Residential mobility and suicide in Belgium: understanding the role of union transitions and life stages

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ABSTRACT

Using Belgian administrative datasets (National Register, Census, and death certificates) on individuals aged 20–64 (N=7,246,740 individuals and 4,109 suicides), the study examined the association between mobility and suicide in the context of union transitions and different life stages. Using Cox proportional hazard models, we found that, in general, moving was associated with an increased risk of suicide than immobility, except for moves in the context of union transitions. Additionally, results highlighted that union dissolutions were associated with a higher risk of suicide – regardless of residential mobility. Moreover, mobility (compared to immobility) for individuals who were in stable situations (single or partnered) or who were in their mid-adulthood was associated with higher risks of suicide. Finally, middle-aged adults (aged 40–54) presented higher suicide risks in all cases of residential mobility, including if accompanied by union transitions.

Keywords: suicide; residential mobility; union transitions; life stages; Belgium.

1. Introduction

In recent decades, suicide has been one of the leading causes of death among the young and middle-aged European population and the seventh for adults aged 50–64 (*GBD Compare, 2017*). In 2015, Belgium showed the fifth highest suicide rate in Europe, with about 17 suicides per 100,000 inhabitants (while the EU-28 average is 11). Understanding the determinants of suicide, precisely the relation between life-course events and suicide is worth scientific interest.

There is little knowledge about the link between internal migration and suicide risk, especially for working-age populations. Scientific literature has highlighted that residential moves were challenging life changes associated with mental health struggles (Oishi, 2010; Oishi & Schimmack, 2010), but a study showed lower suicide risks for movers than non-movers (Hagedoorn & Helbich, 2022). The consequences of mobility on individual trajectories and life satisfaction depend on its context, its emergency level, the financial constraints, and the lifestyle changes it implies. Literature on the topic is still scarce, and

the few existing articles omit considering the life course context of the move regarding union transitions and age.

This study investigates the relationship between residential mobility within Belgium and the risk of suicide in the working-age population. It unravels the role of the union transitions (dissolution, formation, no union, union stability) and life stage (younger, middle-aged, and older working-aged populations) on the relation. This research benefits from high-quality administrative datasets, including the Belgian National Register, 2001 and 2011 Census, and death certificates, following the population registered in Belgium between 2008 and 2015.

2. Literature review

2.1. Mobility and mental health

Internal migrants reported more health issues than non-migrants (Larson et al., 2004). To understand the relationship between mobility and suicide, we will extend the literature review to other mental health outcomes, such as depression and self-assessed life satisfaction. Indeed, pre-existing mental health struggles and suicidal behaviours are major suicide determinants (Conejero et al., 2018). For children and teenagers, residential mobility is associated with poorer mental health outcomes (Tseliou et al., 2016). For adults, the literature is scarcer. Migrants report being less happy than locals and feeling isolated and unsatisfied by their social environment (Hendriks et al., 2016). Migrants tend to be less involved in social networks and activities that promote well-being, health, and mental health (Hendriks et al., 2016). However, the literature nuances the possible effect of mobility on mental health. A reverse causation exists: poor physical and/or mental health can affect residential mobility (Morris et al., 2018). Movers are generally younger and healthier than non-movers (Norman et al., 2005). Some can move when their health requires them to get closer to (un)professional support or to find a more affordable residence. Others can postpone a move because of health incapacities.

Residential mobility has mixed consequences on mental health, depending on context and motivation (Choi & Oishi, 2020; Oishi & Schimmack, 2010). According to the *familiarity-liking theory,* moving and adapting to a new environment requires individuals to leave their comfort zone and change their habits and lifestyle (Magdol, 2002; Oishi & Talhelm, 2012). It can imply a break in social ties, a disruption in belonging to a neighbourhood and being socially included. The damaging effect can be reduced if one disposes of high social capital not tied to the place of living, a high income and a mobility history (Oishi, 2010; Stanley et al., 2012). But on the one hand, mobility is an essential asset for individuals' development. It can create new professional and personal opportunities by giving more job possibilities (especially for men: Mulder and Van Ham, 2005), improving interpersonal skills, and enlarging the social network (Oishi, 2010), as well as bringing one closer to non-resident family members (Mulder, 2018; Mulder and Wagner,

2010). Moving to accede homeownership is associated with more positive mental health outcomes than moves associated with homeownership loss (Wood et al., 2023). Also, places carry symbols and memories, including traumatic elements (Trigg, 2009), and mobility can help move on from the past.

In the Netherlands, a change of neighbourhood is associated with a lower suicide risk than immobility among the 20–64-year-old population (Hagedoorn & Helbich, 2022), especially if a neighbourhood quality improvement accompanies the move. However, the Belgian context differs from the Netherlands in one important aspect. Belgium's housing market is static, contrary to other countries such as the Netherlands. The Belgian housing system presents incentives for construction, encourages homeownership, residential stability, and immobility, and provides short rental provisions. Private individuals acquire new properties early in life and modify their homes rather than move out. The number of real estate transactions is minimal because they are costly. Homeownership is an asset for households, thanks to the rising property prices, but access is difficult for low-income families (De Decker et al., 2017; van der Heijden et al., 2011). Thus, the results observed in the Netherlands might differ from those in Belgium. If mobility can be considered a solution to an unsatisfactory living environment in the Netherlands, mobility is associated with high costs in Belgium and is often avoided, if possible.

> *Hypothesis 1: Mobility is associated with higher suicide risks than immobility in Belgium.*

2.2. Mobility and union transitions

Residential mobility often happens hand in hand with other life changes, such as union transitions, parenthood, job losses or professional changes. Union dissolution is a common reason to move. In parallel, a marital or non-marital union dissolution is detrimental to mental health (Switek and Easterlin, 2018; Næss et al., 2015), as shown by several measures (antipsychotics consumption rates: Metsä-Simola and Martikainen, 2014; depression: Tosi and van den Broek, 2020; suicide: Evans et al., 2016). A separation is a synonym of short-term and long-term changes, which can impact well-being and life satisfaction. Men are more vulnerable to short-term consequences of union dissolutions (e.g. loss of social ties) than women (Leopold, 2018). In the longer term, women have to face a higher risk of poverty and single motherhood, possibly affecting their mental health for a longer time (Conejero et al., 2018; Leopold, 2018; Stack, 1982). In addition, there is a selection effect: people predisposed to poor mental health also have a higher risk of having a more chaotic personal life and separating more frequently (Amato, 2000).

After a separation, in most cases, at least one of the two ex-partners will quickly move out of the shared home. Compared to being single or married, being separated or divorced is associated with an increased risk of residential mobility, which peaks at separation and decreases over time (Kulu et al., 2021). In Belgium, separated individuals remain at risk of moving for a long time – more than a year – after the union dissolution

(Kulu et al., 2021). The decision of who moves and stays in the previously shared place can rely on contextual factors. In Belgium, the legal framework does not encourage any party to leave or remain in the shared place. One will likely move if they do not have enough financial means to afford those costs (Mulder & Malmberg, 2011; Mulder & Wagner, 2010). Studies in Belgium confirmed women's higher risk of moving after separation, especially among the lower-educated ex-couples (Theunis et al., 2018). Beyond that, the decision of who moves masks the decision process of the separation. We can think that the person who decides to break up is likely to be the person who moves out of the shared place because they are more ready to leave the relationship or because they plan to join a new partner (Kolodziej-Zaleska & Przybyla-Basista, 2020). Women tend to initiate separations more often than men (Hewitt et al., 2006).

In theory, moving after a union dissolution appears to be more challenging than staying in the previously shared place. First, the new residence is often temporary, found urgently, and with fewer resources and temporary (Feijten & Van Ham, 2007). In many cases, it can be considered an unwanted migration, triggering frustration and low life satisfaction (Oishi & Schimmack, 2010; Warner & Sharp, 2016). Separated individuals can expect to lose some financial resources and, by extension, housing quality and their homeowner status (Lersch & Vidal, 2014). Homeownership is associated with a lower risk of suicide (Damiens & Schnor, 2022), as well as a higher level of housing stability (Fowler et al., 2015; Vásquez-Vera et al., 2017), housing comfort (Jiang et al., 2021) and a better-quality neighbourhood (Cairns et al., 2017). Also, due to the possibly conflictual climate surrounding a union dissolution and the redefinition of the family unit, separation-driven moves can damage a person's social network and trigger social isolation (Coulter & Van Ham, 2013; Oishi, 2010). For parents, moving can be detrimental to their relationship with their children, especially for those with no custody of the minor children (Ferrari et al., 2019). In Belgium, the number of divorces per 1,000 marriages has risen over the last decades (Eurostat, 2021) and divorce rates have been higher than the EU average since the early 1980s. This is accompanied by increased non-marital cohabitation (Statistics Belgium, 2020), which is considered less stable than marriages (Andersson et al., 2017). The demand for housing has thus increased, making it difficult for recently separated individuals and parents to find a decent and affordable place (Biotteau et al., 2019; Feijten, 2005).

Mobility can also mark the start of a new cohabitation. This facet of mobility is less studied. Still, it was shown that, in heterosexual relationships, women were more prone to join their male partner's residence (Brandén & Haandrikman, 2019). Within existing couples, mobility is often associated with the evolution of family life, such as marriage, pregnancy, or accession to homeownership (Michielin & Mulder, 2008). It can be associated with increased wealth. In general, the mobility of a couple is associated with more positive outcomes for men than for women, as the man's professional career often triggers the couple's mobility (Brandén, 2014; Cooke, 2008). For unpartnered individuals, mobility can have many motivations, such as a professional change or the development of the housing career, by acceding to homeownership.

Hypothesis 2: The association between residential mobility and suicide depends on the context of the partnership. In the context of union dissolution, mobility is associated with increased suicide risk compared to immobility. In the context of a union formation or no union change (single and partnered individuals), moving is not associated with a higher suicide risk than immobility.

2.3. Life stage and mobility

Life events do not carry the same social significance at different ages. Young adults are also the most mobile population (Bernard et al., 2014), partly because unions are often shorter and less stable than later in life (Halpern-Meekin et al., 2013). In their twenties and thirties, young adults undergo experimentation, where cohabiting unions are used as transitory periods (Bernard et al., 2014; Bulloch et al., 2017; Sassler, 2010).

To a lesser extent, mobility is also expected from older adults who approach (pre-) retirement, aged 55 and older, as professional obligations start to disappear. "Grey" divorces, or separations at ages 50 and older, have increased over the last decades (Brown & Lin, 2012). Also, personal life events, family members' situations (children having themselves children, etc.), health issues, and unsatisfactory or inappropriate housing conditions (Begley & Chan, 2022; de Jong & Brouwer, 2012; Hansen & Gottschalk, 2006) can trigger mobility at that life stage. On the other hand, older adults present more resilience than younger populations when facing adverse life events, as their years of experience give them better emotional regulation (Mirowsky & Ross, 1992; Perrig-Chiello et al., 2015).

For middle-aged adults, residential changes are less searched, as adults in their forties and fifties are traditionally expected to be settled down (Kohli & Künemund, 2005). After the thirties, "immobility seems to be the norm" (Coulter & Van Ham, 2013). Divorce or separation is costly in this life stage, as partnerships have a more significant implication on the individual's life regarding social and emotional links, resources, finances, and everyday life maintenance (Amato, 2000). Middle-aged adults in their forties and early fifties are likelier to go through divorce and separation, blended family reconstruction, financial problems and income variations, parental tasks, professional challenges and caretaking older family members (Koo et al., 2017). All those elements can lead them to difficulty finding a new residential equilibrium (Coulter & Van Ham, 2013).

Hypothesis 3: Mobility is associated with higher suicide risk than immobility for middle-aged adults aged 40 to 54 compared to younger and older populations.

3. Data & Method

3.1. Datasets

The datasets used in this paper result from the coupling of several pseudo-anonymised administrative databases. First, the National Register gives information about people's demographics, living place and household configuration. It allows us to reconstruct union transitions and residential mobilities with their exact dates. Then, death certificates provide information about mortality causes following the 10th International Classification of Diseases (ICD). Finally, socioeconomic information, including educational attainment, occupational status, housing tenure and municipal Belgian Multiple Deprivation Index (BIMD), is derived from the 2011 Belgian Census. For people who died before 2011, socioeconomic information was retrieved from the 2001 Census. Our sample covers the whole population registered in Belgium for at least one year between January 1st 2008, and January 1st 2015. We concentrate on the adult population aged 20 to 64 due to the specificity of younger and older populations' suicide determinants. Unlike more seniors, working-age adults are less exposed to extreme isolation due to their work activities and greater independence. For young people under 20, as they most often live with their parents, their mobility patterns are not considered in this study. Our primary analytical sample includes 3,637,761 men and 3,608,979 women.

3.2. Variables

Suicide is here considered as all types of intentional self-harm that led to death, i.e. all deaths categorised as X60 to X84 and Y87.0-87.2 according to the 10th ICD. The definition of suicide here includes all death that was self-intended with certainty, whether this is the primary or underlying cause of death. Suicide is a rare event. In our sample, we count 29,025 deaths for men, including 2,944 suicides and 18,643 deaths for women, including 1,165 suicides.

We define mobility by any registered change of residence, including in the same municipality. In Belgium, information about residential change is reliable, as updating the residence address at the municipal offices is mandatory and required for many administrative procedures (e.g. using a bank account, getting refunded for healthcare). Multiple moves during the observation period are considered.

We define marital and nonmarital separation through physical separation. Between two years, if at least one of the partners changes household identifiers and the two partners have different household identifiers, the couple no longer lives together and is separated. On the contrary, a couple is formed when two unrelated individuals start to share a common residence if their age difference is smaller than 16 years and no other unrelated adult lives with them. Once the individual goes through a union transition, this status (union formation or dissolution) is attributed to them until another change of residence or union transition occurs. Multiple union transitions over the observation period are then considered.

We control for age as time-varying information. Specific analyses present the interaction between mobility and life stages defined by large age groups: 20 to 39-year-old, 40 to 54-year-old and 55 to 64-year-old populations. We also control parental status (living with children, not living with children), which can change over time and the region of residence. The cultural and socioeconomic differences between Flanders, Wallonia and Brussels-capital regions can affect partnership, mobility dynamics, and mental health policies. If a move happens, the region of origin is included in the models, but the region of destination will be associated with the next event. Citizenship is considered: it can impact the union transitions and the mental health trajectories. We also controlled for socioeconomic characteristics such as educational attainment, occupational status, housing tenure and the BIMD. The BIMD is a multidimensional estimation of the deprivation level of the municipality based on housing, employment, education, income or crime (Otavova et al., 2023). The BIMD varies over time only if the individuals change municipalities of residence. We added information on the possible stagnation, rise, or decrease of the BIMD over time. In case of no mobility, no change of municipality, or a move between two municipalities that belong to the same deciles, we assigned a stagnation of the BIMD. For all four socioeconomic variables, we get information at the time of the Census; it might not be exact at the time of the suicide.

3.3. Event history analysis

Event history analysis helps control for the time of exposure of individuals before an event occurs. Individuals become at risk and enter (or re-enter) observation as soon as they are registered in a Belgian municipality, at least a year between 2008 and 2014, and when they turn 20. Apart from the main outcome, suicide, other censoring events could then be considered, such as death from other causes, international outmigration, or deregistration for unqualified reasons. We use Cox proportional hazard models (Cox, 1972) to estimate the hazard of dying of suicide:

$$h(t, X) = h_0(t)\, exp\left(\sum_{i=1}^{p} \beta_i X_i\right)$$

where $h_0(t)$ is the baseline hazard at the beginning of the observation, X is the vector of the p covariates of the model and β are the regression coefficients. Assumptions of proportional hazards were tested with all the covariates and were validated. Full non-adjusted and adjusted models are displayed in Appendix (Tables A1–2)

A stratification by age group was carried out to evaluate whether the relationships between mobility, union transitions and suicide differed across different age groups. As we cannot rule out the possibility that the relationship between our covariates and suicide is similar from one age group to another, we preferred analysing the stratification effect over an interaction effect (Mood, 2010). For instance, childless women in their reproductive years are associated with poorer well-being (Graham, 2015) and higher suicide

risk (Stack, 1982, 2000), but the trend is reversed from age 55 (Graham, 2015; Hank & Wagner, 2013). Full models by age groups are displayed in Appendix (Table A3).

As we work with population data, i.e. exhaustive data, and not on a representative survey, inferential statistics tools will be displayed through 95% confidence intervals in tables and figures, but they will not be strictly interpreted. Instead, substantial significance will be preferred (Bernardi et al., 2017). We suggest a significance threshold: two estimates are considered significantly different if less than 20% of their confidence intervals overlap.

The robustness of the results is confirmed with sensitivity analyses. Younger to middle-aged adults' mortality is rare and often associated with external causes, which can be interrelated with self-harm and suicide (e.g. drug-related or alcohol-related accidents). Assuming that suicide and other causes of death are independent might be problematic. We thus considered a competing risk to suicide: deaths from other causes (all causes except X60-84 and Y87-87.2) in Fine-Gray subdistribution hazard models (Fine & Gray, 1999). They are displayed in the Appendix (Table A4).

4. Results

4.1. Descriptive results

Young adults in their twenties present the highest mobility rates, with more than 50% of the population moving at least once during the observation period (Figure 1). From 30, this rate declines to reach a rate of 18% at age 64. Women aged 20 to 25 are slightly more mobile than men; from age 25, the trend is reversed.

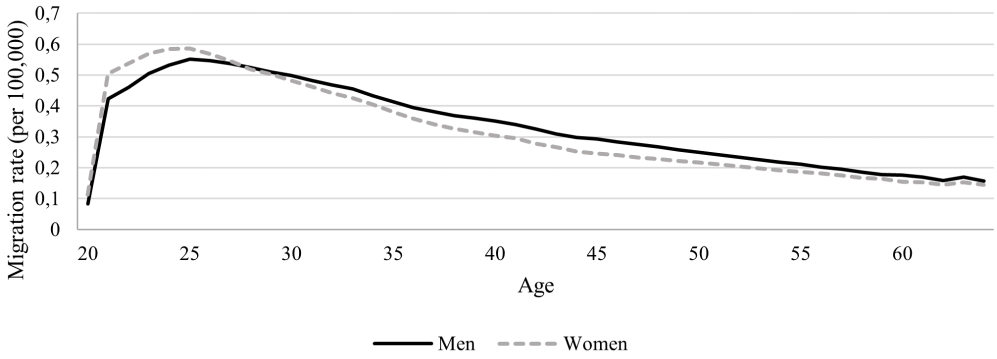

Figure 1 *Share of the population (per 100,000) aged 20 to 64 who moved at least once in 2008–2015, living in Belgium in 2008–2015, by age.*

Note: At age 25, we estimate that 55% of men and 59% of women will move within Belgium at least once during the 2008–2015 period.

Source: Belgium National Register 2008–2015. N= 3,637,761 men and N= 3,608,979 women (total population) observed for seven years.

During the observation period, 67% of the population did not move, while 22% moved once and 10% moved twice or more. Partnered individuals constitute 58% of the sample at the beginning of the observation period. These individuals in a partnership are less mobile than the general population: 71% did not move during the observation period. We observe that 14% of this population in a partnership will separate between 2008 and 2015. Mobility is more frequent among the separated or divorced population: 51% will move once, and 20% will move twice or more.

Figure 2 *Share (%) of the 20 to 64-year-old population living in Belgium who separated at least once in 2008–2015 and share (%) of the separated individuals who moved out at the separation by age.*

Note: At age 25, we estimate that 5% of men and 6% of women will go through at least one separation during the 2008 to 2015 observation period. Among those separations, still at age 25, we observe that 63% of men and 71% of women will move at the separation.

Source: Belgium National Register 2008–2015. N= 2,220,767 and N= 2,325,092 (in a marital or non-marital relation) observed for seven years for A/ and N= 373,791 men who separated and N= 350,269 women who separated for B/.

The separation rate drastically rises in early adulthood, peaking at 30. It remains relatively high during the thirties, decreases during the forties, and more dramatically in the fifties, until a separation rate of 3% for men and 2% for women at age 64 (Figure 2-A). We notice that female separation trends are higher than men's in early adulthood and lower than men's from 30. This can be explained by women being generally younger than their male partners. Regarding mobility behaviours after separation, younger adults tend to move at separation more often than older adults (Figure 2-B). This can be due to the housing tenure according to age. In Belgium, personal homeownership (that excludes homeownership of the parental housing) is low before 30, then rises to reach a rate of 70% at age 40. Sex-wise, young women tend to be more mobile at separation than men before 40; then, trends are the opposite.

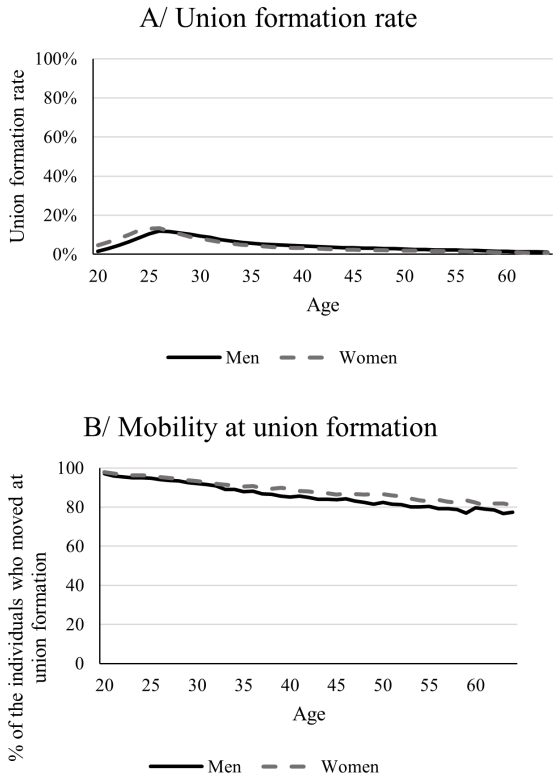

Figure 3 *Share (%) of the 20 to 64-year-old population living in belgium who formed a union at least once in 2008–2015 and share (%) of the individuals who moved at the union formation by age*

Note: At age 25, we estimate that 12% of men and 13% of women will form at least one union during the 2008 to 2015 observation period. Among those union formations, still at age 25, we observe that 96% of men and women will move at the moment of the union formation.

Union formation rates increase during the early twenties and peak at age 25 for women and 26 for men (Figure 3). They decrease until the late sixties, reaching lower points than in the early twenties, especially for women. With age, mobility at union formation decreases for both men and women, but it remains frequent. The high mobility rate observed among younger adults in Figure 1 is partially explained by their regular union formations and the high probability of moving when they form a partnership.

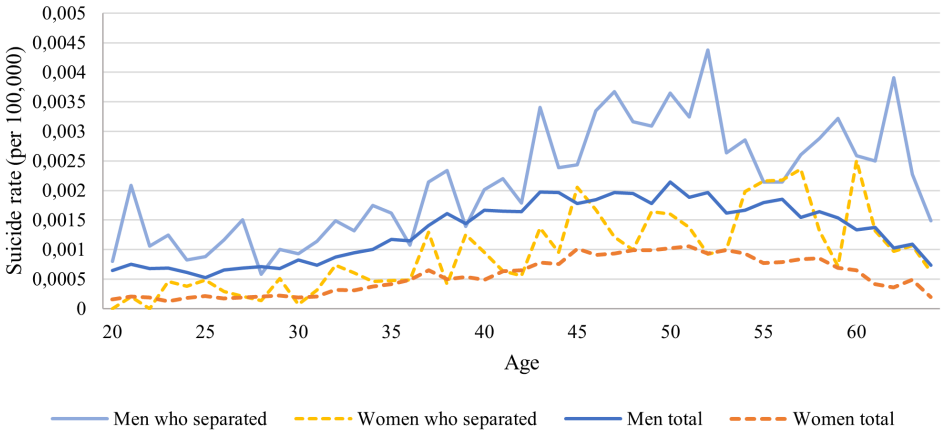

Figure 4 *Suicide rates per 100,000 of the 20 to 64-year-old population living in Belgium in 2008–2015 for the general population (total) and for the people who separated at least once during the observation period.*

Note: At age 25, we observe a suicide rate of 5 per 100,000 for men and 2 per 100,000 for women. For men aged 25 who separated during the observation period, this suicide rate reaches 9 per 100,000, while for women aged 25 who separated, it reaches 5 per 100,000.

Source: Belgium National Register and death certificates, 2008–2015. N= 3,637,761 men and N= 3,608,979 women (total population) observed for seven years, including N= 2,220,767 and N= 2,325,092 (in a marital or non-marital relation).

For people aged 20 to 64, suicide risk is low in young adulthood, increases progressively, peaks around age 50 (at 21 per 100,000 for men and 10 per 100,000 for women) and decreases until the late fifties and early sixties (Figure 3). The suicide rate is higher for men than for women. For men and women who separated at least once during the observation period, rates of suicide are higher than for the general population.

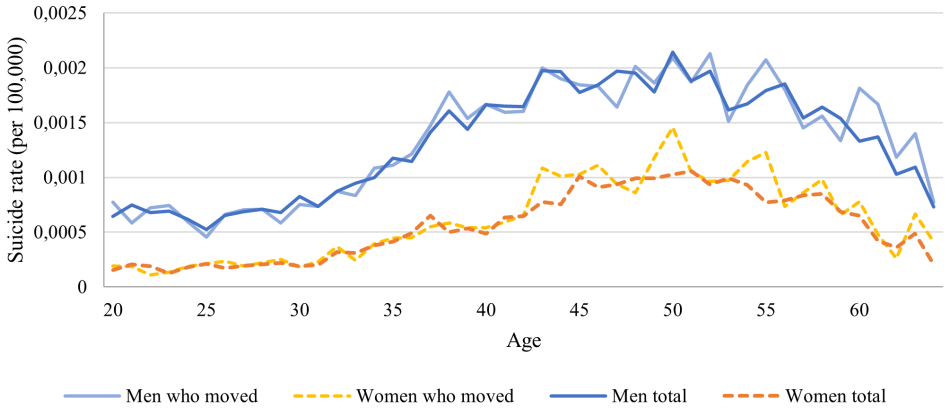

Figure 5 *suicide rates (per 100,000) of the 20 to 64-year-old population living in Belgium from 2008 to 2015 for the general population (total) and for the people who moved (within Belgium) at least once during the observation period.*

Note: at age 25, women present a suicide rate of 2 per 100,000, no matter whether they moved or not during the observation period.

Source: Belgium National Register and death certificates, 2008–2015. N= 3,637,761 men and N= 3,608,979 women (total population) observed for seven years

Individuals who move within Belgium follow suicide trends that are very close to the general population (Figure 4). For women aged 40 to 55, suicide trends are slightly higher for mobile individuals, while for men, this somewhat higher suicide rate for mobile individuals shows up later, from age 55.

4.2. Mobility and suicide

Table 1 presents the results of the Cox proportional hazard models according to the mobility status (moved at least once or did not move) of the individuals during the observation period.

Table 1 *Hazard ratios of suicide (Cox proportional hazard models) and 95% confidence intervals of men and women (aged 20 to 64), according to mobility status.*

		Men			Women		
		HR	IC95%		HR	IC95%	
	Migration (ref. No)	1.31	1.22	1.41	1.44	1.29	1.62
Age group (ref. 20-24)	25–29	0.77	0.68	0.88	0.81	0.63	1.03
	30–34	0.94	0.83	1.07	1.15	0.91	1.45
	35–39	1.22	1.09	1.38	1.71	1.38	2.12
	40–44	1.39	1.24	1.56	1.93	1.57	2.37
	45–49	1.20	1.07	1.34	2.33	1.91	2.84
	50–54	1.01	0.89	1.13	1.83	1.49	2.24
	55–59	0.68	0.60	0.78	1.06	0.85	1.33
	60–64	1.01	0.85	1.20	1.36	1.01	1.83
	Separation during the observation period	1.79	1.64	1.95	1.76	1.53	2.03
	Living with children	0.95	0.90	1.01	0.75	0.68	0.82
Region (ref. Flanders)	Wallonia	1.17	1.09	1.26	1.11	0.99	1.25
	Brussels	0.71	0.62	0.81	0.80	0.66	0.97
Nationality (ref. Belgian)	Other European	0.69	0.60	0.78	0.51	0.40	0.64
	Non-European	0.24	0.18	0.33	0.14	0.08	0.27
Educational level (ref. Pimary)	Lower Secondary	1.29	1.16	1.42	1.58	1.32	1.88
	Upper Secondary	1.11	1.00	1.23	1.54	1.30	1.83
	Higher	0.71	0.64	0.80	1.45	1.21	1.75
	Unknown	0.84	0.72	0.97	1.19	0.93	1.52
Occupational status (ref. Unemployed)	Inactive	1.46	1.30	1.64	1.63	1.36	1.96
	Self-employed	0.87	0.78	0.98	0.82	0.68	0.99
	Sel-employed	1.05	0.92	1.20	0.99	0.76	1.28
	Unknown	0.57	0.41	0.78	0.60	0.32	1.16
Housing tenure (ref. Tenant)	Owner	0.73	0.68	0.78	0.69	0.63	0.76
	Unknown	0.73	0.60	0.88	0.92	0.68	1.25
Deciles of multiple deprivations (ref. 1st)	2nd	1.10	0.99	1.21	1.08	0.92	1.27
	3rd	1.13	1.00	1.26	0.91	0.75	1.09
	4th	1.11	0.98	1.24	1.05	0.87	1.26
	5th	1.16	1.02	1.31	0.93	0.76	1.14
	6th	1.15	1.01	1.30	1.05	0.86	1.27
	7th	1.15	1.00	1.32	0.90	0.71	1.13
	8th	1.17	1.03	1.33	0.95	0.77	1.18
	9th	1.12	0.98	1.29	0.98	0.78	1.23
	10th	1.03	0.89	1.20	1.06	0.84	1.33
Evolution of deciles	Rise	1.05	0.92	1.21	0.84	0.66	1.07
	Loss	1.16	1.01	1.32	0.85	0.67	1.08
	Unknown	1.98	0.94	4.19	7.69	1.91	31.00
	Log-likelihood	-70342.72			-26778.32		

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.

Individuals who moved present a higher suicide hazard (HR=1,31 for men and 1,44 for women) than those who did not (Table 1). Middle-aged adults present a higher suicide hazard than younger and older age groups. Parenthood is associated with lower suicide risk only for women. In terms of other characteristics, living in the Brussels region and being a foreigner are associated with lower hazards of suicide. Compared to a low educational level, having a higher education is associated with a lower suicide risk for men and a higher suicide risk for women. Being unemployed is associated with higher suicide risks than being employed but lower than being inactive. Homeowners are associated with lower suicide risks than tenants. The deciles of municipality deprivation level are not associated with suicide risk. Still, the decrease in the municipality index of multiple deprivations during a move is associated with a slightly higher suicide risk than its stagnation for men only. This result remains after controlling for the competing risk of dying from another cause (Appendix, table A.3).

4.3. Mobility, union transitions and suicide

Figure 6 presents Cox proportional hazard models according to the individuals' mobility status and union transition during the observation period (moved at least once or did not move). The non-adjusted models (Table A1) and fully adjusted models (Table A2) are presented in the Appendix.

Moving in the context of no union transition is associated with a higher suicide hazard than immobility (Figure 6). For men and women who remain partnered, a move is associated with higher suicide risks (HR=1,31 for men and 1,35 for women) than not moving and staying in the same union. Unpartnered single individuals show higher suicide risks than partnered and immobile individuals. Still, we can see that men who are single and mobile present higher suicide risks (HR=1,71) than men who are single and immobile (HR=1,41). The same trend appears for women (HR=1,62 for mobile unpartnered women and 1,32 for immobile unpartnered women). The confidence intervals surrounding these estimates do not overlap, making this difference significant. For individuals separating, both mobility and immobility are associated with comparably higher suicide risks (HR=2,20 for men and 1,92 for women) than the reference category, which is immobility for partnered individuals. Union formations are not associated with higher suicide risks than the reference category, whether the individual is mobile or not.

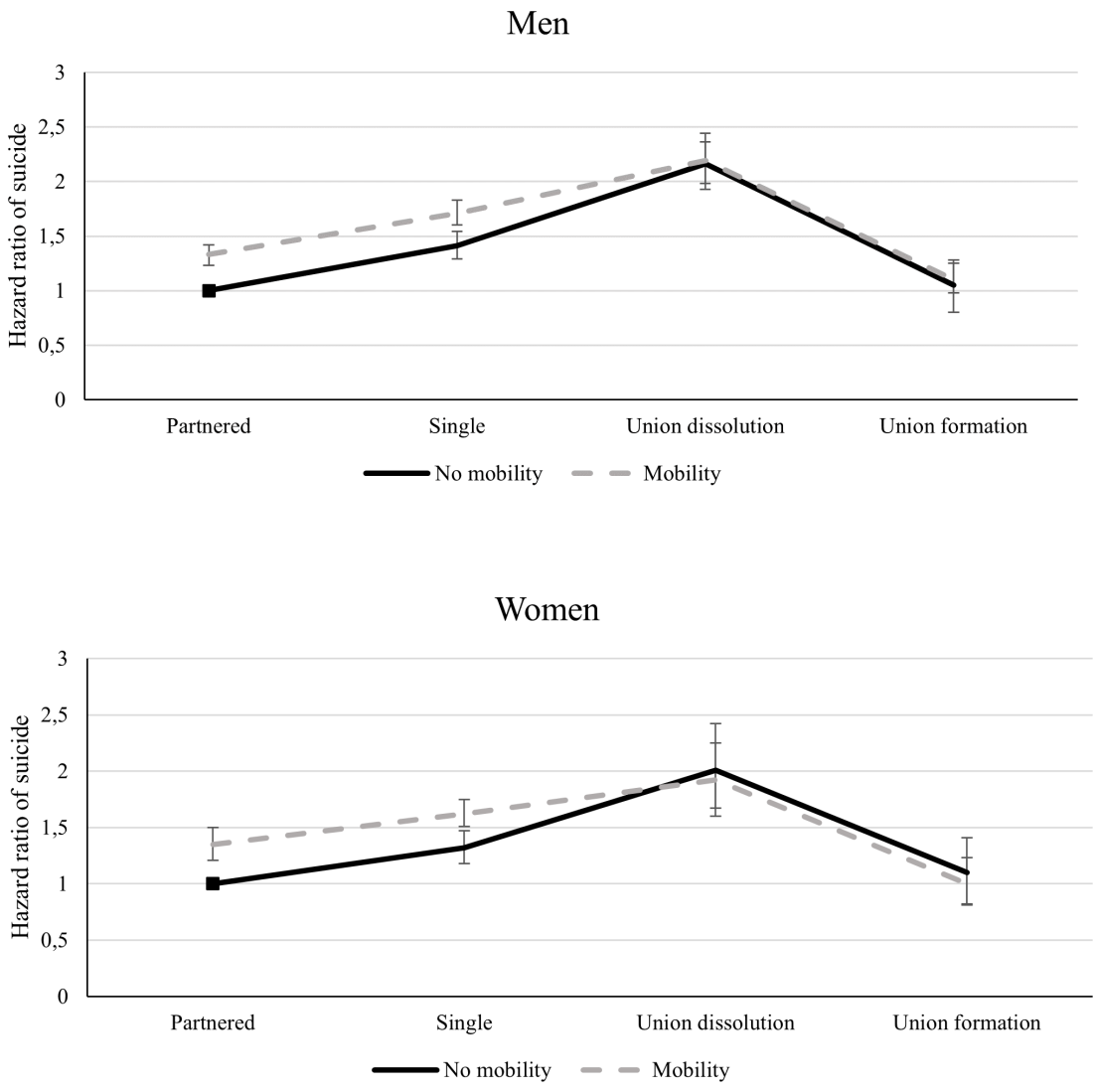

Figure 6 *Proportional hazard Cox regression on the risk of suicide, expressed in hazard ratio and confidence intervals at 95%. Model controls for age, parental status, region and area of residence (before the move), nationality, educational level, occupational status, housing tenure and BIMD.*

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.

Note: Estimates must be read compared to the reference category “no mobility, no transition during the observation period”.

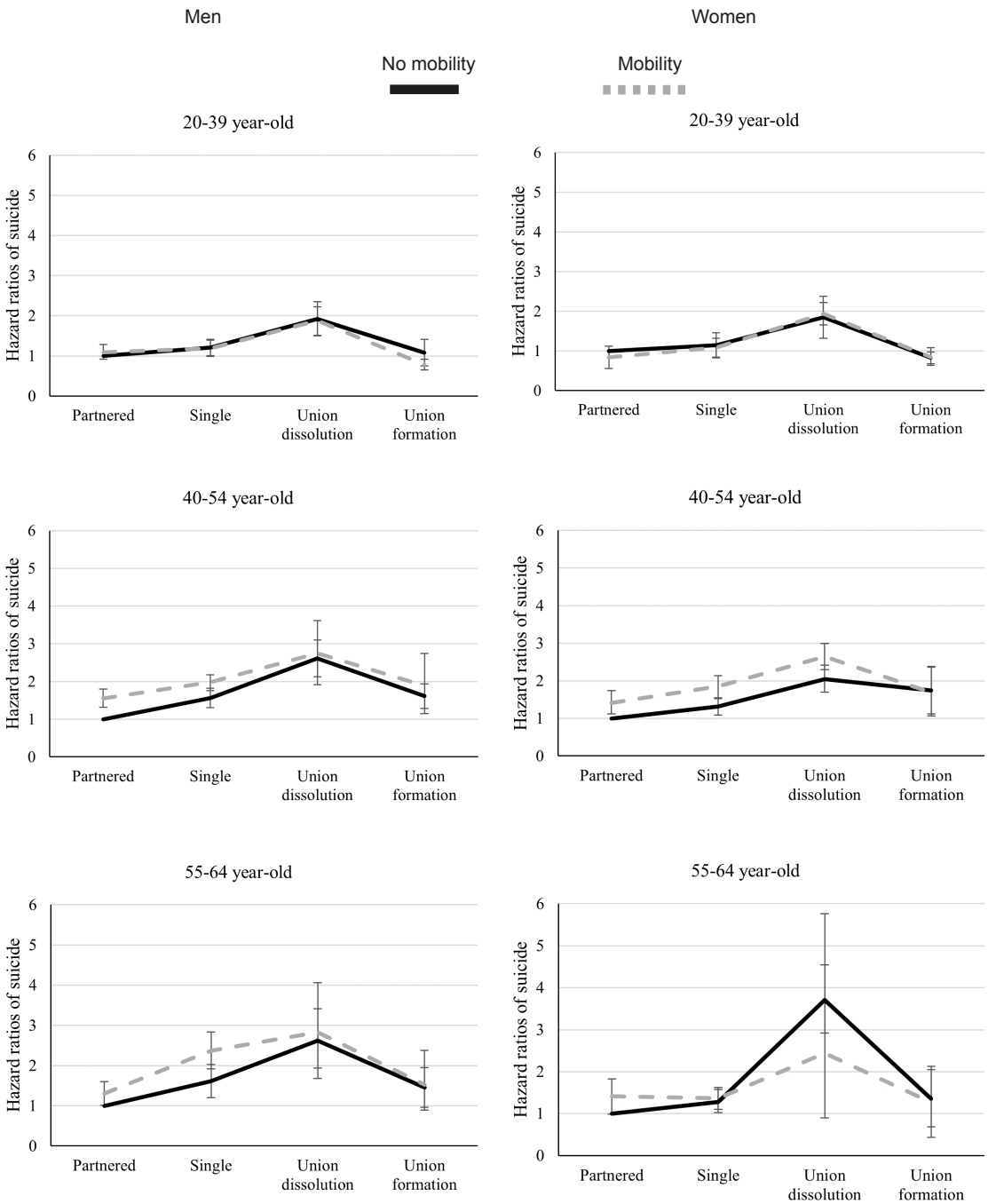

Figure 7 *Proportional hazard Cox regression on the risk of suicide, expressed in hazard ratio and confidence intervals at 95%, by age groups (20–39, 40–54, 55–64). Model controls for age, parental status, region and area of residence (before the move), nationality, educational level, occupational status, housing tenure and BIMD.*

Data source: National Register 2008-2015, Census 2001 and 2011, Death certificates 2008-2015.

4.4. Mobility, union transitions and suicide at different life stages

Figure 7 presents the hazard ratio of suicide according to union transitions and mobility patterns of individuals gathered in three age groups: 20–39, 40–54, and 55–64. Full models are presented in Appendix (Table A3).

Results by age groups show disparities (Figure 7). For younger adults aged 20 to 39, only mobility in the context of union dissolution presents higher suicide risks than the reference category (partnered, no mobility).

For middle-aged adults aged 40 to 54, all types of mobilities and transitions are associated with higher suicide risks than being partnered and immobile. For both sexes, moving while staying in the same relationship is associated with a higher suicide hazard (HR=1,50). Being unpartnered is associated with higher suicide risks than being immobile and partnered, but being single and mobile is associated with higher suicide risks (HR=1,98 for men and 1,85 for women) than being single and immobile (HR=1,56 for men and 1,32 for women). Less than 50% of the confidence intervals surrounding these estimates overlap, making this difference significant. For women, a union formation is associated with higher suicide risk (HR=1,70) than remaining partnered and immobile, regardless of whether the individual moves. For men, both mobility and immobility in the context of a union formation are associated with higher suicide risks than the reference category. For both sexes, union dissolutions are associated with the most increased suicide risks. When they separate, women in their mid-adulthood present a higher risk of suicide (HR=2,04) when they stay and a higher suicide risk (HR=2,64) when they move out of the previously shared place than the reference category. This higher risk of suicide for women aged 40 to 54 who move during a union dissolution can be considered significant according to our criteria.

For older active populations aged 55 to 64, union dissolutions are associated with higher suicide risks than remaining partnered and immobile. Men who move while remaining single are associated with a higher suicide risk (HR=2,37) than the reference category, while men who are single but immobile are associated with a higher suicide risk (HR=1,61). The confidence intervals allow us to confirm this difference.

5. Discussion

This study investigates the relationship between residential mobility and suicide risk in Belgium for adults aged 20 to 64 years, using administrative datasets (National Register, 2011 Census, and death certificates) that cover Belgium's entire registered population from 2008 to 2015. Using event history analysis, we follow individuals' residential and partnership trajectories and control for the time spent at risk of suicide.

5.1. First hypothesis: Mobility and suicide

Mobility is associated with a higher risk of suicide than immobility. This confirms our first hypothesis. Familiarity-liking theory can explain our findings: an individual's well-being and psychological state can negatively impact their lifestyle and habits (Magdol, 2002; Oishi & Talhelm, 2012). In addition, mobile individuals are more at risk of social isolation and withdrawal, at least temporarily (Oishi, 2010). Our results corroborate previous empirical studies showing a decrease in mental health outcomes for internal migrants (Hendriks et al., 2016). Still, they are not in line with a previous study about the relationship between neighbourhood changes and suicide in the Netherlands (Hagedoorn & Helbich, 2022). Belgium presents a static housing market, where homeownership is widespread, mobility is infrequent, and housing transactions are costly (van der Heijden et al., 2011). Thus, residential mobility is more challenging and demanding, resulting in different results from the more flexible Dutch context (Hagedoorn & Helbich, 2022).

5.2. Second hypothesis: Mobility, union transitions and suicide

Results confirm that mobilities in the context of union dissolution are associated with a higher risk of suicide and show that mobilities in the context of union formation are associated with lower suicide risks than no mobility. This relationship can be understood easily, as union dissolution represents a major suicide determinant. Separation is associated with higher risks of depression and suicide (Evans et al., 2016). Also, a reverse association can explain this result: the risk of union dissolution is higher for individuals predisposed to poor mental health (Amato, 2000). At separation, those who move and those who stay present close suicide risks, which can be explained by the active/passive role that someone has in the union dissolution. The person who leaves the shared housing face the struggles and challenges of the move; they might also be the one who decides to leave the relationship (Mulder & Wagner, 2010) and is thus more prepared to separate than the one who stays. Also, mobility can bring advantages and new opportunities (Mulder, 2018; Mulder & Van Ham, 2005; Trigg, 2009), such as physically disconnecting from the past relationship (Trigg, 2009). As men are likelier than women to enter a new union after a separation (Wu & Schimmele, 2007), living in another place might help them open a new chapter in their personal life. Future studies, e.g. qualitative studies, should focus on how individuals experience separation-driven moves and how they can impact their psychological, material and social well-being.

Second, findings show that both men and women do not present higher suicide risk when they move to form a union than when they do not move. We can assume that moves to form a partnership are associated with higher social links, at least within the household. Individuals in a union were shown to behave more healthily (regarding substance consumption, physical activity, and relation to healthcare services), to be more informed about health and to obtain better-coping mechanisms than unpartnered individuals (Brazeau & Lewis, 2021; Meyler et al., 2007).

Finally, mobilities in a context of no union change (for single individuals and stable couples) are associated with higher suicide risk than immobility, which nuances our second hypothesis. This is unexpected as couples migrate to improve their situation, accede homeownership, and adapt their housing to their family needs (Michielin & Mulder, 2008). However, suppose a couple's move implies that one individual is highly unsatisfied by the new situation, which often is the case for women (Cooke, 2008). In that case, this might deteriorate the well-being of the two partners (Meyler et al., 2007). For unpartnered people, residential mobility can be a challenging life event that triggers temporary social isolation, demanding life changes and adaptation skills (Coulter & Van Ham, 2013; Oishi, 2010). Third, we estimate that mobility is rare among single individuals or people in a stable relationship. This population might have fewer resources to face the demanding life changes associated with moves (Oishi, 2010).

5.3. Third hypothesis: Mobility, union transitions and suicide over three life stages

the relationship between mobility and mental health differs according to the life stages. Middle-aged categories (40–54) present the excess mortality due to suicide when mobile, compared to immobile, no matter the context of the move. Contrarily, for younger (20–39) and older adults (55–64), mobility is not associated with higher suicide risks than immobility, except for older partnered individuals and single men. Middle-aged adults are more attached to stability and immobility (Coulter & Van Ham, 2013) as they are likely involved in long-course financial agreements, such as marriages and mortgages. Mobility in this life stage might indicate a disruption in their life course, going against their quest for long-term relationships, career stability and access to homeownership. In the Belgian housing system, mobility is expensive and might be detrimental to individuals' resources and finances, especially for individuals already facing many expenses (De Decker et al., 2017; van der Heijden et al., 2011). In the context of union dissolution, moving is associated with higher risks of suicide than staying for women aged 40 to 54. Separation increases the risk of poverty for women in their childrearing years (Leopold, 2018). For single mothers and women in their forties and fifties, staying in the previously shared place might protect them from housing instability, from a considerable loss of housing conditions associated with a move and let them keep the family unit as intact as possible. Studies in Belgium confirmed women's higher risk of moving after separation, especially among the lower-educated ex-couples (Theunis et al., 2018). We can then assume that women who remain are more privileged than those who move. Moreover, women are likelier to have initiated the separation (Hewitt et al., 2006), all the more if they are the ones to move (Kolodziej-Zaleska & Przybyla-Basista, 2020). They are likelier to have anticipated it and suffered from unsatisfactory relations in the years before the separation.

5.4. Methodological reflections and limitations

Using administrative data offered many methodological advantages, such as the coverage of the whole population living in Belgium, the reconstruction of their residential and partnership transitions and information on their cause of death. However, other aspects cannot be considered with such data. Having more insight into the separation negotiations (e.g., division of the goods, children custody etc.) would help understand the role of housing in the association between union dissolution and mental health outcomes: how the place can anchor the relationship between the separated parents and the children or keep the memories of the past relationship. Future quantitative or qualitative studies would help cover this topic. Also, as suicide is a rare event, our results must be nuanced. Observed differences in suicide hazard between categories (e.g. between mobile and immobile people) would represent little differences in suicide numbers and survival benefits.

A significant limitation in our work is the impossibility of ruling out a selection bias. A predisposition to poor mental health would trigger a higher suicide risk and more instability regarding relationships, finances and housing career. No causal relation can be drawn from our conclusions. However, with the Fine-Gray subdistribution hazard model, we could replicate our models controlling for a competing risk to suicide, that is, death from other causes. Indeed, individuals diagnosed with mental illnesses present a higher rate of suicide than the general population but also a higher rate of all-cause mortality, including death associated with alcohol or drug abuse (Hällgren et al., 2019; Walker et al., 2015). Our results are robust to this alternative specification (Appendix, Table A4). This check could indicate that our results are not particularly biased by an excess representation of individuals suffering from mental disorders among the suicides we study; however, the relationship between mental health and mortality is complex, especially in the active population, where mortality remains a relatively rare event. Using information related to mental health – such as antidepressant consumption, as used by Hagedoorn and Helbich (2022) – would be a more effective way to show the causal nature of our interest relationships.

Conclusion

This is the first time that register-based data was used to investigate the relationship between residential moves, union transitions and suicide risk. Although mobility is a frequent event, often linked to other life changes, its implication on suicide has been very little studied previously. In Belgium, we show that mobility is associated with higher suicide risk than immobility for individuals who do not go through a union transition, stay in the same union or remain unpartnered. This is especially true for middle-aged adults in their forties and early fifties. However, mobility has a limited impact on suicide risks in the context of a union dissolution or formation. Union dissolutions are highly associated with suicide risks, whether the individual moves or not. Only women in their middle adulthood appear to benefit from staying in the previously shared place after a separation.

This observation might relate to Belgium's housing policies and market. Our findings and those of other countries where the housing market is more dynamic encourage a more flexible housing market that adapts to individuals' needs and life changes in Belgium and other countries. More numerous and affordable rental options and lower costs at real estate transactions are examples of policies that could make mobility more accessible and limit their negative consequences on mental health and suicide mortality.

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Appendix

Table A1 *Hazard ratios of suicide (Cox proportional hazard models) and 95% confidence intervals of men and women (aged 20 to 64), according to mobility status.*

	Men			Women		
	HR	IC95%		HR	IC95%	
Migration and transitions (ref. No mobility, partnered)						
Mobility, partnered	1,52	1,41	1,65	1,49	1,30	1,68
No mobility, unpartnered	1,44	1,27	1,59	1,15	1,03	1,27
Mobility, unpartnered	1,33	1,24	1,40	1,19	1,08	1,31
Union dissolution, no mobility	3,20	2,85	3,54	3,37	2,88	3,82
Union dissolution and mobility	3,04	2,75	3,33	2,69	2,25	3,14
Union formation, no mobility	1,22	1,08	1,38	1,17	1,00	1,35
Union formation and mobility	0,87	0,51	1,23	0,95	0,71	1,20
Log-likelihood	-144439			-56913,2		

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.

Table A2 *Hazard ratios of suicide (Cox proportional hazard models) and 95% confidence intervals of men and women (aged 20 to 64), according to mobility status.*

	Men			Women		
	HR	**IC95%**		**HR**	**IC95%**	
Migration and transitions (ref. No mobility, partnered)						
Mobility, partnered	1,33	1,23	1,42	1,35	1,21	1,50
No mobility, single	1,41	1,29	1,54	1,32	1,18	1,47
Mobility, single	1,71	1,60	1,83	1,42	1,25	1,60
Union dissolution, no mobility	2,16	1,93	2,36	2,01	1,67	2,42
Union dissolution and mobility	2,19	1,98	2,44	1,92	1,60	2,25
Union formation, no mobility	1,05	0,80	1,28	1,10	0,82	1,41
Union formation and mobility	1,10	0,98	1,25	1,00	0,81	1,23
Age categories (ref. 20–24)						
25–29	1,05	0,9	1,22	1,05	0,85	1,48
30–34	1,26	1,09	1,46	1,26	1,25	2,13
35–39	1,67	1,45	1,91	1,67	1,86	3,07
40–44	1,94	1,7	2,21	1,94	2,22	3,62
45–49	1,75	1,53	2	1,75	2,74	4,4
50–54	1,57	1,37	1,8	1,57	2,2	3,56
55–59	1,05	0,91	1,22	1,05	1,25	2,07
60–64	0,81	0,69	0,94	0,81	0,87	1,47
Parental status (ref. No)	0,88	0,84	0,93	0,88	0,61	0,73
Region (ref. Flanders)						
Wallonia	1,2	1,14	1,26	1,2	1,02	1,2
Brussels	0,72	0,65	0,79	0,72	0,73	0,98
Nationality (ref. Belgian)						
Other European	0,68	0,61	0,75	0,68	0,46	0,69
Non-European	0,21	0,15	0,28	0,21	0,09	0,28
Undetermined	0,55	0,24	1,24	0,55	0,02	0,37

Table A2 continued

Educational attainment (ref. Primary)						
Lower Secondary	1,04	0,96	1,12	1,04	1,1	1,4
Higher Secondary	0,96	0,89	1,04	0,96	1,08	1,38
Higher, tertiary education	0,62	0,56	0,68	0,62	1,02	1,34
Unknown	0,08	0,06	0,1	0,08	0,13	0,29
Occupational status (ref. Unemployed)						
Inactive	1,33	1,18	1,49	1,33	1,35	1,95
Employed	0,86	0,77	0,96	0,86	0,67	0,97
Self-employed	1,01	0,89	1,15	1,01	0,75	1,24
Unknown	0,54	0,4	0,74	0,54	0,29	1,05
Housing tenure (ref. Tenant)						
Owner	0,76	0,72	0,8	0,76	0,65	0,77
Unknown	0,65	0,55	0,77	0,65	0,38	0,62
BIMD deciles (ref. Most deprived)						
2th	1,11	1	1,23	1,06	0,89	1,23
3th	1,15	1,02	1,28	0,89	0,72	1,09
4th	1,09	0,97	1,28	1,02	0,85	1,23
5th	1,18	1,01	1,35	0,9	0,75	1,12
6th	1,15	1	1,3	1,07	0,89	1,29
7th	1,14	0,99	1,28	0,87	0,69	1,11
8th	1,13	0,97	1,26	0,89	0,75	1,14
9th	1,1	0,99	1,21	0,97	0,77	1,22
Least deprived	1,01	0,87	0,17	1,07	0,86	1,35
Unknown						
Evolution of deciles (ref. Stagnation)						
Rise	1,06	0,94	1,22	0,84	0,65	1,09
Loss	1,18	1,02	1,36	0,89	0,71	1,12
Unknown	2,02	0,9	4,38	7,65	1,89	31,12
Log-likelihood	**-67097.3**			**-22567.704**		

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.

Table A3 *Hazard ratios of suicide (Cox proportional hazard models) and 95% confidence intervals of men and women (aged 20 to 64), according to mobility status, by age groups.*

20–39 year-old	**Men**			**Women**		
	HR	**IC95%**		**HR**	**IC95%**	
Migration and transitions (ref. No mobility, partnered)						
Mobility, partnered	1,09	0,92	1,28	0,84	0,28	0,28
No mobility, single	1,21	1,01	1,41	1,15	0,33	0,31
Mobility, single	1,19	0,99	1,39	1,09	0,25	0,23
Union dissolution, no mobility	1,92	1,5	2,35	1,85	0,53	0,53
Union dissolution and mobility	1,88	1,51	2,22	1,94	0,28	0,28
Union formation, no mobility	1,08	0,75	1,41	0,83	0,15	0,14
Union formation and mobility	0,78	0,65	0,92	0,85	0,21	0,23
Parental status (ref. No)	1,03	0,93	1,14	0,71	0,59	0,84
Region (ref. Flanders)						
Wallonia	1,06	0,97	1,17	1,03	0,86	1,22
Brussels	0,56	0,46	0,69	0,68	0,5	0,94
Nationality (ref. Belgian)						
Other European	0,69	0,55	0,88	0,53	0,35	0,82
Non-European	0,32	0,22	0,47	0,18	0,08	0,42
Undetermined	1,53	0,65	3,6	0,01	0	0,15
Educational attainment (ref. Primary)						
Lower Secondary	1,23	1,01	1,51	1,34	0,87	2,05
Higher Secondary	1,09	0,9	1,33	1,15	0,76	1,72
Higher, tertiary education	0,55	0,44	0,68	0,87	0,57	1,34
Unknown	0,71	0,54	0,94	0,79	0,45	1,36
Occupational status (ref. Unemployed)						
Inactive	1,31	1,1	1,56	1,73	1,25	2,41
Employed	0,83	0,71	0,98	1	0,72	1,39
Self-employed	0,96	0,77	1,19	1,31	0,82	2,1
Unknown	0,7	0,44	1,12	0,21	0,03	1,51
Housing tenure (ref. Tenant)						
Owner	0,77	0,69	0,85	0,68	0,57	0,81
Unknown	0,84	0,61	1,15	0,81	0,44	1,5
BIMD deciles (ref. Most deprived)						
2th	1,15	1,06	1,27	1,08	0,91	1,2
3th	1,15	1,01	1,28	0,91	0,74	1,11
4th	1,1	0,97	1,29	1,02	0,84	1,23
5th	1,17	1,01	1,35	0,99	0,83	1,19

Table A3 continued

6th	1,15	1,02	1,31	1,08	0,9	1,3
7th	1,14	0,99	1,29	0,94	0,75	1,16
8th	1,15	0,98	1,27	0,87	0,73	1,11
9th	1,06	0,94	1,22	1	0,79	1,25
Least deprived	1,03	0,92	1,17	1,02	0,81	1,29
Unknown	3,25	0,66	5,85	4,89	0,89	8,96
Evolution of deciles (ref. Stagnation)						
Rise	1,06	0,94	1,22	0,92	0,71	1,15
Loss	1,18	1,02	1,36	0,93	0,74	1,15
Unknown	2,52	0,92	4,19	6,01	1,89	10,41
Log-likelihood	-23144,54			-7242,739		

40–54 year-old	**Men**			**Women**		
	HR	**IC95%**		**HR**	**IC95%**	
Migration and transitions (ref. No mobility, partnered)						
Mobility, partnered	1,55	1,32	1,80	1,41	1,12	1,74
No mobility, single	1,56	1,31	1,82	1,32	1,09	1,55
Mobility, single	1,98	1,76	2,18	1,85	1,52	2,14
Union dissolution, no mobility	2,61	2,12	3,10	2,04	1,70	2,41
Union dissolution and mobility	2,75	1,91	3,61	2,64	2,30	2,99
Union formation, no mobility	1,61	1,29	1,94	1,74	1,12	2,36
Union formation and mobility	1,89	1,15	2,74	1,69	1,07	2,38
Parental status (ref. No)	0,93	0,85	1,02	0,71	0,63	0,81
Region (ref. Flanders)						
Wallonia	1,16	1,06	1,26	1,08	0,95	1,23
Brussels	0,66	0,55	0,8	0,75	0,58	0,98
Nationality (ref. Belgian)						
Other European	0,69	0,57	0,82	0,52	0,37	0,71
Non-European	0,16	0,09	0,3	0,11	0,04	0,35
Undetermined	0,42	0,09	1,92	0,51	0,07	3,57
Educational attainment (ref. Primary)						
Lower Secondary	1,25	1,08	1,45	1,4	1,11	1,77
Higher Secondary	1,24	1,08	1,43	1,48	1,18	1,86
Higher, tertiary education	0,93	0,8	1,09	1,72	1,36	2,19
Unknown	0,93	0,76	1,14	1,28	0,93	1,78
Occupational status (ref. Unemployed)						
Inactive	1,45	1,22	1,72	1,63	1,27	2,09
Employed	0,95	0,81	1,11	0,81	0,63	1,04
Self-employed	1,12	0,93	1,35	0,93	0,66	1,31
Unknown	0,49	0,3	0,79	0,93	0,46	1,89

Table A3 continued

Housing tenure (ref. Tenant)						
Owner	0,73	0,66	0,8	0,74	0,64	0,85
Unknown	0,73	0,55	0,96	0,89	0,58	1,36
BIMD deciles (ref. Most deprived)						
2th	1,1	1,02	1,23	1,01	0,85	1,14
3th	1,17	1,02	1,31	0,9	0,73	1,11
4th	1,01	0,91	1,21	0,99	0,81	1,2
5th	1,15	0,99	1,36	0,99	0,83	1,19
6th	1,15	1,02	1,32	1,11	0,91	1,32
7th	1,12	0,97	1,26	0,89	0,71	1,12
8th	1,15	0,98	1,27	0,96	0,75	1,22
9th	0,98	0,9	1,08	1,04	0,83	1,29
Least deprived	1,03	0,91	1,18	1,02	0,81	1,31
Unknown	2,51	0,75	4,35	4,89	0,89	8,96
Evolution of deciles (ref. Stagnation)						
Rise	1,12	0,98	1,26	0,97	0,79	1,27
Loss	1,21	1,04	1,39	0,93	0,71	1,12
Unknown	2,27	0,88	3,74	5,17	1,24	8,97
Log-likelihood	-29948,052			-13008,718		

55–64 year-old	**Men**			**Women**		
	HR	**IC95%**		**HR**	**IC95%**	
Migration and transitions (ref. No mobility, partnered)						
Mobility, partnered	1,3	1,01	1,67	1,41	0,98	2,04
No mobility, single	1,61	1,20	1,99	1,28	1,02	1,58
Mobility, single	2,07	1,62	2,65	1,67	1,17	2,39
Union dissolution, no mobility	2,83	1,97	4,06	2,41	1,31	4,42
Union dissolution and mobility	2,62	1,94	3,54	3,71	2,46	5,58
Union formation, no mobility	1,45	0,96	2,18	1,45	0,68	3,07
Union formation and mobility	2,52	0,35	18,02	6,13	1,5	25,17
Parental status (ref. No)	0,86	0,74	1,01	0,7	0,55	0,91
Region (ref. Flanders)						
Wallonia	1,3	1,14	1,49	1,17	0,96	1,42
Brussels	0,92	0,71	1,2	1,05	0,73	1,5
Nationality (ref. Belgian)						
Other European	0,69	0,52	0,9	0,47	0,26	0,84
Non-European	0,26	0,08	0,82	0	0	.
Undetermined	2,69	0,39	18,41	0,16	0,01	2,53

Table A3 continued

Educational attainment (ref. Primary)						
Lower Secondary	1,04	0,87	1,24	1,28	0,97	1,69
Higher Secondary	0,91	0,75	1,1	1,46	1,09	1,95
Higher, tertiary education	0,83	0,67	1,02	1,41	1,03	1,93
Unknown	1,05	0,81	1,36	1,32	0,87	2
Occupational status (ref. Unemployed)						
Inactive	1,4	0,93	2,11	1	0,62	1,62
Employed	1,24	0,82	1,88	0,76	0,45	1,28
Self-employed	1,54	0,99	2,41	0,92	0,47	1,81
Unknown	1,36	0,58	3,18	0	0	.
Housing tenure (ref. Tenant)						
Owner	0,71	0,61	0,83	0,66	0,53	0,81
Unknown	0,53	0,33	0,86	0,9	0,5	1,62
BIMD deciles (ref. Most deprived)						
2th	1,09	1	1,2	0,98	0,83	1,11
3th	1,14	1	1,28	0,95	0,79	1,17
4th	0,98	0,88	1,18	1,02	0,83	1,24
5th	1,14	0,98	1,39	0,97	0,81	1,17
6th	1,15	1,01	1,31	1,1	0,9	1,31
7th	1,08	0,95	1,24	0,94	0,75	1,17
8th	1,13	0,96	1,25	0,92	0,73	1,19
9th	0,91	0,81	1,01	1,08	0,85	1,32
Least deprived	0,99	0,88	1,09	0,99	0,79	1,29
Unknown	1,88	0,68	3,14	3,5	0,74	6,31
Evolution of deciles (ref. Stagnation)						
Rise	1,21	0,97	1,45	0,93	0,75	1,24
Loss	1,32	1,08	1,54	0,88	0,69	1,09
Unknown	2,32	0,9	3,78	5,88	1,39	10,58
Log-likelihood	-11984,57			-5376,5193		

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.

Table A4 *Fine-gray model on the risk of suicide in 2008–2015 expressed in sub-hazards-ratio and 95% confidence intervals, controlling for the risk of dying from another cause (competing risk).*

	Men			Women		
	SHR	**CI95%**		**SHR**	**CI95%**	
Migration (ref. No)	1.37	1.28	1.46	1.40	1.26	1.55
Age group (ref. 20–24)						
25–29	0.78	0.68	0.88	0.81	0.63	1.03
30–34	0.93	0.82	1.06	1.15	0.92	1.45
35–39	1.21	1.07	1.36	1.72	1.39	2.12
40–44	1.38	1.23	1.54	1.94	1.58	2.38
45–49	1.18	1.05	1.32	2.32	1.90	2.83
50–54	0.99	0.87	1.11	1.81	1.47	2.22
55–59	0.67	0.58	0.76	1.06	0.85	1.32
60–64	0.98	0.82	1.17	1.30	0.96	1.76
Separation during the observation period	1.82	1.67	1.99	1.78	1.54	2.05
Living with children	0.96	0.91	1.02	0.75	0.68	0.82
Region (ref. Flanders)						
Wallonia	1.12	1.06	1.19	1.10	1.00	1.21
Brussels	0.66	0.59	0.75	0.80	0.67	0.96
Nationality (ref. Belgian)						
Other European	0.68	0.59	0.77	0.51	0.40	0.65
Non-European	0.25	0.18	0.34	0.15	0.08	0.27
Educational level (ref. Pimary)						
Lower Secondary	1.29	1.17	1.43	1.58	1.33	1.89
Upper Secondary	1.12	1.01	1.24	1.57	1.31	1.88
Higher	0.72	0.64	0.81	1.47	1.21	1.78
Unknown	0.84	0.72	0.97	1.19	0.93	1.53
Occupational status (ref. Unemployed)						
Inactive	1.43	1.28	1.61	1.68	1.39	2.02
Employed	0.89	0.79	0.99	0.84	0.70	1.01
Self-employed	1.07	0.94	1.22	1.00	0.77	1.29
Unknown	0.59	0.43	0.81	0.62	0.33	1.18
Housing tenure (ref. Tenant)						
Owner	0.74	0.70	0.79	0.70	0.63	0.77
Unknown	0.75	0.62	0.91	0.95	0.70	1.29
Log-likelihood	-71217.16			-27138.10		

Data source: National Register 2008–2015, Census 2001 and 2011, Death certificates 2008–2015.