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Health after union dissolution(s): Cumulative and temporal dynamics☆

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A B S T R A C T

The number of individuals experiencing one or multiple union dissolutions in their lifetime is increasing. The literature has shown significant interactions with health disorders, in response to the crisis situation that affects the spouses. However, processes are still unclear, in particular regarding the timing of the affection. This study explored whether different health disorders are observed shortly after dissolution or are delayed, and whether they are short- or long-lasting. We used data from the two waves (2006 and 2010) of the French Health and Professional Lives Survey (SIP) among 8349 individuals aged 25–64 years. Based on three health disorders, we studied 1) their levels in relation to the retrospective histories of union dissolutions; 2) health changes associated with a dissolution occurring between the two waves. We found that individuals who experienced one or multiple union dissolutions had worse self-rated health, more depressive symptoms and sleep disorders. The two latter were more related with a recent dissolution than with distant ones, suggesting an immediate association, yet long-lasting. Self-rated health was related with distant dissolutions only, suggesting a lagged, however also long-lasting association. Experiencing union dissolution between the two waves was linked to a higher probability of the onset of sleep disorders and depressive mood, and of deterioration of self-rated health if it was not the first dissolution. Our study shows that union dissolutions are highly correlated with different poor health measures, in the short and the long run, depending on the health disorder, with cumulative and durable effects.

1. Introduction

A considerable proportion of marital and non-marital unions end up in separation in Western societies, which means that more and more people are exposed to the consequences of these breakdowns, relating to health, wellbeing, financial resources and social networks (Amato, 2010); with different temporalities. As many of them start new partnerships, increasing numbers of individuals are likely to recover from some of the damaging effects of separation, although increasing numbers of individuals are also exposed to multiple union dissolutions (Gray et al., 2011; Eickmeyer & Manning, 2018). The increasing variability of union trajectories has important implications for health, not least because the experience of stressful life transitions contributes to the accumulation of health-related disadvantages in the course of life (Dannefer, 2018; George, 1993; Thomson, 2014; Zimmermann & Hameister, 2019). In a context of increasing divorce and separation rates, it is crucial to clarify the links between partnership histories and health. There is a large body of studies investigating these associations. However, the literature fails to bring clear evidence on whether they are short-term, long lasting, immediate or lagged and whether health consequences are cumulative with the number of dissolutions.

Using the two waves of the French Health and Professional Survey, we investigated the association between the experience of single and multiple union dissolutions and individuals' health, depending on how long before the most recent dissolution was experienced. In this way, we were able to identify whether the associations between dissolution and health outcomes became stronger with the number of events; whether they were short-term or long-lasting; and whether they emerged concomitantly with the event or lagged. We considered three health dimensions, which we hypothesized might be differently related with the experience of union dissolution: depressive symptoms, responsive to the crisis, to tackle immediate implications of the conflicts and strains surrounding union dissolutions; sleep disorders, a concrete consequence of both physical and mental effects, to tackle objective side effects of

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health deterioration on functioning; self-rated health, an inclusive and rather stable measure of health, was used to point out the long-term implication of union dissolutions on health.

The aim of this study was, first, to examine how dissolution histories were associated with health levels, with possible specific implications across different health dimensions. Second, to describe the associations between the experience of one or more couple dissolutions and different health patterns. No causal effect in the associations could be identified, although the latter analytical approach has been useful to further interpret our results on this respect.

2. Background

A wealth of studies has shown that having a stable partner is associated with better mental and physical health (Carr & Springer, 2010; Umberson et al. 2010), and the dissolution of partnerships has negative consequences on mental health (Amato, 2010; Biotteau et al. 2019; Hughes & Waite, 2009; Ploubidis et al. 2015), wellbeing (Willits et al. 2004; Zimmermann & Hameister, 2019), and physical health (Hewitt & Turrell, 2011; Willits at al., 2004). Being in a partnership can influence health via psychosocial, behavioural and physiological pathways (Thoits, 2010), as well as through levels of access to economic and social resources (Wade and Pevali, 2004; Williams & Umberson, 2004). However, the mechanisms underlying these associations are less clear (Gray et al. 2011). First, evidence regarding the temporary or permanent character of the effect of couple dissolutions is mixed. Longitudinal studies have shown that levels of psychological distress increase around the time of dissolution, to return to initial levels after some time (Booth & Amato, 1991; Bernardi, Huinink, & Settersten, 2019; Willits et al., 2004; Williams & Umberson, 2004). However, there is also evidence that partnership histories, including separations whatever the current marital status, remain associated with deteriorated health status several years after the event (Barrett, 2000; Dupre & Meadows, 2007; Gray et al. 2011; Hughes & Waite, 2009; O'Flaherty, Baxter, Haynes, & Turrell, 2016). The reasons for the lasting associations between dissolution and health are both the long-term direct impact of a separation (loss, conflict, stress) and the possible impact of changes in the close social network, in support, in contact with the family and relatives, and in living conditions (Amato, 2010). The literature has also highlighted heterogeneity in the health patterns observed around the time of a dissolution, across health dimensions and individual characteristics (Dupre & Meadows, 2007; Gray et al. 2011; Hewitt & Turrell, 2011; Hughes & Waite, 2009): the damaging effects on health of separation depend indeed on whether the above-mentioned changes are short-lived or long-lasting, positive or negative and how far they contribute to other pre-existing health vulnerabilities. Last, studies have provided evidence for both causation and selection effects of dissolutions on health. Individuals in stable relationships generally have greater financial, social and psychological resources, which help them develop and maintain better physical and mental health. Separations are stressful, and involve considerable adjustments in many material and non-material aspects of daily life (Umberson, 1987; Bonnet, Solaz, & Algava, 2010; Waite, 1995; Leopold, 2018), and can lead to a decline in social and financial resources. (Lillard & Waite, 1993; Umberson et al, 2010; Biotteau et al. 2019).

However, evidence also suggests that at least part of the association between dissolution and health results from selection mechanisms whereby poor health is observed prior to the separation. Various indicators of poor mental health (Breslau et al. 2011; Wade & Pevalin, 2004) and increased levels of stress (Booth & Amato, 1991) significantly predict the probability of experiencing dissolution. Self-assessed poor health is also associated with a higher risk of dissolutions (Joung et al., 1998), although this seems to be related to being in poor health for a long time rather than to a decline in health (Monden & Uunk, 2013).

2.1. Distant vs recent union dissolutions and health

The effects of union dissolution are time-sensitive and two main hypotheses have been proposed in the literature to explain short-term and long-lasting health consequences. The *crisis hypothesis* predicts that health deteriorates around or right after the separation and then returns to initial levels. It is based on the idea that a separation can be a highly distressing and emotional experience, and could thus lead to a temporary deterioration in health (Booth & Amato, 1991; Williams and Umberson, 2004). The *chronic strain hypothesis* predicts that experiencing a dissolution could contribute to placing the individual on a path of disadvantage so that the effects could persist over time, after the event. Couple dissolution results in a sudden decline in resources (Bonnet, Solaz, & Algava, 2010), and this change in situation can potentially have long-term consequences (Barrett, 2000; Booth & Amato, 1991).

Longitudinal studies have provided support for both hypotheses, and have suggested that one or the other might hold, depending on the health dimension considered. Usually, the negative impact of a dissolution diminishes with the time since the event (Peters & Liefbroer, 1997; Troxel, Robles, Hall, & Buysse, 2007). However, different patterns have been observed for physical and mental health (Lorenz et al. 2006), and depending on individual characteristics (Hewitt & Turrell, 2011). Most longitudinal studies have shown that deterioration of psychological wellbeing is of short duration (Demey et al. 2014; Meadows et al. 2008), as stress levels tend to increase before and just after the separation, but return to lower levels a few years later (Bernardi et al., 2019; Booth & Amato, 1991; Lorenz et al. 2006). Other authors have found that depressive symptoms persist over time, linked to higher levels of stressful life events compounding the experience of separation, for instance being a single parent (Lorenz et al. 2006; Willits et al., 2004).

Findings concerning physical health are more mixed. Some studies have shown that the risks of health problems associated with dissolution decrease over time, although with gender differences (Arcaleni, 2010; Dupre & Meadows, 2007). Other longitudinal studies have found no clear associations: some showed the effects of divorce on health only for individuals who do not remarry (Gray et al. 2011), others found no effect of separation on self-reported health (Williams & Umberson, 2004; Monden & Uunk, 2013) or even improvement in physical health (Hewitt & Turrell, 2011). Monden and Uunk (2013) suggested that the lack of general negative effects of separation on health was linked to the fact that self-assessed health improved among some individuals while for others it declined.

2.2. Concomitant vs lagged effects on health

The inconclusive findings about the health consequences of union dissolutions might be partly due to the different time of occurrence of the effects for the health dimensions considered (Hank & Steinbach, 2018, pp. 23–39). Studies have often found that separation has a substantial effect on psychological distress, but only a minor effect on physical health, probably because most health processes at play in the onset of these illnesses are slow, less visible and sometimes with delayed effect (Lovallo, 2005), compared to immediately observable psychological effects (Hughes & Waite, 2009). Lorenz et al. (2006), for instance, found that divorced women showed no differences in physical health in the years immediately after a divorce, but a significantly higher prevalence of illness, after controlling for remarriage, a decade later. This suggests that union dissolution might have a lagged effect on physical health, which becomes evident only years after the dissolution. Psychological distress and strain have nevertheless proved to be important determinants in various illnesses, which means that, if this distress is experienced for a long time, it could partly explain long-term health consequences.

Studies have usually considered a single dimension of health at a time, rarely discussing the potentially variable implications on different

health outcomes. Yet, differences in the way health dimensions are affected are informative of the mechanisms underlying the associations between dissolutions and individual wellbeing.

2.3. Multiple vs single dissolutions and health

Most studies on couple dissolution and health have not considered separately single and multiple events. According to the *chronic strain hypothesis*, separation places an individual on a trajectory where mental health is compromised, so that any subsequent negative event has a stronger effect on wellbeing. According to the *crisis hypothesis*, on the other hand, individuals who experience a separation learn how to cope with it, so that experiencing a second separation could be less harmful than a first one (Luhman & Eid, 2009).

The few studies examining the consequences of repeated dissolutions have usually found a stronger association with poorer physical and mental health than in the case of a single experience. Some of these studies were based on mental and psychological health (Brody et al., 1988; Kurdek, 1990; Willits et al. 2004; Demey et al. 2014) and others on illnesses (Dupre & Meadows, 2007; Hughes & Waite, 2009). Most of these studies found significant negative association for women, while the impact was less clear for men (Dupre & Meadows, 2007; Kurdek, 1990; Willits et al. 2004). Hughes and Waite (2009) found that while the risk of chronic illnesses was significantly related to marital histories, depression depended solely on current marital status. However, they found no evidence to confirm that the experience of multiple separations was related to poorer health, compared to a single separation, irrespective of current marital status.

It is important to note that most of the mentioned studies did not consider the number of dissolutions and the duration since the most recent dissolution together. One exception was the work by Demey et al. (2014), which showed that both aspects were relevant for mental health, and led to different patterns over time in relation to multiple dissolutions depending on the health measure considered. The experience of dissolution has a detrimental short-term impact on mental health, while experiencing multiple dissolutions has a cumulative effect on psychological wellbeing in the long term.

Finally, the heterogeneity of the effects of separation across a number of individual factors has been highlighted (Amato, 2010; Aassve, Betti, Mazzuco, & Mencarini, 2017). First of all, there is substantial evidence that the consequences of union dissolutions are gender-specific, and women's health on average seem to suffer more from the experience of dissolution compared to men (Biotteau et al., 2019; Dupre & Meadows, 2007; Monden & Uunk, 2013; Willits et al., 2004). Other factors include whether individuals re-form a partnership (Booth & Amato, 1991; Dupre & Meadows, 2007:; Gray et al. 2011), the quality of the relationship before the separation (Kalmjin & Monden, 2006), whether the individual concerned initiated the separation (DiPrete & Eirich, 2006), the reasons for separating as well as personality traits (Cohen & Finzi-Dottan, 2012). Demographic and socio-economic characteristics are also crucial, as they are strongly linked to individual health levels (see among others: Marmot, 2002; Demey et al. 2014), and it has been well documented that one of the explanations for the poorer health status of separated individuals is their lower social and economic resources (Biotteau et al. 2019). Furthermore, individual's resources such as a high educational level, financial wellbeing, and a supportive social network can either serve as a buffer or exacerbate the consequences of separation (Amato, 2000; Lillard & Waite, 1993; Aassve et al, 2017; LaPierre, 2012). For instance, Cohen and Finzi-Dottan (2012) showed that the lower mental health observed among divorces individuals was highly mediated by gender, age and educational level.

3. Research questions and hypotheses

We studied the association between individuals' single or cumulative experiences of union dissolution and health patterns. We were interested in the duration and temporality of these associations: whether they are long-lasting, concomitant or lagged. We measured health across three dimensions, that we expected to be differently associated with union dissolution: depressive symptoms, self-rated health and sleep disorders (see *Health variables* section). While depressive symptoms have been extensively studied in the literature as being a major health issue in relation to union dissolution, few studies have considered self-rated health (Wood et al. 2007; Biotteau et al., 2019). While including evaluation of one's social and psychological functioning, general health self-assessment is strongly driven by various types of diagnosed and perceived illnesses and disorders (Mavaddt et al., 2011), thus providing an overall picture of the perception and knowledge of one's own health. Sleep disorders can also be driven by various physiological and psychological disorders (Hale, 2005).

We expected to observe an association between the experience of union dissolution and health status, but that the dimensions would be differently affected by way of cumulative processes and thus by the number of separations experienced and over time. General health is relatively stable over time (see for instance Lorenz et al., 2006), and affected by chronic stressors, which are less time-dependent and can have cumulative effects on physical health through cardiovascular, neurological, and immunological mechanisms (Lovallo, 2005). Depressive symptoms, on the opposite, have usually been shown to appear around the time of separations, later returning to pre-separation levels, suggesting an adaptation effect (Booth & Amato, 1991). However, some have suggested that depressive symptoms are also linked to chronic stressors that could result from separation (Lorenz et al. 2006) and could persist over time (Willits et al., 2004). Lastly, sleep disorders are liable to result from psychosocial problems and physiological responses to the stressors of everyday life, possibly before and after the dissolution. They have been shown to have a bidirectional association with the quality of a relationship (Hale, 2005). Sleep disorders are thus affected by stressors related to the process of separation from a partner, but they are perhaps less sensitive to cumulative processes. Therefore, the association with sleep disorders should be observed around the time of dissolution, rather than in the long term after the event. It has however been shown that the incidence of sleep disorders is highly correlated with depression, to the extent that only a relatively small proportion of individuals suffering from depression are not affected by sleep disorders (Nutt, Wilson, & Paterson, 2008).

Selection mechanisms would be likely to explain part of the associations that we might observe in the present study, as poor health can itself increase the probability to experience divorce, however information about health before dissolution histories was not available. We partly address this issue by examining change in health status linked to the experience of union dissolution (first or second or more), thus considering individuals with similar health levels before the experience of dissolution.

4. The French context

Welfare system and social and economic contexts mediate the consequences of critical events, with potential differences however across population groups (Cooke & Baxter, 2010; Biotteau et al. 2019; Aassve, Betti, Mazzuco, & Mencarini, 2017; Recksiedler and Bernardi, 2019). France provides an interesting context for the study of union dissolutions and health. Like most Western countries, France has quickly reached high levels of "modern" partnership behaviour, with low marriage rates, a high prevalence of non-marital partnerships and childbearing, and separations. Marriage rates have halved since the beginning of the 1970s, while non-marital partnerships have become more common. Civil unions, called PACS, were introduced in 1999 and are now widespread as a form of legal union (Mazuy, Barbieri, & D'albis, 2014). Compared to marriages, civil partnerships are simpler to form and to dissolve. Separations and divorces are widespread: in 2014, 44 divorces

were recorded for every 100 marriages. Furthermore, France is characterized by a marked spread of the dual-earner model compared to many other Western societies, with 46.7% of parents with at least one child younger than 3 years old in paid work, compared to 31.9% in Germany (Fagnani, 2010).

The French welfare state has been characterized on the one hand by conservative social policies in the labour market, and on the other by a generous, diversified family benefit system, with a whole range of facilities and services which has promoted the increasing presence of women in the labour force (Peters & Liefbroer, 1997; Fagnani, 2010), and pronatalist policies (Troxel, Robles, Hall, & Buysse, 2007; Troxel, Robles, Hall, & Buysse, 2007). Public expenditure on families is among the highest in the OECD countries (3.7% of GDP in 2013).

A context promoting economic independence for both partners is relevant, since the consequences of separations are often linked to changes in resources or working opportunities (Aassve et al., 2017; Biotteau et al. 2019). However, despite these numerous family and employment policies, discrepancies between partners still persist in France (Peters & Liefbroer, 1997): in the early 2010s, three out of four French women of working age were earning less than their partner. Therefore, the gender-specific cost of separation is still debated, and recent evidence has indeed shown that women are more economically affected by separation than men (Aassve, Betti, Mazzuco, & Mencarini, 2017; Bonnet, Solaz, & Algava, 2010); this significantly contributes to the health impact of separation (Biotteau et al. 2019).

5. Hypotheses

In our study, we considered three health dimensions (self-rated health, depressive symptoms and sleep disorders) and analysed their association with single *vs* multiple dissolutions history, and with distant *vs* recent occurrence. We expected to observe that cumulative effects, as well as duration and time occurrence of the effects vary according to the health measure considered.

Our hypotheses on the association between number and timing of dissolutions and health status were thus the following:

H1- multiple dissolutions: Following the accumulation hypothesis, we assumed that experiencing multiple dissolutions is associated with poorer self-rated health (H1a), and with a higher prevalence of depressive symptoms (H1b), compared to experiencing a single dissolution. We did not expect to observe a cumulative association with sleep disorders assuming that they are rather concomitant to the event (H1c).

H2 –duration of the effect: We expected to find a long-term association between dissolutions and self-rated health: self-rated health measures are more stable and have slow evolution (H2a). Depressive symptoms are sensitive to acute psychological distress which might be due to the couple crisis as well as chronic conditions with possible difficulty to totally recover for a part of the individuals; so, we expected effects on depressive symptoms to be stronger in the shorter-term, but possibly long-lasting too (H2b). We finally expected effects on sleep disorders to be more related to acute stress and rather short lasting (H2c). In general, as the French context is considered protective regarding the consequences of dissolutions, the long-term effects could be attenuated compared to short-living ones.

H3 – *Immediate or lagged effect*: Because of the slow evolution of self-rated health measured, we expected to find a lagged association with dissolution, i.e. to observe an association with distant but not with recent dissolutions (H3a). On the opposite, we expected to observe and immediate association between the experience of dissolution and the prevalence of depressive mood (H3b) and sleep disorders (H3c).

6. Data and methods

6.1. Data and sample

We drew on data from the two waves (2006 and 2010) of the "Health and Occupational Trajectories" survey (*Santé et Itinéraire Professionnel,* SIP) that was jointly conducted by the research and study divisions of the ministry of Labour (DARES) and of the ministry of Health (DREES) and ran by the French statistical institute (INSEE). The Survey covers a representative sample of the French population aged 20–74 years living in private households. The questionnaires provide detailed information about work and family events (including partnership separations) experienced by individuals between the two waves, as well as several physical and mental health measures. In 2006, retrospective information about partnership trajectories was also collected. Individuals aged 25–65 (post-education, working age) who were interviewed at both waves and who had been in at least one partnership in 2006 or before, defined as any cohabiting relationship (married or not) lasting 1 year or more or with one or more children in common, were included in our analyses. This yielded a sample of 8349 individuals.

6.2. Health variables

As highlighted in our hypotheses, the three measures were selected to reflect the different health dimensions, for which specific associations with couple dissolution were expected. a) Self-rated health (*very good, good* vs. *fair, bad, very bad*) is a multidimensional measure that reflect physical and mental health as well as how social capital shapes individuals' perception of their own health (Delpierre, Lauwers-Cances, Datta, Lang, & Berkham, 2009; McDonough et al., 2002). Despite its subjective nature, it was shown to be strongly correlated with mortality risk, the onset of chronic diseases, functional decline and care consumption in the long term (Ferraro et al., 1997; Idler & Benyamini, 1997). We expected this measure to tackle the long and/or delayed associations of health with dissolutions. b) Depressive symptoms (whether the individual had experienced depressive mood in the previous 6 months - *most of the day and nearly every day)* were expected to be sensitive both to the crisis and chronic factors linked with a separation (Biotteau et al., 2019; Lorenz et al., 2006), thus to reflect health deterioration especially around separation, but also in the longer term. c) Sleep disorders (*never or rarely; several times a month; several times a week; every day in the previous 12 weeks)* are linked to both mental and physical health (Hale, 2005) and were expected to be observed as a consequence of the crisis due to the conflict and strains surrounding dissolutions. We thus assumed that this measure tackle poor health at the time of dissolution. All variables were dichotomised, and individuals were considered as in good health when they reported satisfactory (good or very good) self-rated health, no depressive symptoms, and sleep disorders less than twice a week. To examine health patterns in 2006–2010, three variables were used, according to whether the respondents reported: 1) stable good or poor health (good/poor health at both assessments); 2) declining health; 3) improving health.

6.3. Union dissolution

The main independent variable in our analysis was whether individuals had experienced one or more dissolutions. Individuals were considered as having experienced dissolution when they had ended a partnership, as defined above. Based on the available data, we were not able to distinguish between marital and non-marital partnerships. However, the inclusion of both couples was justified by the fact that differences in the likelihood of separation according to the type of partnership tend to be less marked in societies where cohabitation or non-marital partnerships are more prevalent (Liefbroer & Dourleijn, 2006), since cohabitation is a heterogeneous phenomenon, with a variety of meanings attached to it (Hiekel & Castro-Martín, 2014). Furthermore, research has shown that cohabiters accrue many of the same psychological and health benefits as their married counterparts (Eickmeyer & Manning, 2018) and suggested that the dissolution of a marital and a non-marital relationship have similar health effects (Wu & Hart, 2002). By merging retrospective information about past

dissolutions with information on dissolutions occurring between the two waves of the survey, we were able to analyse the respondents' complete "dissolution histories". In our sample, among respondents reporting at least one partnership in 2006 or before, 2307 respondents had experienced one separation and 764 respondents had experienced two or more before 2010.

7. Covariates

It has been shown that the effects of union dissolution might differ considerably depending on individuals' availability of resources enabling them to face the consequences of separation, for instance employment, a high income, education and an adequate social network. Although exploring this heterogeneity was not the main aim of this study, we implemented analyses to determine whether and how these characteristics mediated the association between separation and health. Lastly, although the literature has also shown that the consequences of couple dissolutions can differ considerably between women and men, the present study did not explore gender differences. This was mainly due to the relatively small sample size, which meant that considering men and women separately, while at the same time analysing the number and timing of dissolutions would lead to low statistical power. Gender interactions were nevertheless included in the sensitivity analyses.

In all models, we controlled for a number of demographic and socio-economic variables that might be related both to the experience of dissolution and to health. These were age (in 5-year age groups) and gender; educational level (lower secondary; upper secondary and tertiary); the father's education (primary, secondary and tertiary), the number of children the respondents had or had raised. In the last set of models, a number of variables were included, which were considered as indicators of resources liable to mediate the association between dissolutions and health: employment status; income (divided into household terciles); partnership status; social network support (whether the respondent had someone to rely on for help with daily tasks), all measured in 2010.

7.1. Analytical strategy

First, a series of logistic regression models was implemented to study the association between the number of dissolutions experienced, the time occurred from the most recent one, and the individuals' health status in 2010. To explore cumulative processes (H1), in a first set of models we explored whether the experiences of single and multiple dissolutions showed different associations with health. We compared individuals who had not experienced any dissolution, or had experienced one or more than one, in relation to their health status. The category involving multiple dissolutions included all individuals who experienced more than one, because of the small number of individuals who experienced more than two dissolutions in our sample. In the second set of models, to examine the association between dissolution and health over time (H2), we tested whether the association with dissolution differed depending on the timing of the most recent dissolution with respect to the health assessment. We compared: most recent separation occurred more than 10 years, between 10 and 5 years, and less than 5 years before the health assessment.[1] In a third set of regression models, the number of separations experienced and the timing of the most recent one were interacted, to examine whether association of single or multiple dissolution with health were immediate or lagged (H3).

Secondly, in order to partly take into account the issue of selection, we examined associations between dissolutions and changing health between 2006 and 2010, thus comparing individuals who had the same level of health in 2006. We could then discuss whether experiences of separation were likely to have an impact on the probability of health deterioration among subjects who were healthy in 2006, as well as the probability of health recovery among the individuals who were not in good health in 2006. The panel structure of the SIP survey was used to examine the association between the experience of dissolution between the two health assessments and patterns of health. Multinomial logit models were implemented to analyse the probability of being in good or poor health at the time of the two waves, or having improving or deteriorating health between them, in relation to the different dissolution histories. We thus considered 4 health patterns based on 2006 and 2010 health status: being and remaining in good health; being in good health and deteriorating; being and remaining in poor health; being in poor health and improving. Here, to make results more easily readable, we compared individuals who had never experienced a dissolution, those who had experienced distant dissolution(s) (one or more separation before 2006),[2] those who experienced a single and recent dissolution (between 2006 and 2010), those who had experienced multiple dissolutions including a recent one.

We first compared the distribution across the 4 health patterns depending on the dissolution history. We then focused on the specific probability of experiencing improvement or deterioration in health. Logistic models provided the predicted probability of health deterioration for individuals who had reported good health in 2006, and the predicted probability of health improvement for those who reported poor health in 2006. Additional analyses (available upon request) found different, although non-significant, gender patterns in the association between separation and health.

8. Results

Before examining the results of our empirical analysis in detail, it is important to note that there were differences among individuals with a history of couple dissolutions in terms of demographic and socio-economic characteristics, supporting the need for accounting for these covariates (Table 1). In our sample, 63% of the individuals had no experience of separation and 32% had experienced distant dissolution(s) (before wave 1); these two groups were on average older compared to individuals who had experienced recent dissolution (between the two waves): one first/single dissolution (2.7% of the sample), or a second or further dissolution (2.8% of the sample). Individuals who had experienced a single and recent dissolution had on average higher educational level and higher income, compared to those who had experienced multiple and recent dissolution. Men who had experienced no dissolution had on average a lower educational status than other male groups, but this was not the case for women. For both genders those who had not experienced dissolution had higher income levels compared to those who had.

Women reported on average poorer health outcomes than men, except for self-rated health among those who had not experienced any dissolution. Individuals who had experienced couple dissolutions reported not only poorer health outcomes in 2010 but also more frequent deteriorating health between 2006 and 2010 compared to individuals who had not experienced any dissolution.

8.1. Number and timing of dissolutions and health status in 2010

Results from the logistic models on the association between past dissolutions and health in 2010 (Table 2) showed that the experience of dissolution was associated with poorer health outcomes. For the three health dimensions, multiple dissolutions were associated with poorer

[1] Additional models were run including further categories (10–15 years and more than 15 years) as well as different categories (three and four years time periods) but did not show interesting differences in the association with health.

[2] Due to small group sizes, we had to group together single and multiple ancient dissolutions.

Table 1
Descriptive characteristics of the sample, according to dissolution history.

Characteristic (%)	No dissolution			Distant dissolution(s)			One dissolution, recent			2+ dissolution, last recent		
	T	F	M	T	F	M	T	F	M	T	F	M
Age (years)	46.9	46.2	47.7	48.4	48.5	48.1	39.0	38.5	39.7	40.9	40.7	41.2
Female	52.3			60.1			58.0			59.9		
Educational level												
Primary	57.4	51.8	63.5	59.1	57.5	61.8	38.2	36.3	40.8	51.9	52.1	51.6
Secondary	16.1	17.5	14.5	16.4	16.5	16.3	18.2	15.9	21.5	17.7	17.8	16.2
Tertiary	26.5	30.6	21.9	24.4	25.9	21.9	43.5	47.7	37.6	30.9	30.0	32.2
Father- higher education	8.1	9.3	6.8	9.4	9.0	10.2	15.1	17.9	11.3	10.1	10.5	10.5
HH income												
3rd tercile	36.1	35.9	36.3	19.3	16.0	24.5	39.4	35.1	45.3	20.25	16.9	25.3
2nd tercile	49.0	48.9	49.1	40.7	38.6	44.0	47.2	48.5	45.3	39.6	40.1	38.9
1st tercile	11.1	10.7	11.5	37.5	42.6	29.1	14.9	12.7	6.2	22.9	41.5	31.6
Employment status												
Employed	71.3	67.3	75.8	66.0	62.8	71.2	80.0	75.4	86.6	75.5	70.4	83.1
Student	0.2	0.3	0.01	0.1	0.2	0.0	0.4	0.0	0.1	0.1	0.01	0.1
Unemployed	4.7	0.5	3.6	8.8	9.8	7.2	6.9	0.6	8.2	13.5	16.2	9.4
Retired	13.8	10.1	17.8	15.2	14.3	16.8	1.7	0.0	3.1	3.8	3.5	4.2
Number of children (mean)	2.1	2.1	2.1	1.9	2.0	1.8	1.8	1.9	1.6	1.7	1.8	1.4
Supportive social network	94.5	94.6	94.3	87.9	87.4	88.7	89.1	93.2	83.5	83.9	85.2	82.1
Has a stable partner	100	100	100	44.5	37.3	56.3	12.1	9.7	15.4	7.5	5.6	10.5
Self-rated health												
Good self-rated health in 2010	71.8	72.0	71.5	65.2	64.2	66.9	78.3	76.8	80.4	64.5	60.6	70.5
Improving	7.5	7.6	7.5	10.3	10.9	9.4	9.5	12.7	5.1	11.4	12.7	9.4
Deteriorating	12.2	12.4	12.1	13.4	13.7	13.1	11.6	13.4	9.2	17.7	15.5	21.0
Depressive mood												
No depressive mood in 2010	84.1	80.1	88.6	77.2	74.1	82.3	75.7	71.6	81.4	64.1	59.8	70.5
Improving	11.1	13.5	8.5	16.1	18.2	12.6	11.6	11.2	12.4	14.7	16.2	12.6
Deteriorating	9.9	12.1	7.6	10.2	10.7	9.5	13.8	14.1	13.4	18.9	21.1	15.7
Sleep disorders												
No sleep disorders in 2010	75.1	71.5	79.1	66.9	62.7	73.8	70.9	66.4	77.3	57.8	54.9	62.1
Improving	10.5	11.9	8.9	13.7	14.4	12.5	11.2	13.4	82.4	15.6	14.8	16.8
Deteriorating	12.5	14.0	10.7	13.8	15.3	11.3	20.3	16.9	18.5	17.3	16.9	17.9
N	5278 (63.2%)			2603 (31.28%)			231 (2.7%)			237 (2.8%)		

Table 2
Dissolutions and health in 2010. Odds ratios for logistic regression models.

VARIABLES	(model 1) Number of dissolutions			(model 2) Time since last dissolution		
	Self-rated Health	Depressive symptoms	Sleep disorders	Self-rated Health	Depressive symptoms	Sleep disorders
One dissolution	0.785*** (0.70–0.87)	0.677*** (0.59–0.77)	0.710*** (0.63–0.79)			
2+ dissolutions	0.663*** (0.56–0.78)	0.485*** (0.40–0.58)	0.570*** (0.48–0.67)			
Last dissolution <5 y				0.718** (0.57–0.89)	0.388*** (0.31–0.48)	0.529*** (0.42–0.65)
Last dissolution 5–10 y				0.8175** (0.68–0.97)	0.621*** (0.51–0.75)	0.659*** (0.55–0.78)
Last dissolution >10 y				0.734** (0.65–0.82)	0.698*** (0.61–0.80)	0.717*** (0.63–0.80)
Observations	8199	8199	8199	8199	8199	8199

Notes all models were controlled for age, gender, education, paternal education, number of children.
95% Confidence Intervals in parentheses, ***p < 0.01, **p < 0.05.

health compared to single dissolutions, after adjusting for covariates. While cumulative associations with both self-rated health and depressive symptoms were in line with our hypotheses (H1a and H1b), we also observed a significant cumulative association with sleep disorders (contrary to H1c). All three health dimensions were associated with distant dissolutions in line with long lasting effect, but associations with recent dissolutions were stronger for depressive symptoms and sleep disorders (thus confirming H2a and H2b but contrary to H2c that did not predict significant associations between sleep disorders and distant dissolutions).[3]

Interacting the number of dissolutions and their timing first without adjusting for covariates (Fig. 1a), and second with adjustments (Fig. 1b), we found that poor self-rated health was associated with distant (>10 year), but not with recent single dissolutions, confirming the hypothesis of a lagged association of the dissolution on self-rated health (H3a). In contrast, a single dissolution either distant or recent was associated with depressive symptoms and sleep disorders, in the line of the crisis hypothesis (H3b and H3c). The adjustment on covariates did not change these results.

Regarding the number of dissolutions, individuals who had experienced multiple dissolutions showed poorer health considering all three dimensions, irrespective of when the most recent one had occurred. However, when adjusting for covariates, the associations held for multiple and recent (<5 years) dissolutions, but lost significance when the latest dissolution was distant (confidence intervals being large for these small size groups); it was not the case for sleep disorders which remained more common among those who experienced multiple dissolutions, even more than 10 years before. At this stage of our analyses, this result invalidates a solely crisis-association between sleep disorders

[3] Sensitivity analyses were run to examine whether the observed associations between dissolutions and self-rated health could be explained by poor mental health. However, results (available upon request) showed substantial and significant associations between dissolution histories and self-rated health after including depressive symptoms and sleep disorders as potential mediators.

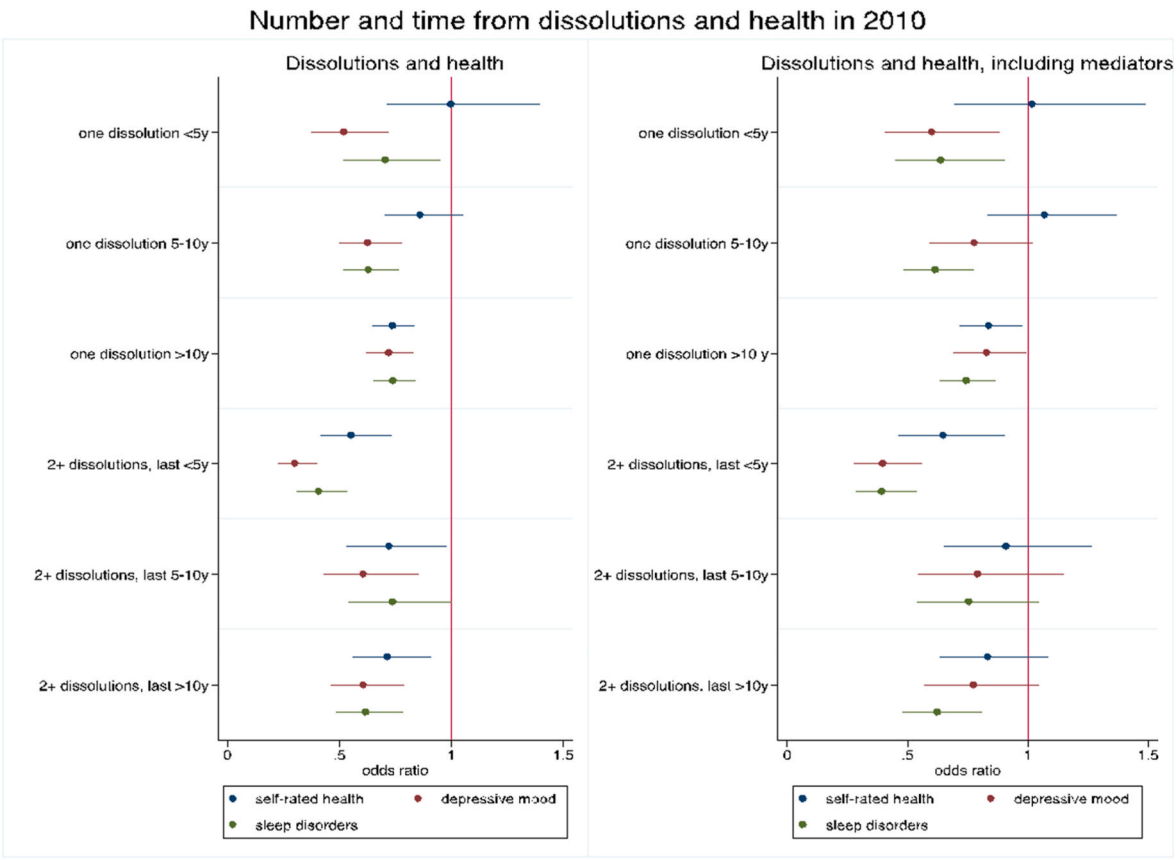

Fig. 1a and b. Experience of separation and good self-rated health in 2010, with and without mediating factors. Results of logistic modelsNote
All models were controlled for age, gender, educational level, father's educational level, number of children. Models in 1. b. controlled for partnership and employment status and social network in 2010. Reference category is individuals who experienced no dissolution.

and dissolution (results for the full models are shown in table A1 in the Appendix).

8.2. *Dissolutions histories and health changes between 2006 and 2010*

Fig. 2 displays the predicted health changes associated with each dissolution history. Individuals who had experienced no dissolution showed the highest predicted probabilities of reporting good health in 2006, with around 80% for each three health measures (summing up the probability of remaining in good health and deteriorating; Fig. 2); they were also more likely to remain in good health in 2010 (between 60 and 70% depending on the health measure) and less likely to experience health deterioration. As expected, the experience of union dissolution was associated with more frequent health changes, and in particular among those who had experienced multiple and recent separations.

Multiple dissolutions of which a recent one were associated with the highest probabilities of both being in poor health and of experiencing health deterioration. The largest disadvantage was for sleep disorders: more than 40% had sleep disorders in 2006, while these disorders concerned around 20% of individuals who had no dissolution or those who had a first dissolution between 2006 and 2010, and around 30% of individuals who had experienced distant dissolutions. Individuals who experienced a single and recent dissolution had a similar prevalence of sleep disorders in 2006 than those who experienced no dissolution, however a much larger probability of deterioration between the two waves. Individuals who had distant dissolution had a higher predicted probability of sleep disorders in 2006, but a lower probability of deterioration between the two waves than individuals who had experienced a recent dissolution. These patterns are specific to sleep disorders and suggest the important role of both the cumulating experience of dissolution on top of a crisis effect.

To further analyse the changing patterns, we examined the predicted probabilities of (1) health deterioration among those initially in good health and (2) health improvement among those initially in poor health (Fig. 3). Multiple dissolutions of which a recent one were associated with the highest predicted probabilities of onset of depressive symptoms and sleep disorders, reaching over 30%; and this, on top of having the lower probability of being in good health in 2006. The probability of onset of depressive symptoms was around 10% for individuals who had experienced no dissolutions, 14% in case of distant dissolutions and 20% in case of a first and recent dissolution (the two latter being not statistically different).

Compared to no dissolution, the onset of sleep disorder between the two waves was slightly higher for those who experienced ancient dissolutions, and much higher (but with large confidence intervals) in case of dissolution between the two waves.

Recent dissolutions were associated with deteriorating self-rated health only in the case of second or further separations, thus confirming once more our hypothesis of the lagged and cumulative association between dissolutions and self-rated health.

Considering the probability of improving health, associations with dissolution were not statistically significant.

9. Conclusion

In this study, we used data from a representative household survey, which included retrospective and longitudinal information about partnership histories, to examine the association between the number and timing of union dissolutions and health patterns. Our results showed that, overall, the experience of dissolution was negatively associated

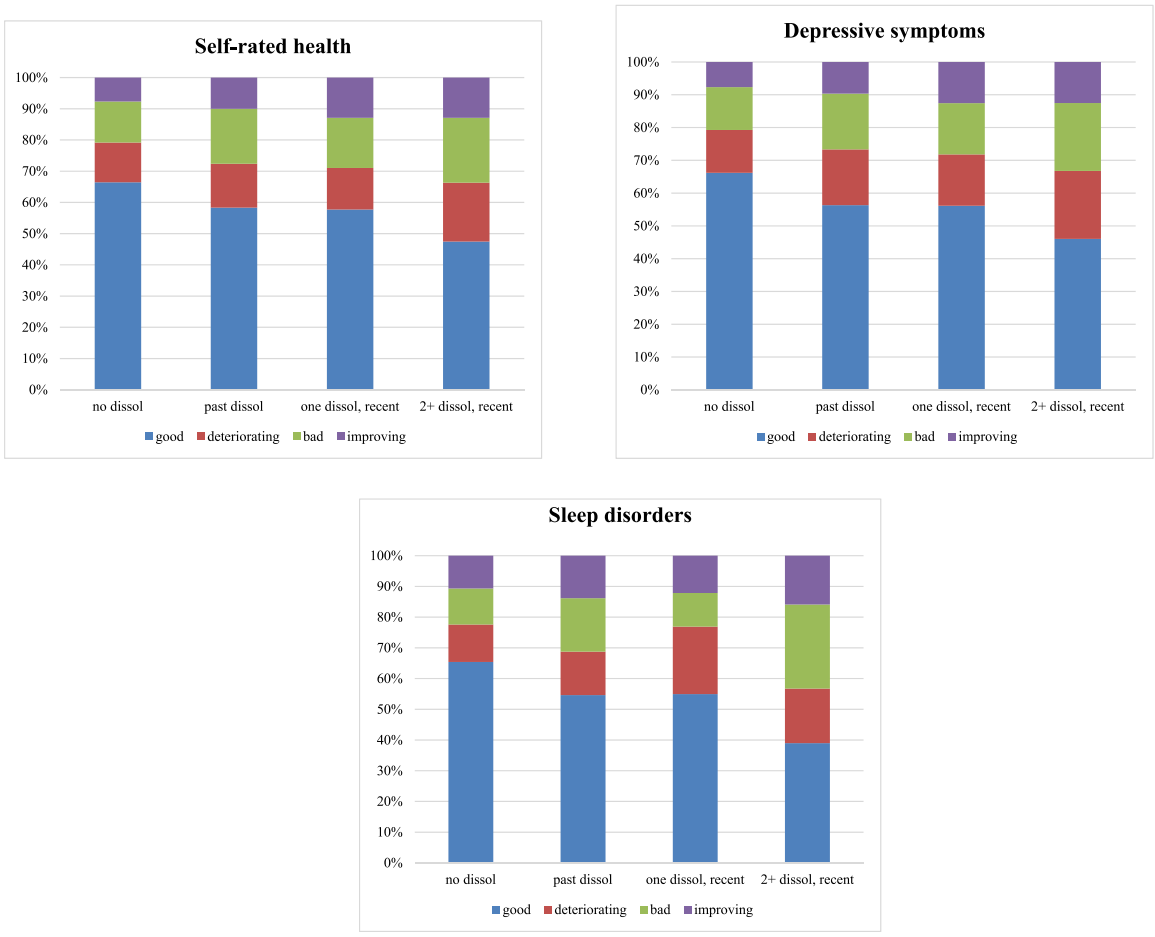

Fig. 2. Dissolution histories and health patterns (2006–2010). Predicted probabilities from ordered logit models
Source: authors' elaboration of SIP data
Note: all models controlled for age, gender, educational level, father's educational level, number of children.

with health. The association was strong for individuals who had experienced multiple dissolutions including a recent one. However, associations with single dissolutions were also observed, and for up to 10 years at least after the last separation. As expected, the different health dimensions were differently related to the number of separations and their timing.

Our first set of analyses, based on retrospective information, showed that both single and especially multiple dissolutions, even when the latest one was distant in time, were associated with deterioration in all the three health dimensions we considered. More recent dissolutions were associated with depressive symptoms and sleep disorders, but not with self-rated health, for which the association seemed lagged. These results were overall in line with previous literature showing deterioration of mental health especially in the short-term (Booth & Amato, 1991; Demey et al., 2014; Meadows et al., 2008) and physical health in the longer-term following union dissolution (Hughes & Waite, 2009; Lorenz et al., 2006). The result that association with poorer physical health were lagged might provide a possible explanation for why previous results about physical health following dissolutions were mixed (Monden and Uunk, 2013; Williams & Umberson, 2004). Furthermore, we extended the existing evidence to sleep disorders, which we hypothesized might be related to both the physical and mental strains related to the period of separation. Indeed, sleep disorders showed especially strong, cumulative associations with the experience of dissolution(s) Overall, the results confirmed our hypotheses, except that sleep disorders seem to have both a "crisis-related" and a long-term association, while we assumed it was only linked to the period of the event.

Our second set of analyses aimed to further explicit health changes, using the two waves of the survey. We found that the experience of union dissolution was associated with more frequent health changes. The experience of multiple dissolutions including a recent one was associated with the highest predicted probability of both initial poor health, and of health deterioration between the two waves. A single recent dissolution was associated with poorer sleep disorders and depressive symptoms at the first wave, compared to the "no dissolution" group; but with a statistically different probability of health deterioration between the two waves only for sleep disorders. Self-rated health was associated with recent dissolution when it was not the first one This confirms a lagged and long-lasting association of dissolution with self-rated health and depressive symptoms, and a less marked crisis effect. In contrast, sleep disorders were strongly associated with dissolutions, distant or recent, with a long-lasting effect on top of a concomitant association.

When interpreting these results, it is important to consider that this study presents some limitations. First of all, the individuals included in our sample varied considerably in age, which is in itself an important determinant of health; we need to keep in mind that cumulative and distant *vs* single and recent experience reflect on average different lifespan exposure in our sample. Furthermore, the health dimensions considered differed considerably in their patterns across age groups (Figure A1). In addition, individuals with different histories of dissolutions also varied in their demographic and socio-economic characteristics. Although our models controlled for age and socio-economic background, it is likely that selection of individuals into the different

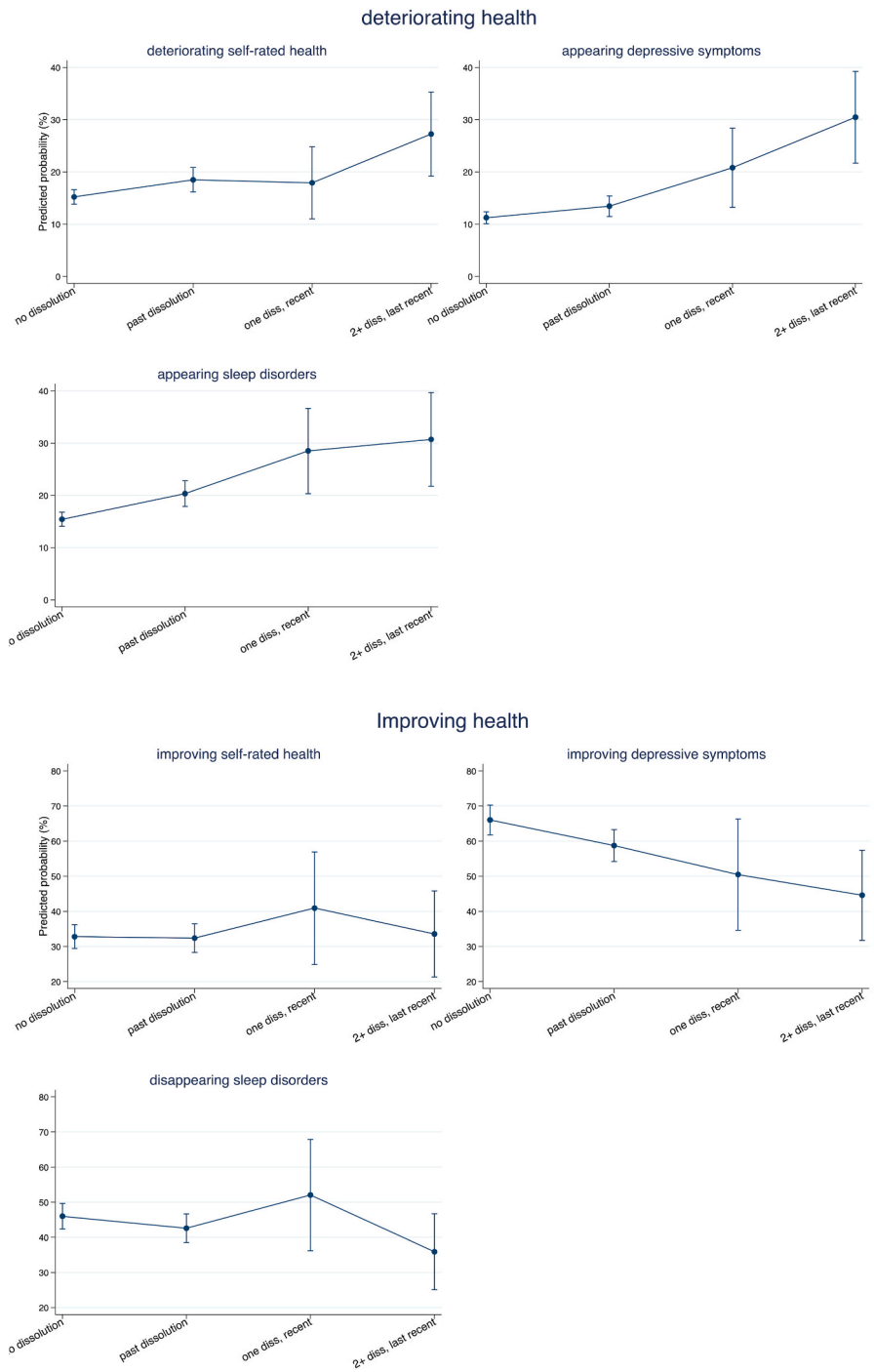

Fig. 3. Dissolutions histories and changing health. Predicted probabilities from logistic models
Source: authors' elaboration of SIP data
Note: all models controlled for age, gender, educational level, father's educational level, number of children.

analysis groups could have had a role in the associations observed. Importantly, no information was available in our data on the respondents' health status before the start of their histories of separation. This is a substantial limitation in our study, as we could not control for the fact that poor health can be itself a determinant of union dissolution (s), for instance through unhealthy behaviors that influence negatively physical and personal attractiveness (Joung et al., 1998). Indeed, selection mechanisms were shown to explain part of the associations between union/dissolution histories and health. However, we were able to partly address the issue of selection in the second part of our analysis, where individuals with similar health levels at the time of the first observation were compared, to examine the probability of changes in health associated with the experience of dissolution.

Another limitation concerns the nature of our main dependent and independent variables. Partnership histories were measured retrospectively and could thus have been affected by recall biases, especially when considering separations occurring a long time before the survey interviews. In addition, all health measures were self-reported. This means that differences in reporting behaviour according to sociodemographic characteristics could have played a role in the differences observed, as these characteristics are also likely to be related to the probability of experiencing dissolution. While recent studies have found

no systematic gender or educational differences in reporting either good or bad health, they have found a declining concordance between self-reported and actual health among older respondents (Subramanian, Kim, & Kawachi, 2005; O'Flaherty, Baxter, Haynes, & Turrell, 2016), although this appears much less so among younger adults (Peters & Liefbroer, 1997). In addition, our data did not include information about the quality of relationship before dissolution, the reason for the dissolution or any personality trait. We were thus not able to explore heterogeneities based on these characteristics of the union, which have been shown to be relevant for the consequence of dissolution (Cohen & Finzi-Dottan, 2012). Indeed, individuals ending partnerships characterized by low quality of relationship were shown to experience lower deterioration or even improvements in health (Kalmjin and Monden, 2006). Finally, because of the relatively small sample size when considering the different dissolution histories, we were not able to examine gender differences.

Despite these limitations, the present study provides an important contribution to the literature on dissolution and health. First, using retrospective information about dissolutions occurring before subject inclusion in the survey, we were able to examine how overall dissolution histories were associated with health levels in both the longer and the shorter term. Secondly, separate analyses of the probabilities of experiencing health improvement or deterioration associated with dissolution allowed the issue of selection to be partly considered. It also meant that we were able to identify health patterns following separation without the risk that they might be masked by non-significant average effects. This is important in light of the existing evidence that dissolutions tend to be followed by both health improvement and deterioration, depending on individual characteristics (Monden & Uunk, 2013). The comparison of various measures of health was another important contribution of this work, as these dimensions showed different socio-demographic patterns and were differently associated with the experience of separation, so that they could be informative on the mechanisms at play.

Our results are an extension to previous findings on the cumulative associations between dissolutions and psychological (Demey et al. 2014; Willits et al. 2004) and physical health (Hughes & Waite, 2009) in a French context, and including non-marital partnerships, integrating different health measures. In addition, the results from the second part of our empirical analysis suggested health crisis concomitant to the dissolution period or delayed health consequences. Because consequences on health were found for every partnership history under consideration, our study suggests a substantial, cumulative association of this dimension of the life course with health, approached here in different ways. We confirmed that the association varied according to the health dimension, with some dimensions showing immediate and others showing lagged associations, which can explain the variation in the conclusions of previous studies about the crisis *vs* long-term assumptions. Although we did not focus on socio-demographic heterogeneities, we found that they play a role in the association between union dissolution and health, especially regarding cumulative effects. The existence of associations between dissolution and all dimensions of health reject the evidence of a specific "protective" status of the French context. Analogous cross-county comparisons could shed the light on whether the impact is weaker in France than in other contexts. In addition, as the experience of union dissolution becomes more frequent and widespread, it will be crucial to examine whether its consequences for individuals' health and wellbeing change over time, and whether these consequences differ considering the dissolution of marital and cohabiting unions.

In general, we conclude that further explorations with larger samples could be expected to highlight critical situations, in which separations could accumulate because of a lack or loss of material and non-material resources. Further research is required in this field, in the context of an ageing population, the injunction for healthy ageing and the increase in the number of couple dissolution among older individuals.

Ethics Approval

Ethics Approval was not required for this study as we used data already collected and publicly available from the Santé et Itinéraire professionnel (SIP) survey (https://drees.solidarites-sante.gouv.fr/sources-outils-et-enquetes/06-lenquete-sante-et-itineraire-professionnel-sip).

Author statement

Substantial contribution was made by A.B. and C.C. in terms of devising the idea and designing the study. A.B. wrote the first draft of the manuscript and executed the data analyses. A.P. and E.C. contributed with statistical advice, critical comments, revising the paper and writing the final version of the paper. All the authors contributed with advice and approved the final version of the paper.

Declaration of competing interest

None declared.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101042.

Appendix

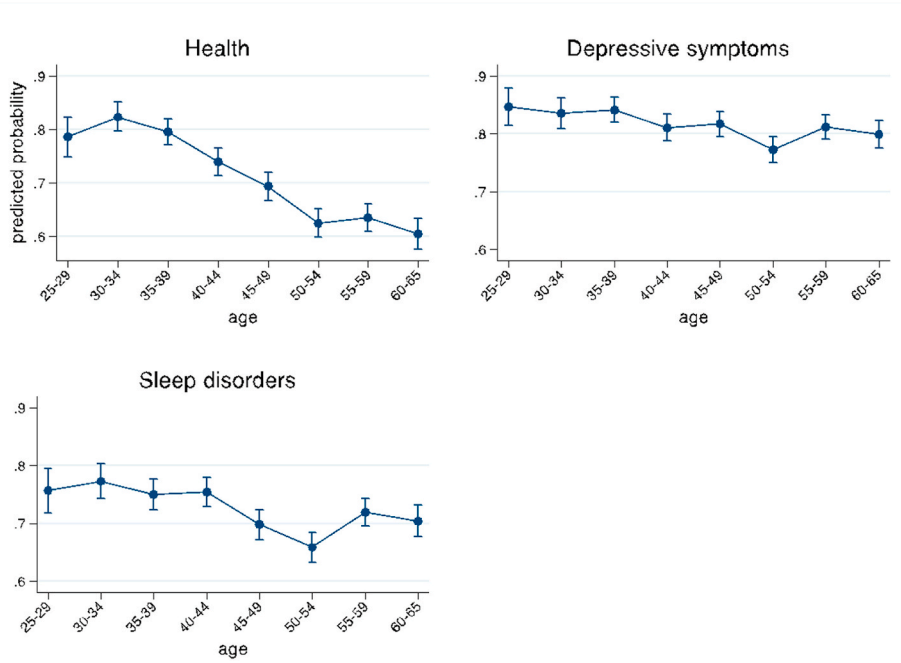

Fig. A1. Health across ageSource authors' elaboration of SIP data

Table A1
Number and timing of dissolutions and health in 2010, including mediating factors. Odds ratios resulting from logistic models.

	General health		Depressive symptoms		Sleep disorders	
VARIABLES						
Female	0.898*	0.95	0.542***	0.582***	0.616***	0.629***
	(.813-.991)	(.862–1.060)	(.481-.611)	(.511-.654)	(.556-.681)	(.565-.696)
Age group	0.884***	0.935***	0.973*	1.024	0.961***	0.978
	(.862-.907)	(.907-.965)	(.944–1.002)	(.989–1.061)	(.936-.985)	(.948–1.009)
Tertiary education	2.363***	1.831***	1.768***	1.458***	1.579***	1.434***
	(2.061–2.709)	(1.578–2.125)	(1.511–2.068)	(1.229–1.729)	(1.384–1.801)	(1.251–1.666)
Secondary education	1.380***	1.192**	1.237**	1.144	1.189*	1.132
	(1.202–1.585)	(1.032–1.378)	(1.051–1.455)	(.969–1.362)	(1.033–1.368)	(.978–1.309)
Father higher education	1.261*	1.262*	1.023	1.025	0.952	0.957
	(1.021–1.556)	(1.015–1.569)	(.813–1.287)	(.809–1.298)	(.786–1.151)	(.787–1.163)
Num. children	0.932**	0.940**	0.903***	0.911***	0.933**	0.941**
	(.895-.970)	(.901-.979)	(.862-.945)	(.869-.955)	(.895-.972)	(.903-.981)
High income		1.894***		1.485***		1.265**
		(1.624–2.209)		(1.240–1.779)		(1.086–1.473)
Mid income		1.306***		1.175*		1.214**
		(1.152–1.482)		(1.015–1.359)		(1.064–1.377)
Employed		1.579***		1.496***		1.187***
		(1.394–1.788)		(1.295–1.728)		(1.048–1.349)
In a partnership		0.955		1.094		0.858
		(.795–1.147)		(.890–1.343)		(.717–1.027)
Social network		1.601***		1.942***		1.337**
		(1.344–1.906)		(1.613–2.339)		(1.121–1.597)
One dissolution, <5 y	0.999	1.019	0.521***	0.601**	0.706*	0.639**
	(.714–1.396)	(.694–1.495)	(.376-.722)	(.409-.884)	(.522-.954)	(.451-.906)
One dissolution 5–10 y	0.862	1.070	0.628***	0.779	0.631***	0.616***
	(.703–1.058)	(.836–1.371)	(.503-.783)	(.594–1.021)	(.519-.767)	-(.487-.778)
One dissolution, >10 y	0.738***	0839*	0.721***	0.830*	0.741***	0.745***
	(.651-.838)	(.717-.982)	(.622-.835)	(.691-.997)	(.652-.842)	(.638-.870)
2+ dissolutions, last <5 y	0.554***	0.648**	0.303***	0.398***	0.410***	0.393***
	(.416-.736)	(.463-.907)	(.228-.404)	(.281-.565)	(.312-.540)	(.285-.543)
2+ dissolutions, last 5-10 y	0.723*	0.910	0.608**	0.792	0.740*	0.755
	(.532-.982)	(.652–1.270)	(.432-.855)	(.545–1.151)	(.543–1.007)	(.542–1.051)
2+ dissolutions, last >10 y	0.716**	0.834	0.609***	0.776	0.619***	0.625***
	(.562-.911)	(.638–1.089)	(.463-.794)	(.573–1.050)	9.486–.787)	(.481-.812)
Constant	1.660***	2.249***	1.637***	0.523***	0.981***	1.141***
	(0.101)	(0.118)	(0.101)	(0.186)	(0.209)	(0.186)
Observations	8195	8195	8199	8195	8195	8195

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