantage/disadvantage theory (Dannefer, 2003; DiPrete & Eirich, 2006) posits, the accumulation over the life course of resources, events and stress might explain differences observed much later on in life.

The current study investigates the long-term relationship between the concentration of events over the life course and SWB later in life. Few longitudinal studies have compared the association between given life events and SWB in the context of a wide range of other events. Yet,

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the assessment of cumulative adversity has typically involved only counts of negative events experienced over a given period (Frijters et al., 2023; Wheaton & Clarke, 2003). The extent to which different distributions of critical life course events across time have differentiated long-term associations with wellbeing remains largely unmeasured.

We argue that a concentrated distribution over time of critical events may result in an acute resource drain and may more strongly correlate with subjective wellbeing compared to a situation in which the same events were sparsely distributed over the life course. We propose a novel indicator of the concentration of events in individuals' histories, the Concentration Index (CI), that allows us to assess more rigorously the relationship between a lifetime concentration of critical events and SWB later in life. We argue as well that even transitions that are normally benign (e.g., childbirth) may become stressful if they take place in close temporal proximity to multiple other transitions. To test this, we pool all events – irrespective of the life domain to which they belong and their valence – and then investigate the link between the concentration over time of those occurrences and SWB measured later in life. Furthermore, as the relationship between life event concentration and wellbeing will likely vary by gender and social origin (Aquino et al., 2022; Koren, 2016), we analyze heterogeneities in the relationship between the CI and SWB between men and women and by socioeconomic family background.

We exploit the complete retrospective biographical information on life events in multiple domains (family, work, health, and residence) collected in the 2013 wave of the Swiss Household Panel (SHP) to investigate lifelong associations between the concentration of events over the life course and life satisfaction later in life. We take into account not only the overall number of events ever experienced, as previous studies did, but thanks to our CI, we innovatively measure the time lag between them. This study contributes to the body of research on life course and cumulative advantage/disadvantage theory, and to the wellbeing literature with an original assessment of whether and the extent to which the concentration of critical events during the life course relates to SWB later in life.

## 2. Background

### 2.1. Critical life events and wellbeing

Critical life events are occurrences of sufficient magnitude to challenge people's adaptive capacities (Pearlin, 2010, p. 208), bringing about a readjustment of individuals' activities and a major change in their statuses or social roles (Dohrenwend et al., 1978; Park, 2010). Critical life events are distinct from short-term fluctuations in life circumstances (e.g., income variations) because the latter do not involve a status or role change. Critical life events are also distinct from developmental transitions (e.g., to adulthood) because the latter unfold over longer periods and are not time-discrete (Luhmann et al., 2012). Bereavement, health issues, childbirth, marriage, union dissolution, migration, job loss, or retirement are examples of critical life events in different domains. Some authors have distinguished life events by valence. One could probably define most positive events as desirable and expected, namely being episodes consistent with normative expectations and characterized by a certain degree of predictability. Yet, the valence of many events can be ambiguous. Although occurrences such as marriage or childbirth tend to be identified as positive and others such as divorce or job loss as negative, identifying a priori the valence of events can be challenging (Kettlewell et al., 2020).<sup>1</sup> Moreover, the valence of events may not necessarily be constant over the life course (Balbo and

Arpino, 2016).

A rich literature has documented that critical life events are related to wellbeing (Hentschel et al., 2017; Yap et al., 2014). While early cross-sectional studies supported the notion that people adapt to most life changes over time (Brickman & Campbell, 1971) and that most life events affect wellbeing only in the short-term (Lykken & Tellegen, 1996), more recent longitudinal studies have shown that the effects of major life events on wellbeing can instead persist over several years (Bühler et al., 2023; Dyrda et al., 2019; Krämer et al., 2024; Lucas, 2007; Luhmann et al., 2014).

### 2.2. Multiple life events and SWB

Events vary by their individual properties, like valence (positive or negative), but also in terms of structural properties, like number, timing, and dispersion over the life course (Lindeboom et al., 2002). Studies focusing on the wellbeing consequences of *multiple events of the same kind* (Booker & Sacker, 2012; Demey et al., 2014) have shown that the recurrence of some types of events has cumulative negative effects on wellbeing (Clark et al., 2008; Frijters et al., 2011; Luhmann & Eid, 2009). Similarly, a longer duration or persistence of some events or statuses generally results in a greater reduction of wellbeing (Lucas et al., 2004). In unemployment research particularly, the duration, timing, and recurrence of events have been shown to affect mental health and wellbeing in the long-term and even net of other more proximal determinants of wellbeing outcomes (Ponomarenko, 2016; Wheaton & Reid, 2008).

Treating each (kind of) event separately undoubtedly allows researchers to focus more deeply on each event's impact on the life course. However, this gives a decontextualized, partial view (Thomas, 2018). Given the multidimensionality of the life course, *critical events of different kinds* can be, and often are, coupled together. Some events prompt another event, such as a residential move following retirement, divorce, or childbirth (Clark, 2016; South et al., 1998; Weitzman, 1985). Economic strain and family conflict often follow involuntary job loss (Pearlin et al., 1981), so a job loss can lead to marriage dissolution (Charles & Stephens, 2004; Di Nallo et al., 2022; Sayer et al., 2011). Such critical events could also occur independently but successively within a given short time frame. Few studies in social psychology have investigated how the effects of clusters of adversities differ from those of single events (Kessler et al., 1997; Raposa et al., 2014). Although with varying strength depending on the type of clustered events, the effects of single isolated events are considerably attenuated once the clustering of multiple adversities is considered. Moreover, the effects of concurrent critical events on mental health and wellbeing appear to be multiplicative and not simply additive (Kessler et al., 1997). Consistent with the cumulative advantage/disadvantage theory (Dannefer, 2003; DiPrete & Eirich, 2006), studies have also shown the presence of cumulative effects over the life course: Clusters of early childhood adversities predict later experiences of stressful events, resulting in a compounded negative effect on young adults' mental health (Raposa et al., 2014; Rindfuss et al., 1987; Turner & Lloyd, 1995).

Seery et al. (2010) investigated how lifetime adversity, measured as the number of negative events experienced over the life course (in the health, finance, relationships, family, and work domains), influences life satisfaction later in life. Their study demonstrated that the association between lifetime negative events and SWB later in life is quadratic, following an inverted U-shaped pattern: Both individuals who experienced either zero negative events or low adversity, and those who experienced a relatively large number of events, reported lower wellbeing than those who reported an average number of negative events. The authors referred to Dienstbier's (1989, 1992) theory emphasizing that regular exposure to several adverse events followed by adequate recovery periods promotes the development of mental toughness, namely a greater capacity to deal with future stressors. The argument of spacing between multiple critical events is crucial (Thoits, 1983; Dutta

<sup>1</sup> For instance, despite the positive valence of marriage, Holmes and Rahe (1967) identified marriage as the sixth most stressful event in the life course. Similarly, the issue of whether childbirth increases parents' life satisfaction has been debated at length (Aassve et al., 2012; Myrskylä & Margolis, 2014).

et al., 2013) but in Seery and colleagues (2010), remained untested.

Kettlewell et al. (2020) investigated the relative impact of specific events on wellbeing, conditional on the occurrence of other events. Their main finding was that some events, such as being fired or getting promoted, have little independent effect on wellbeing, whereas others, such as widowhood or childbearing, influence wellbeing regardless of whether other events co-occur. However, Kettlewell and colleagues did not investigate the effects of the overall dispersion of events but focused on singling out the impact of each event on wellbeing, net of additional events happening at the same time. In addition, their study focused on SWB fluctuations in the years around the event and not on the long-term effects of the co-occurrence of events. Krämer and colleagues (2024) further demonstrated that the strongest association between the co-occurrence of life events and life satisfaction is found in the family domain (relationships and fertility) because those events are more likely to be clustered together and to follow a more normative sequence.

A study by Frijters and colleagues (2023) investigated the nexus between the clustering of events by valence (negative and positive) on life satisfaction in the short and medium term. As in earlier studies, the authors measured the concentration of events as the number of occurrences within a 2-year window. Analyzing within-individual variation, hence reducing the bias from selection into life events, they found that life satisfaction is greatest when both negative and positive life events are spread out in time. Engaging with the literature on the heterogeneous effects of good and bad events on SWB goes beyond the scope of this study, which starts from the premise that any kind of critical event is potentially stressful if co-occurring with others. However, since we will test the validity of our assumption later in the study, it is worth mentioning that events with opposite valence may theoretically compensate for each other in influencing SWB and the concentration of positive events may be positively related to SWB. Yet, the evidence supporting this argument is contradictory. Taken independently, negative and positive events have been shown to influence wellbeing asymmetrically (Boyce et al., 2013; De Neve et al., 2018; Kahneman & Tversky, 1979; Vendrik & Woltjer, 2007). Yet, taken together, positive occurrences are found to buffer the effects of negative events only on some negative psychological outcomes (e.g., stress and depression), and only among the most vulnerable individuals (Longua et al., 2009; Nezlek & Plesko, 2003; Reich & Zautra, 1981).

### 2.3. Gender and social origin differences

The process linking life events concentration to wellbeing is likely to be gendered: not only life course trajectories differ by gender, but women's life courses are characterized by greater complexity than men's (Widmer & Ritschard, 2009). This means women tend to experience a greater number of critical events over the life course. In addition, the spillovers across life domains, such as family and work-related duties, are generally less reconcilable for women (Keizer et al., 2010). Nevertheless, women are also found to be more resilient than men in late life after the experience of critical events, such as a partner's death (Koren, 2016). This suggests that women, despite the greater number of critical events experienced, and potentially a greater concentration in time of such events, may suffer less from the negative consequences of the greater concentration. Similarly, the process may vary also depending on the individual's social background (Aquino et al., 2022). On the one hand, individuals with fewer resources are more likely to experience critical events, which may also be less spaced over time. On the other hand, the cumulative advantage theory and vulnerability framework in a life course perspective posit that individuals from low socio-economic origins have access to fewer compensatory resources, such as social support, information, mental health, or financial resources. This means that early disadvantages may translate not only in the experience of a greater number and concentration of critical events in adulthood but also that disadvantaged individuals tend to be less equipped to compensate for the negative consequences of such critical

and potentially concentrated events (Dannefer, 2003; O'Rand, 2006; DiPrete and Eirich, 2006; Spini and Widmer, 2023). Long-term multidimensional disadvantage may weaken the ability to deal with concentrated critical events. Yet, low socioeconomic origin may also make individuals less vulnerable to concentrated critical events because they have less to lose (Aquino et al., 2022). Namely, they experience a floor effect: their SWB is already very low and additional critical events and their concentration do not reduce it further.

Considering the mixed findings in the literature on short- and long-term effects on SWB of experiencing given life events of the same or different kind, and acknowledging the arbitrary categorization of events as (exclusively) "good" or "bad", we posit that the crucial factor lies in the time elapsed between events and their concentration in time, irrespective of their positive or negative nature or the life domain to which they are associated. Throughout the remainder of this manuscript, we will use the term "critical events" without attaching a positive or negative connotation.

## 3. This study

### 3.1. Research hypotheses

In the studies conducted on the relationship between multiple life events and wellbeing so far, clusters of critical events have generally been measured through the simple counting of events, which is not ideal for measuring the *distribution* over time of co-occurring critical events, especially over a long period. Our study aims to assess more rigorously the nexus between lifetime concentration of critical events and life satisfaction later in life. To do so, we rely on a novel indicator of individuals' overall histories of events, the Concentration Index. We innovatively take into account not only the overall number of events ever experienced but also the time between them, their recentness, and the number of life domains involved at each time.

Our study is the first to assess how the lifetime concentration of critical events lowers SWB later in life. *First, we hypothesize that a greater concentration of critical events is negatively associated with SWB later in life and that this effect holds independently of the number of total events ever experienced and their recentness (H1). Second, we hypothesize different associations between the concentration of critical events in the life course and SWB later in life among men and women and across social strata, with women (H2) and individuals from high socioeconomic origin (H3) being more resilient than men and individuals from low socioeconomic origin when events are concentrated in time.*

### 3.2. Data and measures

Our data came from the SHP (SHP Group, 2023), an ongoing rich longitudinal representative survey of households in Switzerland. In 2013 the SHP collected complete retrospective information on life events in various domains from newly recruited respondents in the second refreshment sample. In practice, the respondents completed a roster (a life calendar) listing the events they had experienced since birth. From the initial sample of 6090 individuals who filled in the biographical life calendar in 2013, 5964 filled in the life calendars in all domains (family, work, health, and residence). To select our analytic sample, out of those 5964 individuals, we kept men and women who also participated and reported a valid level of life satisfaction<sup>2</sup> in any of the waves between 2014 and 2017 (3481 individuals), and among them, we further selected respondents in the age range 40–75 in 2014 (3018 individuals). Finally, we dropped 479 respondents with missing data on

<sup>2</sup> The life satisfaction question was not asked in 2013 along with the life calendar but only in subsequent waves (as of 2014). To maximize the sample size, we consider the life satisfaction in the first wave available from 2014 to 2017.

social origin. The final sample was composed of 2539 individuals (1179 men and 1360 women) aged 41 to 79<sup>3</sup> who were retrospectively observed, since age 16, the longest for 63 years and on average for around 45 years.

### 3.3. Critical life events

The life calendar allowed us to reconstruct entire biographies on family life, work, health, and residential mobility<sup>4</sup> and to construct a measure of the lifelong concentration of critical events. We considered the following as critical events. In the family domain, we included parental marriage or union, parental divorce, separation or remarriage, birth of siblings, death of parents or other relatives, respondents' own marriage or union, own separation or divorce, childbirth, and loss of a child. Events in the work domain included entry into full-time work (from education, unemployment, or part-time work), entry into unemployment, and exit from unemployment (into part-time work or education), entry in social assistance (social benefits excluding unemployment benefits), and retirement. Events in the health domain were any accident, illness, or surgery and mental health issues. Finally, we counted any residential moves within Switzerland or from or to abroad. Table A1 in the Appendix provides a detailed distribution of these events by gender. The most common events were in the health domain, with slightly less than 30% of the total ( $N = 12310$ ), followed by residential moves ( $N = 10092$ ). Around 15% of the reported events constituted marriages and childbirths ( $N = 6769$ ). Retirement ( $N = 3321$ ) and bereavement ( $N = 2953$ ) are the other most common events. Compared to men, women reported more events ( $N = 24068$  versus  $N = 17823$ ).

### 3.4. Subjective Wellbeing

Information on our dependent variable, wellbeing, came from subsequent panel waves (2014–2017). We measure SWB with life satisfaction, which was reported on a scale from 0 (*not at all satisfied*) to 10 (*completely satisfied*) and for which the question was formulated as follows: "In general, how satisfied are you with your life if 0 means 'not at all satisfied' and 10 means 'completely satisfied'?"

### 3.5. Concentration Index (CI)

Our main independent variable, the life course CI, is the weighted average time distance between all critical events ever experienced. We adapted the CI from the Longitudinal Poverty Index developed by Mendola and colleagues (Mendola et al., 2011; Mendola and Busetta, 2012). The main difference between their version of the index and ours is that we used different types of events, whereas previous specifications focused on only one type of event at a time (e.g., poverty or unemployment spells). To the best of our knowledge, this is the first time a similar approach is used in life course research.

At each year of the life history, we counted how many critical events happened and in which of the four life domains (family, work, health,

and residence). Due to the nature of the data, we did not have the exact dates of events but only the years when they occurred, so we ended up having multiple critical events that happened simultaneously, that is, in the same year. We needed to distinguish then between *event-years* and *events*. By "event-years," we mean the years (age) in which at least one critical life event was reported. By "events," we mean each single occurrence, counting multiple occurrences per year. In other words, for each event-year (year when at least one occurrence was reported), we counted how many events happened.

Eq. 1 presents our CI:

$$CI_i = \frac{\sum_{j,k} (d_{jk} + 1)^{-1} w_{jk}}{\sum_{g=1}^{T-1} \frac{g}{T-g+1}}, \quad j > k \quad (1)$$

The term  $d_{jk}$  in Eq. 1 represents the time span between any pair of event-years (i.e., the number of years between any pair  $j, k$ ). For instance, one individual in our sample reported four critical events over the life course: marriage and a residential move both at the age of 20, childbearing at age 25, and a job loss at age 30. Because marriage and the residential move happened simultaneously (i.e., in the same year) and we could not distinguish which one happened first, we considered them as one event-year, so we ended up with three event-years: (1) marriage and moving, (2) childbearing, (3) job loss. We calculated the (yearly) distance between each pair of event-years as follows: (a) distance between marriage/moving and childbearing ( $d_{12} = 5$ ), (b) distance between marriage/moving and job loss ( $d_{13} = 10$ ), and (c) distance between childbearing and job loss ( $d_{23} = 5$ ).

For each distance  $d$ , that is, for each pair of event-years  $j, k$ , the weight ( $w_{jk}$ ) allowed us to consider that multiple events might have happened simultaneously, as in the example above. The weight gives more importance to pairs of event-years in which multiple events took place. Because in our study three or more events in the same year were rare,<sup>5</sup> we considered the occurrence of two or more events in one year as multiple events. We set then the weight equal to 1 for a pair of event-years in which in both years, multiple events happened, whereas it was equal to 0.75 for a pair of event-years in which in one year only one event occurred and in the other year multiple events happened. Finally, the weight was equal to 0.5 for pairs of event-years in which in both years only one event occurred. In other words, pairs of event-years that happened in crowded years received higher weights. In our example above, we would have for the first distance ( $d_{12}$ ) two events (marriage and moving) in the first event-year and one (childbearing) in the second event-year. The associated weight would then be  $w_{12} = \frac{2+1}{2} = 0.75$ . Similarly, for the other pairs of events, we would have:  $w_{13} = \frac{2+1}{2} = 0.75$  and  $w_{23} = \frac{1+1}{2} = 0.5$ .

Finally,  $T$  is the total number of years each person was present in the data (with or without events) and  $g$  indexes each of those years. The denominator represents the maximum concentration possible for an individual observed for  $T$  waves, namely as if they had multiple events every year (see Mendola et al., 2011 for a demonstration).<sup>6</sup>

The index ranges theoretically from 0, representing the lowest possible concentration scenario (in our case, when one person experienced zero events or only one event over many years of observation) to 1, representing the highest possible event concentration scenario (in our case, when one person experienced two or more events in every year observed). Following our example above, if the respondent with 3 event-years and 4 total events was observed in our sample at age 40 (and no

<sup>3</sup> We selected individuals in the age range 40–79 to ensure we observed a substantial portion of the life course and an adequate number of critical life events. The choice of the cutoff at age 40 is motivated by the necessity to balance the need to reach an adequate sample size and to focus on the long-term wellbeing consequences of lifelong concentration of events. However, earlier versions of the study included also younger respondents and results were qualitatively similar.

<sup>4</sup> For the health and family domains, the respondents identify what qualifies as an important event to them. For each year, the respondents could report multiple family life events, multiple residential moves, and/or multiple health issues. For the work domain, they could report only one event (e.g., job loss) per year.

<sup>5</sup> The distribution of number of events by event-year is: only one event per event-year 70.98%; two events 18.93%; three events 5.27%; four events 2.1%; five or more events 2.07%.

<sup>6</sup> For a more detailed graphical illustration of the index, interested readers can refer to Busetta et al. (2019).



other occurrences took place between age 30 and age 40) his/her CI would be 0.0078, while if he/she had been observed at the age of 60 (with no other occurrences between age 30 and age 60) his/her CI would be 0.0029.

To summarize, the CI is a holistic measure of the concentration of critical events over the life course. It innovatively includes not only the overall number of critical life events ever experienced and their possible nonlinear cumulative effect, but also the yearly distance between them weighted for the number of events experienced each year. Notably, the CI can be extended in different ways according to the specific research questions or the sociological theories being tested and the type of data available. For example, weights can be discarded, or different weights can be given to different types of events (e.g., by valence, occurrence, whether expected or not), the CI can be calculated for one given life domain at a time, and the number of years of recovery between events or their recentness can be included. Reviewing all possible extensions of the index goes well beyond the scope of this study. However, we conducted robustness checks utilizing different versions of the index, and the results were qualitatively similar, at least in our sample (see Appendix B - Supplementary material).

### 3.6. Controls and socio-demographic variables

Following existing literature on the association between SWB and life events, we included a series of socio-demographic variables to control for individual characteristics that may bias our estimates. Summary statistics for all variables are presented in Table 1.

Events that are closer in time to the observed measure of life satisfaction tend to have larger impacts on life satisfaction (Suh et al., 1996). Because we observed individuals of different ages, we controlled for the age (and age squared) of the individual when wellbeing was measured, and the time elapsed since the last event. Additional controls were being born in Switzerland, region of residence (NUTS-2 level), and educational level (primary or lower secondary, upper secondary, tertiary).

Yet, the experience of given events and their number and concentration in time may be endogenous to pre-trajectory SWB levels. Unfortunately, we did not observe life satisfaction before the trajectory of events and the presence of pre-trajectory mental health issues was negligible in our sample. However, we disposed of other proxies for pre-trajectory wellbeing, namely the respondents' family living arrangements at age 15 (living with both parents, living with a lone parent, living alone or missing living arrangement), and the respondents' social origin, measured through father's education (primary or lower secondary, upper secondary, tertiary). Though this did not completely solve the issue of reverse causality, previous studies have shown that childhood characteristics and family background represent strong determinants of adolescent wellbeing (Comolli et al., 2021).

### 3.7. Method

We used linear OLS models to test the association between the CI (linear and quadratic to test possible non-linearities) and life satisfaction later in life (research hypothesis *H1*). To test the presence of heterogeneity due to gender and social origin (research hypotheses *H2* and *H3*), in a second set of models we interacted gender, with father's level of education, and the CI. In all model specifications, we measured the association between the CI and life satisfaction net of the total number of events,<sup>7</sup> the timing of the most recent event, pre-trajectory confounders, and sociodemographic controls. Results are presented both graphically

in terms of predicted levels of life satisfaction (Figs. 3–4) and in terms of beta coefficients in Table 3.

Besides the core models testing our research hypotheses, we ran several additional analyses. First, we relaxed the assumption that the concentration of events was associated with lower SWB irrespective of their life domain and valence (positive and negative events). We calculated the CI separately for each domain and, for events in the family and work domains separately for positive and negative events and tested their associations with SWB later in life (Table A3). Second, we tested whether the concentration of events had a direct association with SWB beyond current professional and family conditions, adding to our model the more proximal determinants of SWB (marital status, employment status, and number of children) to rule out the possibility that the lifetime concentration of events is linked to wellbeing only through respondents' current status (Table A4). Finally, to verify the robustness of our results to minor modifications of the indicator, we tested a few versions of the index: disregarding weights for multiple occurrences per year, including recovery years between critical events and including the recentness of the last event in the index itself instead of controlling for it separately in the models. In addition, we tested the robustness of our models by excluding outliers (individuals with five or more events per year) and running the main analysis stratified by gender.

The additional sensitivity analyses and the index robustness checks are discussed in separate sub-sections in the Results and tables and figures are reported in Appendix A and Appendix B - Supplementary material.<sup>8</sup>

## 4. Results

### 4.1. Descriptive results on the concentration of critical events

The number of event-years the respondents had experienced over the life course ranged from 0 to 56 with an average of 13.2, with the longest biography retrospectively observed covering 63 years. The overall number of events ranged from 0 to 281, with an average of around 16.3 events experienced over the life span. Women experienced slightly more event-years and events than men (Table 1). Fig. 1 additionally shows, separately for men and women, the simple mean frequency of critical events by life domains calculated as the number of events in each domain experienced by each individual over the number of years the respondent was observed, then averaged for the whole sample of men and women respectively. The vertical dashed line corresponds to a frequency of one event every 10 years. The more the domain dots are located on the right of the graph the more frequent they were. While for both men and women, residential changes and family-related events happened on average almost once every 10 years, among women health issues were the most frequent events happening once every 7.7 years. Among men, work-related events were relatively less frequent (every 14.3 years). Overall, women experienced all kinds of events slightly more frequently than men, but especially health issues.<sup>9</sup> Mean frequencies, though, only gave us a rough idea of the distribution of events in time. We aimed to test more precisely whether critical events more concentrated in time have a more negative effect on SWB compared to events more spaced out over the life course. To this end, we adopted a more precise measure of the lifetime concentration of critical events, the CI.

In our analytic sample, the CI ranged from 0 to 0.926 for women and 0 to 0.705 for men (Table 1). As an illustration of the interpretation of

<sup>7</sup> We checked the possible presence of multicollinearity between the total number of events and the CI with the Variance Inflation Factor (VIF) obtaining a value of 2.39, hence well below the critical thresholds of 10 considered as an indication that estimates may be influenced by multicollinearity (Neter et al., 1989).

<sup>8</sup> Hypotheses and analyses presented in this study were not preregistered.

<sup>9</sup> This could be partly due to gender differences in reporting behavior during interviews, although the higher prevalence of health issues reported by women has been found "real and not a reporting artefact" (Stenberg & Wall, 1995: 491).

**Table 1**  
Summary statistics by gender.

		Men					Women				
		Obs/N	Mean/%	SD	Min	Max	Obs/N	Mean/%	SD	Min	Max
Life satisfaction (SWB)		1179	8.415	1.331	0	10	1360	8.439	1.428	0	10
Concentration Index (CI)		1179	.08	.105	0	.705	1360	.113	.151	0	.926
Work CI		1179	.025	.054	0	.722	1360	.038	.095	0	.921
Work positive CI		1179	.009	.025	0	.213	1360	.008	.025	0	.253
Work negative CI		1179	.011	.044	0	.722	1360	.024	.087	0	.921
Family CI		1179	.012	.017	0	.44	1360	.012	.013	0	.212
Family positive CI		1179	.003	.004	0	.034	1360	.004	.004	0	.038
Family negative CI		1179	.001	.007	0	.216	1360	.001	.004	0	.099
Residential moves CI		1179	.015	.024	0	.23	1360	.018	.026	0	.224
Health issues CI		1179	.043	.138	0	.921	1360	.077	.197	0	.947
Total number of event-years		1179	12.382	7.348	0	53	1360	13.996	9.351	2	56
Total number of events		1179	14.898	14.246	0	218	1360	17.759	18.565	0	281
Years since last event-year		1179	4.738	5.002	0	33	1360	4.912	5.452	1	50
Age at interview		1179	56.761	10.188	40	77	1360	55.866	10.031	40	78
Number of kids at interview		1179	1.866	1.189	0	14	1360	1.816	1.169	0	7
Number of event-years by domain	Health	4667	26.6				7643	32.1			
	Residence	4553	26.0				5539	23.3			
	Work	3708	21.1				5303	22.3			
	Family	4618	26.3				5292	22.3			
		17,546	100.00				23,777	100.00			
Education at interview	Primary or low secondary	49	4.16				129	9.49			
	Upper secondary	570	48.35				829	60.96			
	Tertiary	560	47.50				402	29.56			
Born in Switzerland	Born in Switzerland	1029	87.28				1224	90.00			
	Born abroad	150	12.72				136	10.00			
Living arrangement at age 15	Lived with both parents	991	84.05				1126	82.79			
	Lived with lone parent	125	10.60				143	10.51			
	Lived alone or other arrangement	53	4.50				65	4.78			
	Missing living arrangement	10	0.85				26	1.91			
Father Education	Primary or low secondary	405	34.35				504	37.06			
	Upper secondary	489	41.48				545	40.07			
	Tertiary	285	24.17				311	22.87			
Marital status at interview	Single, never married	122	10.35				142	10.44			
	Married or Reg. partnership	894	75.83				894	65.74			
	Divorced or Separated	133	11.28				217	15.96			
	Widow	30	2.54				107	7.87			
Employment at interview	Employed	806	68.36				839	61.69			
	Unemployed	12	1.02				16	1.18			
	Not in labor force	361	30.62				505	37.13			

Source: Authors' elaboration based on Swiss Household Panel 2013 biographical data and 2014–2017 Swiss Household Panel data. Note: Education (respondents' and fathers') recoded from ISCED classification: 0-2 into 1 for primary or low secondary education, 3-4 into 2 for upper secondary education and 5 + into 3 for tertiary education. The variable Born in Switzerland is recoded from the original 'nat\_1\_' variable: 1 for respondents born in Switzerland and 0 otherwise (merging into the 'Born abroad' category all other nationalities). Civil status had originally six categories which have been recoded into four by merging the categories of married and registered partnership into one category and separated and divorced into one category.

the CI, Fig. 2 plots a varying number of critical events occurring by age for four respondents with different lifelong CIs. Two of them had extreme profiles, one with a very low CI of 0.0003 and one with a very high CI of 0.575, while the other two respondents had midrange profiles: CIs of 0.077 and 0.177. The two extreme profiles show that the lowest concentration represents individuals with very few events happening sparsely in time: In the example given, the first event happened at the age of 26 years and the second at the age of 50 (and no multiple events happened in the same year, not shown). The respondent with the highest concentration experienced 27 event-years in the lifespan of 31 years observed, hence with at least one event taking place almost every year and a few times with multiple occurrences in the same year (34 total events experienced, not shown). The other two profiles were intermediate. Figs. 3–4.

Table 2 reports the descriptive statistics of our variables of interest comparing individuals with very low CIs (bottom 10%: < 0.0112) and very high CIs (top 10%: > 0.2335). The high CI group experienced on average almost 8 times the number of event-years, and around 10 times as many total events than the low CI group, and the last event occurred much more recently. The high CI group included a larger share of women than the low CI group, but we did not find much difference in terms of respondents' age, education, and social origin.

#### 4.2. The association between CI and SWB: multivariate results

Consistent with existing literature and cumulative advantage/disadvantage theory, we found that a higher number of critical events ever experienced in life was associated with lower levels of SWB later in life (Model 1, Table 3). However, this negative association between SWB and the *quantity* of life events experienced actually masked the relevance of the spacing between those events. When including in the model the CI (Model 2, Table 3), the estimated negative relationship between the total number of events and life satisfaction was no longer statistically significant and the point estimate went very close to zero.

In support of our first hypothesis, results (Model 2, Table 3) showed that—net of total number of events, the time since the occurrence of the most recent of these events, sociodemographic characteristics, and pre-trajectory (before age 16) determinants of wellbeing—the concentration of life events over the life course was negatively correlated with life satisfaction later in life. The point estimate suggested lower SWB, approximately –0.2 points, for every 0.1 increase in (the mean-centered) Concentration Index (mean CI=0.08, see Table 1). Additionally, the positive and significant quadratic term (with an estimated coefficient for squared mean-centered CI of 1.86) suggested that the relation may be weakening or disappear at exceptionally high levels of concentration (Model 2, Table 3). Confidence intervals became

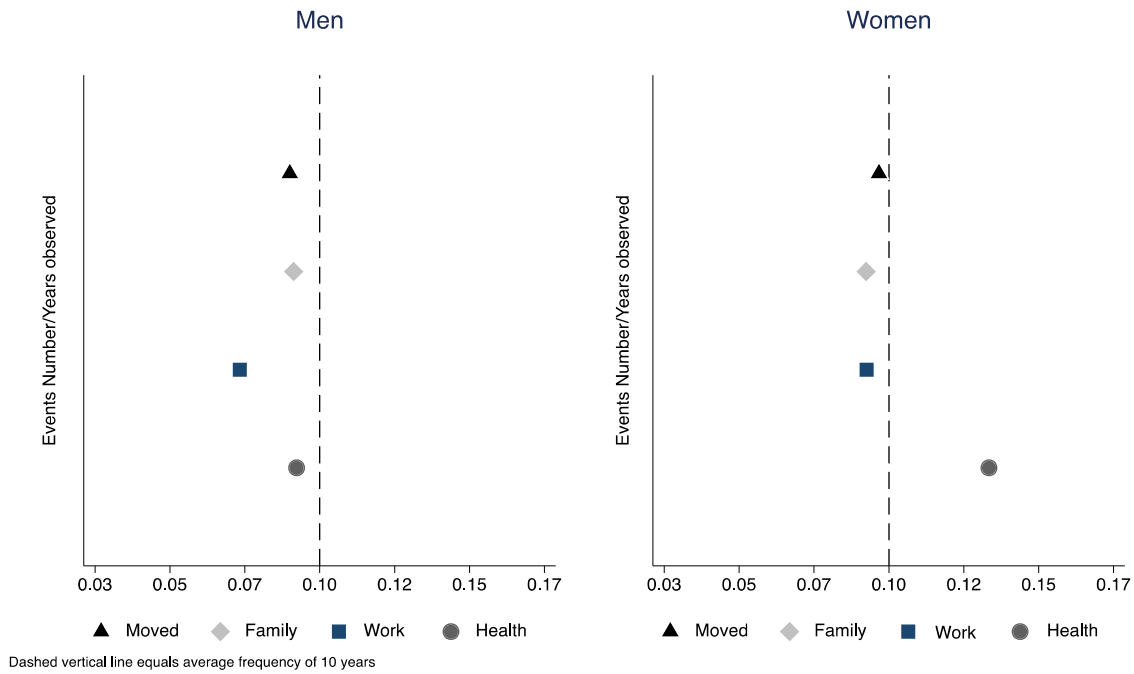


Fig. 1. Mean Frequency of Occurrence of Events by Domain. Source: Authors' elaboration based on Swiss Household Panel data.

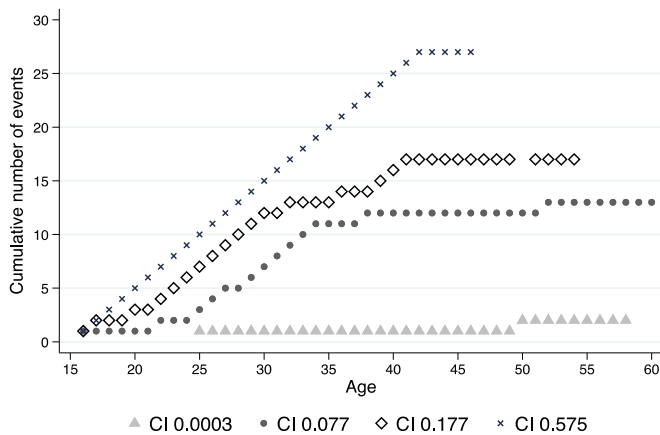


Fig. 2. Events-Ages Profiles of Respondents with Different Life Course CIs. Source: Authors' elaboration based on Swiss Household Panel data. Note: CI = Concentration Index.

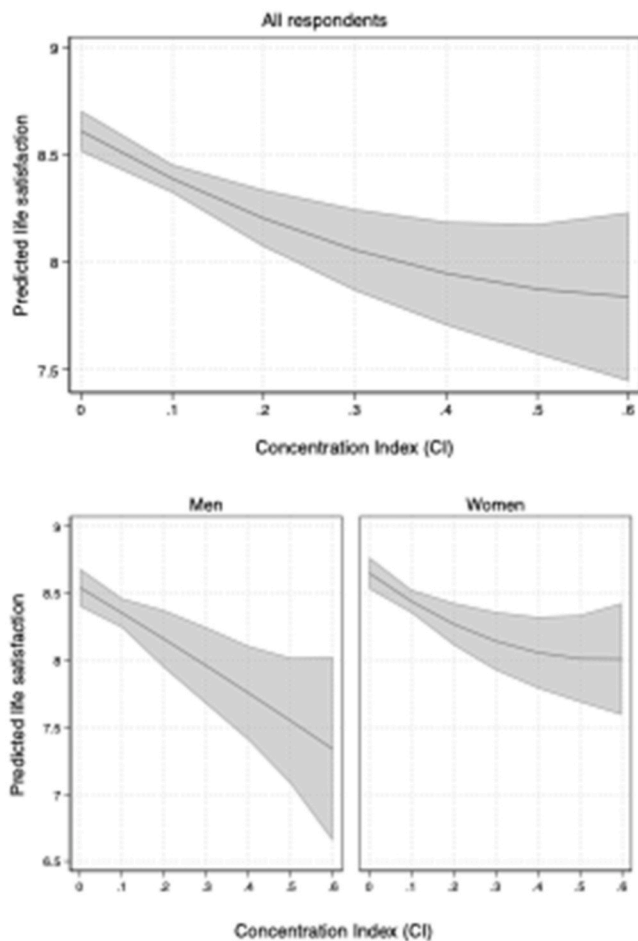
relatively large at these high levels of CI due to the limited number of respondents experiencing such extreme concentration of lifetime events. Consequently, it was not possible to draw definite conclusions regarding the linearity or quadratic nature of the relationship with SWB. For a visual representation of this association, please refer to Fig. 3 (top panel) showing estimates based on Model 2 from Table 3.

In terms of socio-demographic controls, older respondents, non-natives, highly educated and individuals residing in German-speaking regions (Central and East Switzerland) reported higher levels of well-being. We also found that experiencing disadvantages or critical events very early in life had long-lasting effects on wellbeing: more specifically, we found that respondents with a low educated father and those who lived at age 15 with a single parent reported lower SWB than those with a tertiary educated father and those who lived with both parents at age 15.

Our second and third hypotheses proposed a differentiated association between the concentration of events and wellbeing based on gender and socioeconomic origin. Fig. 3 illustrates the link between CI and

predicted levels of SWB by gender (bottom panel, based on Model 3 in Table 3). For both men and women, we observed a detrimental effect of experiencing life events concentrated in time on life satisfaction later in life. Among men, the relationship seemed to follow a linear (and downward) pattern, whereas for women the negative association weakened when the CI was high. These findings are confirmed even when we analyzed the data separately for each gender (Table S1). Specifically, the relationship among men appears to be linear with a negative but small and non-statistically significant estimate for the quadratic term of the CI; while among women, we observed a flattening downward curve with a slight incline at higher levels, as indicated by the relatively large positive estimate for the quadratic terms. However, it is worth noting that, as for men, the quadratic term did not reach statistical significance.

To get a better idea of the magnitude of the association between the CI and SWB, we take as an example the event-age profiles of the respondents plotted in Fig. 2, assigning them fixed socio-demographic characteristics so that they differ only in terms of gender and CI, and calculate their predicted life satisfaction at age 60. Let's consider four Swiss-born respondents, with upper secondary education and an upper secondary educated father, living with both parents at age 15, and 60 years old when SWB was measured. The only difference among these respondents is the life course concentration of events: one had a very low CI of 0.0003, one had a low (slightly lower-than-average) CI of 0.077, one had a high (slightly higher-than-average) CI of 0.177 and the other had a very high CI of 0.575. The predicted SWB, the estimated differences across CI, and the test of statistical significance of these differences by gender are presented in Table 4 (top panel). Let's consider first the two central and most common profiles (low CI versus high CI). If the respondents were two men, those with a high CI would have reported a 0.194-point lower life satisfaction (SWB=8.259) than the respondent with a low CI (SWB=8.453). If the respondents were two women, the difference in SWB would have been 0.179 (SWB=8.354 versus SWB=8.533). The difference between the extreme profiles (very low CI versus very high CI), instead, would amount to a difference of 1.152-point lower life satisfaction for men (SWB=8.559 versus SWB=7.447) and 0.644-point for women (SWB=8.698 versus SWB=8.054). All the predicted differences in SWB across levels of CI are statistically significant, except the drop in SWB between women with high and very high CI



**Fig. 3.** Life Satisfaction by Concentration Index. *Source:* Authors' elaboration based on Swiss Household Panel data. Robust standard errors. *Note:* Top panel figure from estimates in Model 2 in Table 3. Bottom panel figures from estimates in Model 3 in Table 3. For the sake of graphical clarity, in the figure variables are not mean-centered.

(Table 4. Exact values of the Wald tests available upon request). Overall, the magnitude and relevance of the drop in wellbeing associated with increases in lifetime concentration of events seem substantial and larger for men, especially at high CI levels where the relationship may weaken for women. However, given the rarity of the experience of a very high CI and the large confidence intervals, we cannot rule out the possibility of a linear relationship between the CI and SWB for women too.

The negative long-term influence of events clustered in time on wellbeing varied not only across genders but also among individuals from different social backgrounds (Fig. 4 and Model 4 in Table 3). While among women, we did not observe significant variations in life satisfaction based on social strata for different levels of CI, there was a noticeable difference among men. Specifically, men from low socioeconomic backgrounds (Fig. 4 - left panel) appeared to be less resilient than those with higher SES profiles. More precisely, we consider again the SWB predictions across the CI profiles presented earlier, this time comparing differences across CI profiles also by social origin (Table 4, bottom panel). Starting with the most common profiles (low CI versus high CI), we observed a similar decline in the predicted level of life satisfaction between men with a highly (upper secondary or tertiary education) rather than low (primary or lower secondary) educated father. Considering the two extreme CI profiles, for male respondents with high socioeconomic backgrounds the SWB cost of experiencing many events concentrated in time (very high CI) instead of few events sparse in time (very low CI) amounted to around 0.8 points. In contrast, men with

a low socioeconomic status background experienced a much more pronounced difference, of more than 2.3 points, in predicted subjective wellbeing within the same CI range.

In the following sections, we will briefly present the findings from two supplementary analyses. Firstly, we illustrate that differentiating events based on their life domains and presumed valence (positive or negative) added only subtle distinctions to our understanding of the influence of event concentration on SWB. Secondly, we delved into investigating the direct relationship between event concentration across the life course and later wellbeing. This supplementary analysis seeks to determine whether the association was directly or operated indirectly through proximal determinants of SWB, with a specific focus on the individual's living arrangement and employment status at the time of SWB measurement.

#### 4.3. Life domains, valence of events and SWB

Until now, this study considered all events to be equal. Yet, as distinguishing events by life domains and valence, as done in the vast majority of existing studies, might bring some interesting nuance in studying the long-term effects on SWB, we re-calculated the CI by life domains and valence. In the following additional analyses, we categorized events in the family and work domains by valence based on theoretical assumptions and following previous studies (Kettlewell et al., 2020), although, as mentioned, no classification is without flaws.<sup>10</sup> We considered the following events as negative: separation and divorce (own or parents'), bereavement, entry in unemployment or social assistance, and any move from full-time to part-time work, thus assuming the latter is involuntary. Positive events were births and marriages (own or parents'), retirement, and any move from joblessness to employment and from part-time to full-time work.

Using the same set of covariates discussed above, we compared – separately for men and women – the results of regression models with the “overall” CI as the main independent variable (Models 1 and 2 in Table A3) and regression models with CI calculated, first, by life domains and, second, for family and work domain events further distinguishing by valence.<sup>11</sup> While the overall concentration of life events exhibited a consistent negative association with SWB for both men and women (Models 1 and 2), when examining specific life domains (Models 3 and 4), interesting gender differences emerged.

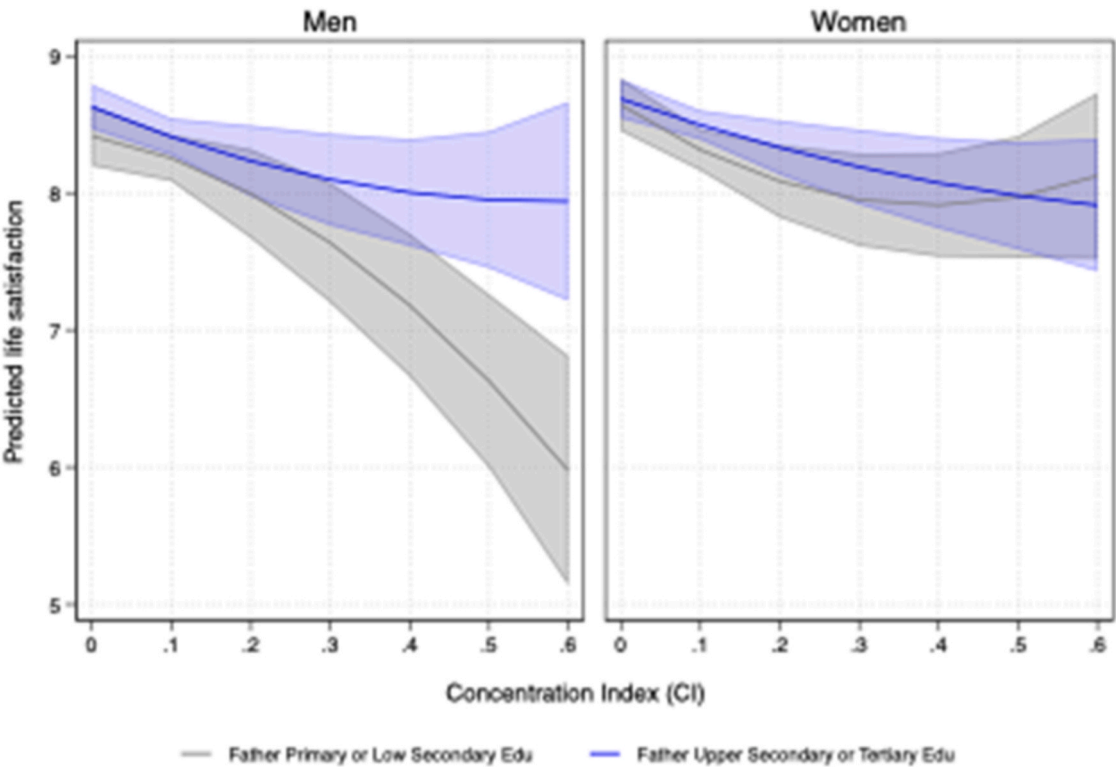
Taking residential mobility as an example, the relationship between CI and SWB was the opposite among women and men. Among women, there was a U-shaped relationship, indicating that the initial concentration of residential changes is negatively associated with SWB, but the association weakened or reversed at higher levels of CI (confidence intervals were too large to draw definite conclusions). Conversely, men exhibited an inverse U-shaped relationship, where initial concentration of residential mobility is positively associated with SWB, and then the trend flattened or reversed at higher CI levels (here too confidence intervals were too large to draw definite conclusions).

Turning to work-related events, the concentration of events in this life domain was negatively associated with SWB, specifically in a U-

<sup>10</sup> It is worth stressing that the classification of the events' valence is entirely based on the authors' assessment and not on the respondents' assessment.

<sup>11</sup> We will refer to the domain-specific indexes of concentration (CIs), namely the CIs calculated only on the events in the X domain as “X domain CI” and for the Work/Family domains we will refer to the CI calculated only on the negative Work/Family events as “Work/Family negative CI” and to the CI calculated only on positive Work/Family events as “Work/Family positive CI”. For the models presented in Table A3, the domain-specific CIs have been multiplied by 10 because the CI range was too small to report meaningful estimates relative to a 1-point increase in CI. The interpretation of the point estimates is thus the increase in SWB relative to a 0.1 increase in the domain-specific CI.





**Fig. 4.** Life Satisfaction by Concentration Index by social origin. *Source:* Authors’ elaboration based on Swiss Household Panel data. Robust standard errors. *Note:* Estimates from Model 4 in Table 3. For the sake of graphical clarity, in the figure variables are not mean-centered and the categories of father upper secondary and tertiary education are merged.

**Table 2**  
Descriptive Statistics for Individuals with Very Low and Very High Concentration Indices.

		Low CI (< 0.0112)				High CI (> 0.2335)				
Variable		Mean	SD	Min	Max		Mean	SD	Min	Max
Total number of event-years		4.21	1.40	0	8		31.13	9.47	11	56
Total number of events		4.66	1.84	0	10		46.25	30.95	2	281
Time since last event		9.95	8.03	0	50		1.78	1.33	1	16
Age		53.90	7.51	40	75		56.00	10.35	40	75
<b>Variable</b>	<b>N</b>	<b>%</b>				<b>N</b>	<b>%</b>			
Gender										
Men	130	51.38				76	30.04			
Women	123	48.62				177	69.96			
Total	253	100.00				253	100.00			
Education										
Primary or lower secondary	27	10.67				24	9.49			
Upper secondary	152	60.08				156	61.66			
Tertiary	74	29.25				73	28.85			
Total	253	100.00				253	100.00			
Father Education										
Primary or lower secondary	99	39.13				96	37.94			
Upper secondary	108	42.69				110	43.48			
Tertiary	46	18.18				47	18.58			
Total	253	100.00				253	100.00			

*Source:* Authors’ elaboration based on Swiss Household Panel data. *Note:* Age and education were measured at the time subjective wellbeing was measured. CI = Concentration Index.

shaped pattern observed, but it was significant statistically and in magnitude only for men. Notably, this relationship held independent of the valence (positive or negative) of the events. The estimated coefficients in Table A3 - Model 5 revealed a U-shaped relationship for both positive and negative CI work domain events among men.

In contrast, the concentration of family events was significantly related to SWB exclusively among women. As before, the valence of the events seemed irrelevant. The direction of the association remained consistent for both positive and negative CI. In this domain, at lower

concentration levels, we observed among women higher levels of SWB, followed by a decrease as concentration intensified (linear and quadratic components).

All in all, our findings supported our premise that the concentration of critical events is negatively associated with SWB measured later in life irrespectively of their valence and that to distinguish the CI by life domain would add, at least in our sample, only minor nuances in our comprehension of the relationship between the concentration of events and SWB.

**Table 3**

Association between lifetime number of events and Subjective Wellbeing and Concentration of critical events and Subjective Wellbeing. Interaction models by gender and social origin.

	Model	Model	Model	Model
	(1)	(2)	(3)	(4)
<b>Concentration Index (CI), MC</b>		-2.041 * **	-1.926 * *	-2.118 *
		(-3.062 - -1.019)	(-3.550 - -0.302)	(-4.511 - 0.276)
<b>Concentration Index (CI) squared, MC</b>		1.860 *	-0.204	-4.984 *
		(-0.205 - 3.926)	(-4.581 - 4.172)	(-10.392 - 0.425)
Total number of events, MC	-0.010 * **	-0.002	-0.002	-0.000
	(-0.014 - -0.006)	(-0.008 - 0.004)	(-0.008 - 0.003)	(-0.006 - 0.005)
Time since last event	0.020 * **	0.015 * **	0.016 * **	0.016 * **
	(0.010 - 0.029)	(0.006 - 0.025)	(0.006 - 0.025)	(0.006 - 0.025)
Gender, Men (Ref.)				
Women	0.098 *	0.122 * *	0.088	0.059
	(-0.009 - 0.205)	(0.015 - 0.229)	(-0.050 - 0.226)	(-0.163 - 0.282)
Father primary or low secondary education (Ref.)				
Father upper secondary education	0.064	0.063	0.060	-0.010
	(-0.063 - 0.191)	(-0.064 - 0.190)	(-0.066 - 0.186)	(-0.260 - 0.239)
Father tertiary education	0.139 * *	0.134 *	0.137 *	0.161
	(0.000 - 0.277)	(-0.004 - 0.272)	(-0.001 - 0.274)	(-0.091 - 0.412)
Father upper sec edu*Women				0.070
				(-0.248 - 0.389)
Father tertiary education*Women				0.004
				(-0.328 - 0.335)
<b>Concentration Index interaction terms</b>				
Concentration Index (CI), MC*Women			0.016	-0.742
			(-1.811 - 1.843)	(-3.714 - 2.231)
Concentration Index (CI) squared*Women			2.282	9.822 * **
			(-2.663 - 7.228)	(2.736 - 16.907)
Concentration Index (CI), MC*Father upper secondary Education				-0.515
				(-3.783 - 2.754)
Concentration Index (CI), MC*Father tertiary education				0.470
				(-3.252 - 4.191)
Concentration Index (CI) squared*Father upper secondary education				10.480 * *
				(1.640 - 19.321)
Concentration Index (CI) squared*Father tertiary education				4.684

**Table 3 (continued)**

	Model	Model	Model	Model
				(-4.605 - 13.973)
Concentration Index (CI), MC*Father upper secondary Education*Women				0.919
				(-3.274 - 5.112)
Concentration Index (CI), MC*Father tertiary education*Women				1.967
				(-2.787 - 6.721)
Concentration Index (CI) squared*Father upper secondary education*Women				-13.011 * *
				(-23.592 - -2.429)
Concentration Index (CI) squared*Father tertiary education*Women				-10.757 *
				(-22.165 - 0.652)
Age, MC	0.018 * **	0.016 * **	0.016 * **	0.016 * **
	(0.013 - 0.024)	(0.010 - 0.021)	(0.010 - 0.021)	(0.010 - 0.021)
Age squared	0.001 * **	0.001 * **	0.001 * **	0.001 * **
	(0.000 - 0.001)	(0.000 - 0.002)	(0.000 - 0.002)	(0.000 - 0.002)
Born in Switzerland (Ref.)				
Not born in Switzerland	0.294 * **	0.297 * **	0.294 * **	0.299 * **
	(0.107 - 0.481)	(0.110 - 0.485)	(0.106 - 0.481)	(0.112 - 0.487)
Primary or low secondary education (Ref.)				
Upper Sec Edu	0.435 * **	0.414 * **	0.417 * **	0.430 * **
	(0.161 - 0.710)	(0.140 - 0.688)	(0.143 - 0.690)	(0.155 - 0.705)
Tertiary education	0.460 * **	0.447 * **	0.442 * **	0.454 * **
	(0.176 - 0.743)	(0.164 - 0.730)	(0.159 - 0.725)	(0.169 - 0.738)
Region of residence Lake Geneva (Ref.)				
Middleland	-0.095	-0.078	-0.082	-0.069
	(-0.268 - 0.078)	(-0.250 - 0.094)	(-0.254 - 0.090)	(-0.241 - 0.103)
North-west Switzerland	0.079	0.083	0.081	0.077
	(-0.101 - 0.259)	(-0.095 - 0.261)	(-0.097 - 0.260)	(-0.101 - 0.256)
Zurich	-0.109	-0.090	-0.090	-0.079
	(-0.297 - 0.079)	(-0.277 - 0.097)	(-0.277 - 0.097)	(-0.266 - 0.108)
East Switzerland	0.174 *	0.182 * *	0.178 *	0.180 * *
	(-0.005 - 0.353)	(0.004 - 0.360)	(-0.000 - 0.356)	(0.002 - 0.358)
Central Switzerland	0.177 *	0.179 *	0.176 *	0.173 *
	(-0.008 - 0.361)	(-0.005 - 0.364)	(-0.009 - 0.361)	(-0.011 - 0.358)
Ticino	-0.212	-0.202	-0.209	-0.203
	(-0.556 - 0.132)	(-0.541 - 0.137)	(-0.548 - 0.130)	(-0.543 - 0.137)
Lived with both parents at age 15 (Ref.)				
Lived with lone parent	-0.246 * *	-0.244 * *	-0.248 * *	-0.266 * **
	(-0.448 - -0.044)	(-0.445 - -0.043)	(-0.449 - -0.047)	(-0.468 - -0.065)
Lived alone or other living arrangement	0.133	0.143	0.139	0.126

(continued on next page)

**Table 3** (continued)

	Model	Model	Model	Model
	(−0.099 - 0.365)	(−0.083 - 0.369)	(−0.087 - 0.366)	(−0.098 - 0.350)
Missing living arrangement	−0.274	−0.316	−0.321	−0.316
	(−0.778 - 0.230)	(−0.819 - 0.186)	(−0.821 - 0.180)	(−0.817 - 0.184)
Constant	7.484 ***	7.446 ***	7.480 ***	7.478 ***
	(7.145 - 7.824)	(7.105 - 7.787)	(7.129 - 7.830)	(7.120 - 7.836)
Observations	2539	2539	2539	2539
R-squared	0.064	0.073	0.074	0.080

Source: Authors' elaboration based on Swiss Household Panel data. Robust standard errors. Note: MC stands for Mean-centered.

**Table 4**

Predicted SWB for different CI profiles and contrast of predictions across profiles. Estimates by gender and social origin.

	Father Edu	Very Low (CI=0.0003)	Low (CI=0.077)	$\Delta_{\text{Very Low-Low}}$	High (CI=0.177)	$\Delta_{\text{Low-High}}$	$\Delta_{\text{Very Low-High}}$	Very High (CI=0.575)	$\Delta_{\text{High-Very High}}$	$\Delta_{\text{Very Low-Very High}}$
<b>Men</b>		8.599	8.453	−0.146 * (−0.030 - 0.011)	8.259	−0.194 * (−0.338 - −0.050)	−0.340 ** (−0.638 - −0.042)	7.447	−0.812 * (−1.442 - −0.181)	−1.152 *** (−1.798 - −0.0505)
<b>Women</b>		8.698	8.533	−0.165 *** (−0.273 - −0.057)	8.354	−0.179 ** (−0.287 - −0.071)	−0.344 *** (−0.558 - −0.129)	8.054	−0.300 (−0.660 - 0.060)	−0.644 *** (−1.091 - −0.197)
<b>Men</b>	Low	8.498	8.382	−0.115 (−0.343 - 0.112)	8.139	−0.243 ** (−0.465 - −0.021)	−0.358 (−0.805 - 0.088)	6.134	−2.006 *** (−2.811 - −1.201)	−2.364 *** (−3.310 - −1.418)
	High	8.678	8.484	−0.194 * (−0.395 - 0.006)	8.271	−0.213 ** (−0.398 - −0.027)	−0.407 ** (−0.791 - −0.023)	7.884	−0.387 (−1.091 - 0.317)	−0.794 ** (−1.541 - −0.048)
<b>Women</b>	Low	8.730	8.480	−0.250 ** (−0.441 - −0.059)	8.236	−0.243 *** (−0.423 - −0.063)	−0.493 *** (−0.862 - −0.124)	8.206	−0.030 (−0.624 - 0.564)	−0.523 (−1.190 - 0.144)
	High	8.687	8.549	−0.138 ** (−0.272 - −0.004)	8.390	−0.159 ** (−0.296 - −0.022)	−0.297 ** (−0.566 - −0.027)	7.984	−0.406 * (−0.863 - 0.051)	−0.70 ** (−1.292 - −0.113)

Source: Authors' elaboration based on Swiss Household Panel data. Note: Estimates based on Models 3-4 in Table 3 for men and women born in Switzerland, with Upper Secondary Education (and fathers also with Upper Secondary Education in top estimates), living with both parents at age 15 and age 60 when SWB is measured.

#### 4.4. The proximal determinants of SWB

The concentration of life course critical events during adulthood likely affects the family and work status of individuals at older ages which in turn likely affects their levels of life satisfaction. Our CI, therefore, is associated with the current level of wellbeing either directly or indirectly through more proximal determinants of life satisfaction. To explore this relationship, we compared our main findings (Table 3 – Models 3 and 4) with those obtained by introducing in the models the living arrangement of the respondents and their employment status at the time when SWB was measured (Table A4). After including these proximal determinants of SWB, the CI remained statistically significant with only a slight reduction in its linear and quadratic points estimate. The results suggest the presence of a direct long-lasting association of the concentration of life events with SWB.

#### 4.5. Robustness checks on the Concentration Index

We conducted several checks to ensure the robustness of our estimates vis-à-vis slight modifications in our index (Figures S1–S4 and Table S2 in Supplementary Material). First, we excluded the weight term ( $w_{ij}$ ) that gives more relevance to event-years with multiple events. Figure S1 (Model 1 in Table S2) shows that results were qualitatively similar without the inclusion of the weights, although not accounting for multiple events happening in the same year reduced the association between CI and SWB. This seems to suggest individuals reacted to the intensive margin of the number of events: taking into consideration that

some years may include more than one event is crucial to fully grasp the negative influence of the concentration of events over time on well-being. Second, when we included a term,  $o_{jk}$  in the index to account for the number of years without any events (length of recovery period), our results slightly strengthened<sup>12</sup> (Figure S2, Model 2 in Table S2). A longer period of recovery means a reduced number of event-years experienced consecutively, and a greater chance to recuperate the strength and resources needed to deal with the next period dense of events. Third, we also obtained qualitatively similar results when we explicitly added a term in the index that accounted for the recentness of events, instead of controlling for the time since the last event as we did in our models. Following Busetta et al. (2019), we added a recentness factor,  $re$ , that was greater the more recent the latest event was. This factor was inserted in the CI as an additive term, and its relevance with respect to the main

term of the index as in Eq. 1 was weighted by choosing a discretionary alpha level.<sup>13</sup> Figure S3 (Models 3–4 in Table S2) shows that at different alpha levels (0.8 and 0.6), the index remained negatively correlated with SWB and slightly strengthened in magnitude. Despite the strengthening effect on our estimates, we preferred the simpler specification without the recovery  $o_{jk}$  and the  $re$  factors because results were more transparent, offering a simpler interpretation of the CI, and depended less on the researchers' discretionary choices, but as shown the results were substantially unaltered by this choice. Finally, we excluded outliers, namely individuals who experienced a very large number of occurrences (five or more events per year) to exclude the possibility that they were the ones driving the results. Figure S4 (Model 5 in Table S2) demonstrates that the negative association between CI and SWB became actually slightly stronger when excluding these outliers. Although not specifically tested here, we may speculate that the outliers represent a selected group of people experiencing an extensive number of life events and repeated status changes who are more resilient in dealing with a complex life course dense of critical occurrences.

<sup>12</sup> This version of the index was calculated as  $CI_i = \frac{\sum_{j=1}^k (d_{jk}+1)^{-(\alpha_{jk}+1)} w_{jk}}{\sum_{j=1}^{T-1} \frac{1}{T-k+1}}$ ,  $j > k$ .

<sup>13</sup> This version of the index was calculated as  $CI_i = \alpha \frac{\sum_{j=1}^k (d_{jk}+1)^{-(\alpha_{jk}+1)} w_{jk}}{\sum_{j=1}^{T-1} \frac{1}{T-k+1}} + (1-\alpha)re$ ,  $j > k$ .

## 5. Discussion

### 5.1. The concentration of life events and SWB

Individuals experience a variety of critical events during their life course. A rich literature has documented that such critical events influence SWB (Hentschel et al., 2017; Yap et al., 2014), but most studies have focused on only one event or, at best, multiple events in one life domain at a time (Booker & Saker, 2012; Demey et al., 2014). However, the principle of the multidimensionality of the life course and the cumulative disadvantage theory posit that life domains are strictly interconnected, and life events rarely happen in isolation one from another.

The relatively few studies on this topic have focused predominantly on the evolution of SWB over time, in terms of processes of anticipation, adaptation, and length and quality of recovery (Anusic et al., 2014; Dutta et al., 2013; Luhmann & Eid, 2009; Luhmann et al., 2014; Voelkle et al., 2013) and they have simply counted the number of events experienced in a specific period as a measure of the concentration of events (Frijters et al., 2023; Seery et al., 2010; Wheaton & Clarke, 2003). This study aimed to fill gaps in the existing literature by acknowledging not only that multiple events might happen at the same time or in close temporal proximity but also that the distribution of critical life course events in time, that is, what we called the concentration of events, might be related to variations in individuals' SWB. We argued that the concentration of critical events correlates with wellbeing more strongly and more persistently over time than if the same events were sparsely distributed.

The first contribution of this study is that we were able to assess the influence of a lifetime concentration of critical events on SWB more rigorously than just by counting the number of events (McMahon et al., 2003; Seery et al., 2010). We introduced a novel indicator of the distribution of events in individuals' histories, the CI, that considers not only the overall number of events ever experienced, as previous studies did, but also the time between them and the number of occurrences involved each time. Our main finding was that the CI of critical life course events was negatively associated with life satisfaction later in life. Crucially, this not only held net of sociodemographic characteristics and pre-trajectory (before age 15) determinants of wellbeing but also mattered beyond the total number of events ever experienced and the recentness of the experience of the last of these events.

### 5.2. Gender and social origin

Finally, our findings revealed notable gender and (even greater) socio-economic differences in the association between the CI and SWB. Consistent with existing literature and our hypothesis, we found that despite women experiencing on average more critical events than men, they were also more resilient: The negative correlation between the concentration of events and life satisfaction was stronger among men than women. However, our indicator allowed us to identify an interesting pattern overlooked in prior studies. While men tended to display an almost linear relationship between the concentration of critical events over the life course and life satisfaction later on, women reported a greater decline in SWB with increases in CI at low levels of concentration, but the association seemed to flatten out at higher levels of concentration. This suggests that women's resilience may be driven by the fact that they are exposed frequently to events close in time (high concentration) and additional events likely will not influence their SWB later on in life. Among women who instead had been exposed to events more dispersed over the life course (low concentration), the negative association with SWB resembled the one observed among men. This finding about women, on the one hand, resonates with Dienstbier's (1989, 1992) theory emphasizing that exposure to some (not too many, not too few) adverse events followed by adequate recovery periods promotes a greater capacity to deal with stressors. On the other hand, studies from psychology and psychogeriatrics point to the different

cognitive appraisal of critical events by men and women, the access to different coping resources (i.e. social support) and the adoption of different coping strategies (i.e. emotion-focused instead of problem-focused) to explain why men are found more vulnerable and women more resilient in dealing with critical events (Koren, 2016; Stroebe et al., 2001).

These estimates, however, mask the heterogeneity in the lasting influence of concentrated critical events on wellbeing, which strongly varied among individuals of different social origins. Men (not women) from a lower socioeconomic family background exhibited a much stronger association between CI and life satisfaction compared to those with higher social origin. While our descriptive statistics did not suggest that men from low socioeconomic origin experienced either a disproportionately large number of events or particularly concentrated events over the life course, it seems that disadvantaged men suffered more of the negative consequences of concentrated events (Dannefer, 2003; Spini and Widmer, 2023). As posited by the cumulative disadvantage theory, long-term socio-economic disadvantage may weaken the ability to deal with concentrated critical events. Notably, this result speaks, once again, to the importance of looking at the concentration of events over time to study their impact on the quality of life and the long-term reproduction of inequalities implied in the process of cumulation of disadvantage, rather than simply relying on the total number of events experienced.

The observed pattern is true in general and for the concentration of events in all domains and of any valence for men, except for residential relocations. Among women, family events (irrespective of their valence) present a positive, though strongly concave, association with SWB. These additional findings point to cumulative risk as the underlying process, rather than a stress proliferation or chain of risk process where one triggering event (e.g. health issues) provokes other events which in turn decrease SWB.

### 5.3. The study limitations

Our study suffered from a few limitations. First, this study's approach followed the broad life course literature on the long-term nexus between life trajectories - seen as unique conceptual units - and outcomes measured later in life (Bernardi et al., 2019). Using a life course index to summarize lifelong trajectories of critical events prevented us from analyzing the effects of time-varying covariates and identifying the mechanisms explaining the relationship between the concentration of critical events and SWB over time. This is an unavoidable consequence of the tradeoff between the long-term holistic view we took - crucial to investigate the multidimensionality and interdependencies of the life course as advocated by the life course perspective (Elder, 1998; Piccarreta and Studer, 2019) - and zooming in on specific events, domains or phases in the life course. Relatedly, our choice of limiting our analytic sample to respondents aged 40 or above is arbitrary, as we could have selected individuals from age 45 or 35. We chose age 40 based on the need to, on the one hand, ensure observing an adequate portion of life course before recording life satisfaction levels and, on the other hand, maintain our focus on the wellbeing late life effects of life course trajectories. Second, despite controlling for pre-trajectory determinants of SWB, we did not have information on SWB during adolescence or before the first critical event included. To estimate the causal effect of the CI on change in SWB, we would need to control for that to rule out the possibility that individuals who were happier at the start tended to experience not only fewer critical events, but also less concentrated events. Similarly, due to data limitations, we cannot dismiss the possibility that other unmeasured aspects influenced both the SWB and the accumulation of events (i.e. personality traits). Third, the relatively limited number of observations prevented us from investigating potential heterogeneities besides gender and social origin which potentially intersect in the link between CI and SWB later in life (e.g. life stages). Fourth, yearly data did not allow us to measure distance



between events happening during the same year and, more importantly, are more prone to induce measurement errors in our Concentration Index given that some events may have happened closer in time but recorded in two different years (if one happens in December in one year and the other in January the following year) compared to events happening the same year but many months apart (e.g. if one event takes place in January of one year and the other in December of the same year). Moreover, as in all studies analyzing self-reported life events, only a subsample of possibly relevant events was identified and used to calculate the CI and since also the date of the events was auto-reported, we cannot exclude timing misreporting. Nevertheless, life history calendars are well-established tools that help reduce retrospective recall bias. Future studies should replicate our findings with administrative data that dispose of a finer reporting of events' dates (at least with a monthly calendar). An additional open inquiry for future research remains the question about potential individual agency and motivation: Do individuals choose to cluster (some kind of) events together (e.g. marriage and childbirth) hoping for some short-term benefits (that, however, damage them in the long-term)? Or else, are our findings driven by unplanned events that individuals would prefer to be spread in time but they happen to come close together?

6. Conclusions

Despite these limitations, our study represents an important contribution to the literature, being the first to assess how a lifetime concentration of critical events in a relatively crowded life course lowers men's and women's SWB later in life. It is important to stress that the effect of a higher concentration of critical events on life satisfaction is not simply a reflection of the number of critical events a person experiences, but that the dispersion of such events over time plays an independent role.

Appendix

Table A1  
Tabulation of Events.

Categories of events	Men		Women		Tot	
	N	%	N	%	N	%
Health issues	4667	26.2	7643	31.8	12,310	29.39
Residential moves	4553	25.5	5539	23.0	10,092	24.09
Birth of a child	2133	12.0	2440	10.1	4573	10.92
Retirement	1611	9.0	1710	7.1	3321	7.93
Bereavement (parents/siblings/own children)	1406	7.9	1547	6.4	2953	7.05
Own marriage/registered partnership	1039	5.8	1157	4.8	2196	5.24
Unemployment	1146	6.4	2178	9.0	3324	7.93
Entry into full-time work	456	2.6	406	1.7	862	2.06
Entry into social assistance	353	2.0	581	2.4	934	2.23
Own separation/divorce/widowhood	210	1.2	307	1.3	517	1.23
Exit from unemployment -> part-time work	80	0.4	227	0.9	307	0.73
Parental separation/divorce	55	0.3	83	0.3	138	0.33
Exit from full-time work -> part-time work	27	0.2	162	0.7	189	0.45
Birth of a sibling	36	0.2	22	0.1	58	0.14
Exit from unemployment -> Employed (no info. on activity rate)	35	0.2	39	0.2	74	0.18
Parental marriage/remarriage/partnering	16	0.1	27	0.1	43	0.10
	17,823		24,068		41,891	100.00
	(42.5%)		(57.5%)			

Source: Authors' elaboration based on Swiss Household Panel data.

CRediT authorship contribution statement

**Laura Bernardi:** Writing – review & editing, Writing – original draft, Conceptualization. **Marieke Voorpostel:** Writing – review & editing, Writing – original draft. **Danilo Bolano:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Chiara Ludovica Comolli:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

Authors declare they have no competing interests.

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**Table A2**  
Bivariate correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Life satisfaction (SWB)	1.000												
(2) Concentration Index (CI)	-0.156	1.000											
(3) Years since last event	0.074	-0.271	1.000										
(4) Age at interview	0.110	0.005	-0.166	1.000									
(5) Gender	0.009	0.125	0.017	-0.044	1.000								
(6) Born in Switzerland	0.092	0.054	-0.041	0.137	0.043	1.000							
(7) Education at interview	0.053	-0.043	0.026	-0.129	-0.195	0.030	1.000						
(8) Father Education	0.056	-0.003	0.022	-0.097	-0.026	0.078	0.278	1.000					
(9) Region	0.043	-0.028	0.010	0.014	-0.011	0.034	-0.039	0.016	1.000				
(10) Living arrangement at age 15	-0.034	0.048	-0.040	0.055	0.030	-0.040	-0.063	-0.107	-0.001	1.000			
(11) Number of kids at interview	0.042	0.015	-0.001	0.063	-0.021	0.032	-0.033	-0.005	0.015	-0.020	1.000		
(12) Marital status at interview	-0.082	0.065	-0.062	0.206	0.115	0.041	-0.073	-0.027	-0.029	0.017	0.206	1.000	
(13) Employment at interview	0.024	0.106	-0.224	0.650	0.070	0.058	-0.177	-0.102	-0.019	0.062	0.039	0.120	1.000

Source: Authors' elaboration based on Swiss Household Panel data. Note: Age and education were measured at the time subjective wellbeing was measured. CI = Concentration Index.

**Table A3**  
Association between concentration of critical events in different domains and valence, and Subjective Wellbeing. Separate models by gender.

	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)
	Men	Women	Men	Women	Men	Women
Concentration Index (CI), MC	-1.991 * *	-1.848 * *				
	(-3.854 -	(-3.097 -				
	-0.128)	-0.600)				
Concentration Index (CI) squared	-0.210	1.983				
	(-4.688 - 4.268)	(-0.504 - 4.469)				
Work domain Concentration Index (CI), MC			-0.374 * *	-0.043		
			(-0.651 -	(-0.260 - 0.174)		
			-0.098)			
Work domain Concentration Index (CI) squared			0.089 * *	0.004		
			(0.036 - 0.141)	(-0.043 - 0.050)		
Family domain Concentration Index (CI), MC			-0.426	0.933 * *		
			(-1.163 - 0.312)	(0.162 - 1.705)		
Family domain Concentration Index (CI) squared			0.064	-0.634 * *		
			(-0.111 - 0.240)	(-1.235 -		
				-0.033)		
Work domain Positive Concentration Index (CI), MC					-0.814 * *	-0.587
					(-1.625 -	(-1.448 - 0.274)
					-0.003)	
Work domain Positive Concentration Index (CI) squared					0.472	0.241
Work domain Negative Concentration Index (CI), MC					(-0.118 - 1.062)	(-0.226 - 0.708)
					-0.443 * *	0.068
					(-0.858 -	(-0.175 - 0.311)
					-0.029)	
Work domain Negative Concentration Index (CI) squared					0.098 * *	-0.016
Family domain Positive Concentration Index (CI), MC					(0.029 - 0.168)	(-0.064 - 0.032)
					-0.692	3.046 * *
					(-3.569 - 2.186)	(0.402 - 5.690)
Family domain Positive Concentration Index (CI) squared					7.120	-7.412
Family domain Negative Concentration Index (CI), MC					(-12.904 -	(-22.941 -
					27.145)	8.118)
					-3.106	4.058 * *
Family domain Negative Concentration Index (CI) squared					(-7.944 - 1.732)	(0.186 - 7.930)
					1.319	-5.286 * *
Residential mobility domain Concentration Index (CI), MC			0.430 *	-0.632 * *	0.416	-0.651 * *
			(-0.076 - 0.937)	(-1.136 -	(-0.091 - 0.924)	(-1.154 -
				-0.127)		-0.148)
Residential mobility domain Concentration Index (CI) squared			-0.450 * *	0.551 * *	-0.440 * *	0.567 * *
			(-0.849 -	(0.101 - 1.002)	(-0.841 -	(0.113 - 1.022)
			-0.051)		-0.039)	

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Table A3 (continued)

	Model	Model	Model	Model	Model	Model
Health domain Concentration Index (CI), MC			-0.147 (-0.343 - 0.049)	-0.147 * (-0.297 - 0.003)	-0.135 (-0.331 - 0.062)	-0.154 ** (-0.304 - -0.003)
Health domain Concentration Index (CI) squared			0.004 (-0.026 - 0.033)	0.012 (-0.008 - 0.033)	0.002 (-0.027 - 0.032)	0.013 (-0.008 - 0.034)
Total number of events, MC	-0.002 (-0.010 - 0.006)	-0.002 (-0.010 - 0.005)	-0.005 (-0.013 - 0.004)	-0.002 (-0.010 - 0.005)	-0.005 (-0.013 - 0.003)	-0.002 (-0.010 - 0.005)
Time since last event	0.010 (-0.006 - 0.026)	0.020 ** (0.008 - 0.032)	0.010 (-0.005 - 0.026)	0.022 ** (0.010 - 0.034)	0.010 (-0.006 - 0.025)	0.021 ** (0.009 - 0.034)
Age, MC	0.016 *** (0.008 - 0.023)	0.016 *** (0.009 - 0.024)	0.020 *** (0.012 - 0.029)	0.017 *** (0.009 - 0.025)	0.023 *** (0.014 - 0.033)	0.021 *** (0.011 - 0.032)
Age squared	0.001 ** (0.000 - 0.002)	0.001 ** (0.000 - 0.002)	0.001 ** (0.000 - 0.002)	0.001 ** (-0.000 - 0.002)	0.001 ** (0.000 - 0.002)	0.001 ** (0.000 - 0.002)
Born in Switzerland (Ref.)						
Not born in Switzerland	0.194 (-0.066 - 0.454)	0.412 ** (0.136 - 0.687)	0.186 (-0.076 - 0.447)	0.400 ** (0.124 - 0.675)	0.182 (-0.079 - 0.444)	0.402 ** (0.124 - 0.680)
Primary or low secondary education (Ref.)						
Upper Sec Edu	0.304 (-0.249 - 0.856)	0.465 ** (0.149 - 0.780)	0.323 (-0.232 - 0.878)	0.510 ** (0.193 - 0.827)	0.348 (-0.208 - 0.904)	0.526 ** (0.206 - 0.846)
Tertiary education	0.313 (-0.244 - 0.869)	0.536 ** (0.202 - 0.870)	0.323 (-0.239 - 0.885)	0.592 ** (0.254 - 0.930)	0.332 (-0.231 - 0.895)	0.604 ** (0.265 - 0.943)
Region of residence Lake Geneva (Ref.)						
Middleland	-0.190 (-0.438 - 0.058)	0.012 (-0.230 - 0.254)	-0.203 (-0.451 - 0.044)	0.040 (-0.204 - 0.285)	-0.202 (-0.449 - 0.046)	0.041 (-0.203 - 0.285)
North-west Switzerland	-0.072 (-0.320 - 0.176)	0.217 * (-0.040 - 0.474)	-0.083 (-0.332 - 0.166)	0.240 * (-0.016 - 0.497)	-0.080 (-0.329 - 0.170)	0.238 * (-0.018 - 0.495)
Zurich	-0.193 (-0.457 - 0.071)	0.006 (-0.258 - 0.270)	-0.201 (-0.464 - 0.062)	0.022 (-0.243 - 0.286)	-0.205 (-0.470 - 0.060)	0.020 (-0.242 - 0.283)
East Switzerland	0.052 (-0.194 - 0.298)	0.282 ** (0.026 - 0.538)	0.027 (-0.219 - 0.272)	0.297 ** (0.041 - 0.552)	0.035 (-0.213 - 0.283)	0.289 ** (0.033 - 0.545)
Central Switzerland	0.037 (-0.228 - 0.302)	0.303 ** (0.041 - 0.565)	0.038 (-0.229 - 0.305)	0.301 ** (0.037 - 0.565)	0.035 (-0.232 - 0.302)	0.302 ** (0.037 - 0.567)
Ticino	-0.276 (-0.803 - 0.252)	-0.147 (-0.588 - 0.294)	-0.292 (-0.821 - 0.236)	-0.128 (-0.572 - 0.316)	-0.279 (-0.803 - 0.245)	-0.109 (-0.553 - 0.335)
Father primary or low secondary education (Ref.)						
Father upper secondary education	0.153 (-0.035 - 0.341)	-0.021 (-0.193 - 0.151)	0.144 (-0.043 - 0.330)	-0.031 (-0.203 - 0.142)	0.146 (-0.039 - 0.332)	-0.029 (-0.202 - 0.145)
Father tertiary education	0.240 ** (0.040 - 0.439)	0.042 (-0.148 - 0.231)	0.217 ** (0.017 - 0.416)	0.027 (-0.163 - 0.217)	0.217 ** (0.018 - 0.417)	0.019 (-0.171 - 0.209)
Lived with both parents at age 15 (Ref.)						
Lived with lone parent	-0.213 (-0.478 - 0.053)	-0.271 * (-0.573 - 0.032)	-0.215 (-0.481 - 0.051)	-0.250 (-0.554 - 0.054)	-0.231 * (-0.497 - 0.036)	-0.238 (-0.542 - 0.067)
Lived alone or other living arrangement	0.059 (-0.245 - 0.363)	0.218 (-0.109 - 0.545)	0.058 (-0.264 - 0.380)	0.234 (-0.099 - 0.567)	0.062 (-0.264 - 0.388)	0.235 (-0.102 - 0.571)
Missing living arrangement	-0.188 (-1.371 - 0.994)	-0.363 (-0.889 - 0.164)	-0.211 (-1.393 - 0.972)	-0.322 (-0.861 - 0.217)	-0.210 (-1.393 - 0.973)	-0.343 (-0.880 - 0.193)
Constant	7.779 *** (7.163 - 8.396)	7.385 *** (6.941 - 7.828)	7.775 *** (7.150 - 8.400)	7.328 *** (6.864 - 7.792)	7.729 *** (7.109 - 8.349)	7.269 *** (6.801 - 7.738)
Observations	1179	1360	1179	1360	1179	1360
R-squared	0.073	0.080	0.084	0.086	0.086	0.090

Source: Authors' elaboration based on Swiss Household Panel data. Robust standard errors. Note: In Models 3-6, the domain-specific mean centered indexes of concentration (CIs) are multiplied by 10 because the CI range was too small to report meaningful estimates relative to a 1-point increase in CI. The interpretation of the point estimates is thus the increase in SWB relative to a 0.1 increase in the domain-specific CI.

Table A4

Direct association between concentration of critical events and Subjective Wellbeing, net of proximal determinants of SWB.

	Model	Model
	(1)	(2)
Concentration Index (CI), MC	-1.756 ** (-3.349 - -0.163)	-1.941 * (-4.225 - 0.343)
Concentration Index (CI) squared	0.311 (-4.047 - 4.668)	-4.145 (-9.360 - 1.070)
Total number of events, MC	-0.003 (-0.008 - 0.003)	-0.001 (-0.006 - 0.005)
Time since last event	0.013 *** (0.003 - 0.022)	0.013 *** (0.003 - 0.022)
Gender, Men (Ref.)		
Women	0.173 ** (0.036 - 0.310)	0.169 (-0.046 - 0.384)
Concentration Index (CI), MC*Women	0.179 (-1.595 - 1.953)	-0.251 (-3.098 - 2.595)
Concentration Index (CI) squared*Women	1.746	8.443 **

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Table A4 (continued)

	Model	Model
	(−3.156 - 6.648)	(1.700 - 15.186)
Father Primary or low secondary education (Ref.)		
Father upper secondary education	0.062 (−0.062 - 0.185)	-0.006 (−0.252 - 0.240)
Father tertiary education	0.136 * * (0.002 - 0.270)	0.188 (−0.058 - 0.435)
Concentration Index (CI), MC*Father upper secundaru education		-0.438 (−3.665 - 2.789)
Concentration Index (CI), MC*Father tertiary education		0.130 (−3.511 - 3.771)
Concentration Index (CI) squared*Father upper secondary education		10.520 * * (1.752 - 19.288)
Concentration Index (CI) squared*Father tertiary education		4.364 (−4.900 - 13.628)
Father upper secondary education*Women		0.060 (−0.250 - 0.370)
Father tertiary education*Women		-0.067 (−0.390 - 0.255)
Concentration Index (CI), MC*Father upper sec edu*Women		0.357 (−3.756 - 4.469)
Concentration Index (CI), MC*Father tertiary education*Women		1.705 (−2.904 - 6.314)
Concentration Index (CI) squared*Father upper sec edu*Women		-12.356 * * (−22.739 - −1.974)
Concentration Index (CI) squared*Father tertiary education*Women		-9.354 (−20.514 - 1.805)
Age, MC	0.021 * * * (0.014 - 0.028)	0.021 * * * (0.014 - 0.028)
Age squared	0.001 * * * (0.001 - 0.002)	0.001 * * * (0.000 - 0.002)
Born in Switzerland (Ref.)		
Not born in Switzerland	0.272 * * * (0.086 - 0.457)	0.275 * * * (0.090 - 0.460)
Primary or low secondary education (Ref.)		
Upper secondary education	0.417 * * * (0.152 - 0.682)	0.429 * * * (0.163 - 0.696)
Tertiary education	0.418 * * * (0.146 - 0.691)	0.430 * * * (0.155 - 0.705)
Region of residence Lake Geneva (Ref.)		
Middleland	-0.057 (−0.225 - 0.112)	-0.045 (−0.214 - 0.123)
North-west Switzerland	0.046 (−0.129 - 0.221)	0.043 (−0.132 - 0.218)
Zurich	-0.091 (−0.274 - 0.092)	-0.078 (−0.261 - 0.106)
East Switzerland	0.166 * (−0.007 - 0.340)	0.168 * (−0.006 - 0.342)
Central Switzerland	0.175 * (−0.012 - 0.362)	0.173 * (−0.014 - 0.360)
Ticino	-0.232 (−0.562 - 0.097)	-0.228 (−0.558 - 0.103)
Lived with both parents at age 15 (Ref.)		
Lived with lone parent	-0.193 * (−0.387 - 0.001)	-0.211 * * (−0.404 - −0.017)
Lived alone or other living arrangement	0.140 (−0.075 - 0.354)	0.123 (−0.090 - 0.335)
Missing living arrangement	-0.368 (−0.865 - 0.128)	-0.364 (−0.862 - 0.135)
Number of kids at the time of interview	-0.011 (−0.075 - 0.054)	-0.009 (−0.073 - 0.055)
Single at the time of interview (Ref.)		
Married or in registered partnership	0.497 * * * (0.296 - 0.698)	0.506 * * * (0.305 - 0.706)
Divorced or separated	-0.084 (−0.342 - 0.173)	-0.076 (−0.333 - 0.180)
Widow	-0.353 * * (−0.675 - −0.031)	-0.342 * * (−0.663 - −0.021)
Employed at the time of interview (Ref.)		
Unemployed	-0.910 * * (−1.650 - −0.169)	-0.933 * * (−1.673 - −0.192)
Out of the labor force	-0.151 * (−0.313 - 0.010)	-0.147 * (−0.309 - 0.014)
Constant	7.214 * * * (6.830 - 7.598)	7.194 * * * (6.806 - 7.581)
Observations	2539	2539
R-squared	0.119	0.126

Source: Authors' elaboration based on Swiss Household Panel data. Robust standard errors.



## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.alcr.2024.100616](https://doi.org/10.1016/j.alcr.2024.100616).

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