ISSN 2593-9157

An open-access journal of population research

REVUE Quetelet JOURNAL

Volume 11/2
2023

Identifying partnership biographies from residential information in Belgian administrative data

Joan Damiens*[1,2], Luisa Fadel[1], Benjamin Marteau[3], Alice Rees[1], Christine Schnor[1], Océane Van Cleemput[1], Zuzana Zilincikova[4]

[1] DEMO, Université catholique de Louvain, Belgium
[2] Helsinki Institute for Demography and Population Health, University of Helsinki, Finland
[3] DREES Bureau jeunesse et famille, Paris, France
[4] Population Research Centre, Faculty of Spatial Sciences, University of Groningen, Netherlands.

* Contact: joan.damiens@uclouvain.be

DEMO Centre de recherche en démographie
IACCHOS Institut d'analyse du changement dans l'histoire et les sociétés contemporaines

UCLouvain

DOI.10.14428/rqj2023.11.01.02 • ©2024 Damiens et al.

PUL Presses Universitaires de Louvain

Résumé – Abstract

Abstract

In countries like Belgium, a high-quality registration system is an asset for demographic studies on family transitions, union formation and dissolution, and residential mobility, as it provides the necessary longitudinal data for the entire resident population. This technical report explores Register-based datasets from the Demobel database, developed and supplied by Statbel (Statistics Belgium). Our first contribution is to propose a new typology of household composition that pays more attention to complex categories, such as non-married partners, same-sex unions/families and multigenerational households. Our second contribution is the detailed description of our strategy to identify union formations and dissolutions based on administrative data. In sum, this report provides an example of how partnership biographies can be reconstructed based on the residential information in administrative data, documenting both the challenges and strengths of this dataset and the choices made.

Keywords: *Partnership biographies, Residential mobility, Register data, Union formation and dissolution, Household composition*

Résumé

Dans des pays tels que la Belgique, l'existence d'un système d'enregistrement d'excellente qualité est un véritable atout dans les études démographiques portant sur les transitions familiales, les formations et les ruptures d'union ou la mobilité résidentielle, notamment dans un contexte où ces recherches se font rares du fait d'un manque de données longitudinales. Ce rapport technique présente une exploration des sources de données basées sur des registres de population, à partir de la base de données Demobel, construite et mise à disposition par Statbel. Notre premier objectif est de proposer une nouvelle typologie de composition des ménages, qui donne plus de visibilité, dans le registre de poulation, aux catégories moins usuelles, tels que les couples non-mariés, les unions et les parentalités de personnes de même sexe, et les ménages multigénérationnels. Notre seconde contribution consiste à identifier les formations et ruptures d'union sur base de ces données administratives. Ce document ne fait pas office de règle absolue, mais il délivre un exemple de reconstruction des parcours d'unions à partir de données administratives et il met en lumière les défis et forces relatifs à l'utilisation de ce type de données.

Mots-clés : *Biographies de couple, Mobilité résidentielle, Données de registre, Formation et dissolution des unions, Composition des ménages*

1. Introduction

Administrative data are a precious source of information for studying individuals' life course, even though research is not their primary motivation for collection. In Belgium, a high-quality registration system is an asset for demographic studies on family transitions, union formations and dissolutions, and residential mobility, mainly as these data provide a longitudinal follow-up of the entire resident population since the 1990s. Different administrative databases exist, such as birth and death registers, marriage and divorce registers, health insurance registers, social security data, and data from the registrations at the municipalities. Each source can already yield valuable new insights (Wunsch & Gourbin, 2018). However, it is essential to record linkage among these data sources, which can significantly improve our possibilities of analysis and scientific knowledge and help detect possible causal associations. In Belgium, authorised organisations can link administrative databases based on the personal identifier number (PIN).

Administrative datasets are increasingly used in population studies to reconstruct individual life trajectories such as family formation, partnership transitions, and residential mobility. Access to exhaustive datasets can be challenging for researchers, as they are not directly tailored for research. This document is a technical report: we will develop the methodology and database management strategies. It aims to explain how Belgian administrative data can be used in social science research and help reconstruct household composition, partnership transitions, and mobility. More specifically, we suggest a replicable method to follow up on individuals' partnerships and residential courses for three decades, relying on DEMOBEL data from the early 1990s to the 2020s. To achieve this, we present two elements: a) how to define a more comprehensive and up-to-date household typology that completes and refines existing ones; b) how to establish a database that follows up on individuals' union formation, dissolution, and residential moves. Please note that codes (do-files, Stata17) are available on a repository[1], and the technical work associated with this report is detailed. This paper uses full-population administrative data supplied by Statbel for the FamilyTies project (see more information below), for which exact data are provided.

2. Literature review

Previous studies have already addressed the questions of union transitions and residential mobility in Belgium. Some articles used survey data, such as the Panel Study of Belgian Households (Raeymaeckers et al., 2006), Survey of Health, Ageing, Retirement in Europe (Bernard & Vidal, 2020) or the Gender and Generation Survey (Perelli-Harris & Lyons-Amos, 2015), while others used administrative data, such as the National Register (Kulu et al., 2021; Theunis, Schnor, et al., 2018), the Belgian Social Security Registers (Van Den Berg & Mortelmans, 2022) or the Belgian Labor Market and Social Security Data Warehouse (de Regt et al., 2013). Marteau's (2021) thesis has shed light on the role of separation in the transition to adulthood, analysing, for example, the residential mobility of young adults in light of partnership formation and dissolution. More recently, the Europen Research Council-funded FamilyTies project (PI: Clara Mulder) has investigated the role of family ties in internal migration, immobility and labour-market outcomes.The FamilyTies project (Family ties that bind: a new view on international migration, immobility and labour market outcomes, financed by the European Research Council) was coordinated at the Université Catholique de Louvain (UCLouvain, Belgium) by Christine Schnor

[1] https://github.com/joanjdamiens/Identifying-partnership-biographies

and led to several publications (Rutigliano et al., 2023; Zilincikova, Caceres, et al., 2023; Zilincikova, Linares, et al., 2023; Zilincikova & Schnor, 2023). It provided an opportunity to reflect on best practices of how administrative data can be used in demographic research. Research using Belgian administrative data suffered from different methodological challenges that led to exclude certain population groups. For instance, previous articles in Belgium disregarded non-marital couples (Theunis, Schnor, et al., 2018), while others were limited by the absence of homosexual couples (Theunis, Eeckhaut, et al., 2018). Furthermore, research on partnership dynamics often does not include the dates of union formation or dissolution (Van Den Berg & Mortelmans, 2022), which could restrict their methodological approach, understanding of causal relationships and estimation of risks.

So far, there are no recommendations or technical propositions regarding the use of administrative data for demographic research in Belgium. More importantly, no proposal exists to capture better non-marital cohabitations and multigenerational households than the current LIPRO (LIfestyle PROjections) classification. Similarly, recommendations are missing on optimal use of the longitudinal information, i.e. extracting the timing of the residential moves or union transitions. Here, we propose a strategy for reconstructing partnership and mobility life courses with Belgian administrative data. We pursue different objectives with this paper: we aim to stimulate a discussion on the mostly invisible work of administrative data preparation within and across institutions; we provide other researchers with a direction for reconstructing partner biographies; we add transparency to our research work since variables do not come out of the blue; we increase replicability, by clearly describing our data management steps and its justifications, thereby also increasing our standards as our publications will rely on common definitions.

Our approach has several assets. First, we propose a refined household typology for contemporary partnership and family complexities. Most demographic research relied on the LIPRO definition of couples, developed in 1992 and presuming a cohabitation if two different-sex adults with an age gap under 16 years considered in one household (Van Imhoff, 1992). We highlight the robustness of this definition, which captures about 9 out of 10 non-marital cohabiting couples in our data (Lodewijckx & Deboosere, 2008). However, we suggest a less restrictive approach that also accounts for non-marital couples, same-sex couples, and couples with larger age gaps. This approach is justified by a rising interest in including more diverse compositions in the household typology. In 2022, same-sex couples accounted for 4% of registered cohabitations and 3% of marriages in Belgium (Statbel, 2023a, 2023b). Couples with large age gaps are associated with higher union dissolution risks (Kalmijn et al., 2007) not considering them might impact empirical findings. We also define subcategories of households that present complex compositions, such as households with two or more generations, with two or more cohabiting couples, and blended families. Our vision finally distinguishes a "simple" version of the category that only includes the household members needed to define that category and a "complex" version that takes into account another related or unrelated household member without changing the category type.

Then, we propose a replicable method to reconstruct partnership formation dissolution and residential mobility and retrieve dates of changes. This is an application of how yearly information and daily administrative follow-up can help understand individuals' household changes regarding composition and geographical location. In the context of the more common use of such data and open science principles, we initiate a discussion on the use of administrative data for research while ensuring good practices and respect for information privacy.

3. Data presentation and access procedures

This report explores Register-based datasets from the Demobel database (Statbel, 2019), constructed and delivered by Statistics Belgium (Direction générale Statistique - Statbel; demos@economie.fgov.be). Information given in this section represents the processes at the moment of the publication and might change in the future. Demobel is the demographic database of Statbel. It contains demographic and other microdata from 1992 (included), and it is supplemented with data from the 1991, 2001, and 2011 censuses. Together, the data spans almost 30 years of the demographic history of the entire Belgian population. Demobel is updated annually and has both a structural and a dynamic component. The structural component – referred to as stock files – contains the composition of the population: size, gender and age distribution, nationalities, civil status and household composition. The structure of the population is calculated on an annual basis with a reference date of January 1st. The dynamic component - and referred to as flow files – contains the births, deaths, different forms of migration, changes in nationality, and other demographic phenomena that directly or indirectly impact the population structure. The course of the population is observed over a whole year and forms the bridge between two structures of populations. Demobel was developed based on the Belgian national register[2]. It is still a "work in progress" regarding the number of demographic phenomena and available variables. Statbel is working on further developments, including a new household typology and further integration with the Belgian Censuses.

For the reconstruction of the partnership biographies, we used the stock files which provide detailed yearly information about individuals' household composition, for each January 1st, and flow files which list all events (mobility, nationality, birth and death). The objective of this work is to present the datasets, their potential inconsistencies, and introduce a strategy to identify the household composition and its dynamics, e.g., union formation and union dissolutions, in greater detail. Please note that codes (do-files, Stata17) are provided in the repository[3] and detail the technical work associated with this report.

Demobel is available from Statbel for scientific research upon request[4]. Statbel uses different administrative sources to construct the Demobel database. These administrative data are treated statistically by Statbel in a way that the final product differs from the data source so that Statbel can be considered the data owner. In the databases, all person identifiers are coded, encrypted and anonymised for scientific and ethical purposes. To access the data, researchers must fill out an application that justifies the necessity and proportionality of the required information for the concrete research project. Statbel's Data Protection Officer team will then evaluate the request and give back an opinion. Finally, as data controller, Statbel's General Manager will decide whether the data can be provided[5]. All researchers working on the data must be granted access by Statbel[6]. The data can only be used for the scientific projects presented in the accepted request.

[2] For more information on the national register: https://www.ibz.rrn.fgov.be/nl/rijksregister/

[3] https://github.com/joanjdamiens/Identifying-partnership-biographies

[4] For more information: https://statbel.fgov.be/nl/over-statbel/privacy/microdata-vooronderzoek

[5] https://statbel.fgov.be/sites/default/files/files/documents/Over%20Statbel/Microdata_FR.pdf

[6] This collaborative work is based on data from the FamilyTies project. The data request was approved in 2021 (decision 2021/092). The request justifies why the requested variables are needed for the research project. It is not possible to compute these analyses with aggregated data only. The dataset includes pseudonymised data from Demobel from 1991 to 2020 and may be used until 2030, after which the data must be destroyed. Statbel is entitled to allow researchers access to this data for scientific purposes. *(suite p. 6)*

4. Discussing the original variable list

4.1. Basic file

The basic file gives time-invariant information about each individual present at least once in the dataset, between 1992 and 2021: the personal identifier, the birth date and place of residence (country and city for Belgian-born), and sex. Appendix (Table A1) shows an overview of this file's variables.

4.2. Stock files

4.2.1. Variables description

Stock files include information on all individuals living in Belgium on the 1st of January of a given year between 1992 and 2021. Each year is stored in a separate dataset. There are three types of variables: 1) identification variables; 2) variablesreferring to individual characteristics and 3) variables referring to the household's characteristics. The existing variables and their categories are described in Appendix (Table A2).

► 1. Identification of the preexisting variables:

• **Individual ID** *(ID_DEMO_C)*

Variable ID_DEMO_C is a unique personal identifier. It is constant across the years, stock files and flow files. It is necessary to merge the datasets. If an individual exits the observation and returns (i.e., temporarily leaves the country), they keep the same identifier. This identifier followed an anonymisation process thanks to Stabel's work: ID_DEMO_C is a variable defined explicitly for the FamilyTies project and cannot be used to merge other external datasets' information.

• **Household ID** *(ID_HH_C)*

Variable ID_HH_C is a unique household identifier. However, the household identifier can change between the years, even for identical households. Thus, following individuals rather than households from one year to another is advised.

• **ID of the Head of the household** *(ID_DEMO_HH_HD_C)*

Variable ID_DEMO_HH_HD_C (= Personal Identifier Chef de Ménage) refers to the identifier (ID_DEMO_C) of an individual who figures as the head of the household. In non-collective households, one person is always considered the first member and the reference of all the relations (e.g., wife/husband, child, etc.) within the household. There are no precise rules to define the head of the household. By default, if no head of the household was explicitly chosen among the household, the person who did the last address change at the administrative

6 *(suite)* A confidentiality contract has been set up between the representatives of the authority of UCLouvain and Statbel. All dataset users signed a confidentiality contract and a form regarding data protection.
UCLouvain uses several technical tools to support research and guarantee a safe and secure data analysis environment. All these measures guarantee the safety of the datasets and regulated access to the information. The goal is to ensure both an efficient workflow for research and to protect the anonymity of the respondents, which is primordial for exhaustive data. The data are placed on the UCLouvain server (password-protected) and are only accessible to accredited researchers. All researchers, except the coordinator, have only reading rights and cannot modify the datasets. The data cannot be downloaded to the researchers' personal computers.

services is considered as the head of the household. Most of the time, when the household is composed of a different-sex couple and as a convention, the head of the household is the man. However, this is not always the case, depending on the municipality. For example, if a mother's cohabiting partner is not the father of her children, she might be the head of the household instead of the step-father. Through time, the head of household can change (without any compositional change within the household).

- **Married partner ID** *(ID_DEMO_PTNR_C)*
  Variable ID_DEMO_PTNR_C (= Personal Identifier Partner) refers to the identifier of the married partner or, possibly, the legal cohabitant (legal cohabitation is available in the data since 2000). ID_DEMO_PTNR_C does not change after divorce, separation or widowhood. Thus, it may refer to the current partner, deceased partner or ex-partner. It takes the value of the new partner's identifier in case of remarriage or new legal cohabitation. This code is not limited to the head of the household but may concern all married or legally cohabiting individuals.

► **2. Individual characteristics:**

- **Year, month and day of birth** *(anaiss, mnaiss, jnaiss)* – based on the variable dt_bth (date of birth).
- **Sex** *(cd_sex).*
- **Civil status** *(CD_CIV):* unpartnered, married, divorced, widow/widower.
- **Date of the last civil status change** *(DT_STRT_CIV_STS_RRN*) - for more detailed information, Statbel also broke it down into three indicators: acheciv (year of change); mcheciv (month of change) and jcheciv (day of change).
- **Nationality** *(CD_NATLTY)*
- **Position within household** *(CD_REL_HH_HD)* - in relation to the head of the household (for whom CD_REL_HH_HD =1). For other members, this variable refers to the link between them and the head of the household. If a person already lives in a household and is joined by a new one, the head of the household or the newly arrived person has to declare the change of residence to the municipality's office. When registering, the relationship between this new person and the head of the household will be requested. Within the household, the CD_REL_HH_HD can change between the years, e.g. when cohabiting partners get married. Please also note that the categories of this variable change between the years. For instance, the category of "comaternity partner" was added once same-sex parenthood was allowed and legally recognised in Belgium in 2006 (loi du 18 mai 2006).

► **3. Household characteristics:**

- **Type of household** *(HH_TYPE_LIPRO*). This variable was created to provide an overview of the household compositions in which an individual lives on January 1st and to follow the evolution of individuals' households. It is based on the LIPRO typology created in the early 1990s (Van Imhoff, 1992).
- **Size of the household** *(hh_size*).
- **Municipality of residence of the household** *(CD_REFNIS*).

4.2.2. Inconsistencies in the variables and proposed solutions

Before going further in our objectives, we identified several inconsistencies in the following variables: ID_DEMO_PTNR_C, CD_REL_HH_HD, acheciv, mcheciv, and jcheciv. Most of these issues are related to the registration procedure itself. The marginal flaws that we encountered and that we attempted to correct are listed here:

1. **Inconsistency:** The identification number of a partner (ID_DEMO_PTNR_C) takes a value even though an individual is divorced or widowed.
   Solution: Remove the values for the identification number of a partner (ID_DEMO_PTNR_C) when people are divorced or widowed to avoid confusion for people who repartner and do not marry.
2. **Inconsistency:** In some cases, one individual is noted as the partner of several individuals.
   Solution: Remove the information, as we cannot rely on it.
3. **Inconsistency:** Sometimes, a parent is mistakenly labelled as a child. This mistake occurs when parents move to live with their child (i.e., when precisely two persons live in the household).
   Solution: If a person older than the head of the household is labelled as a child of the head, CD_REL_HH_HD=3 (son, daughter) is recoded to CD_REL_HH_HD=6 (father, mother).
4. **Inconsistency:** When the date of the civil status changes, it may take the value of the individual's date of birth.
   Solution: Insert missing values for acheciv, mcheciv and jcheciv if they correspond to the date of birth.
5. **Inconsistency:** Unclear definition of CD_REL_HH_HD=12 (other, unrelated).
   Solution: Define CD_REL_HH_HD=12 for all unrelated individuals younger than 16 and CD_REL_HH_HD=24 for all unrelated individuals aged 16 and older. We chose 16 as this is the age at which individuals can legally get married.
6. **Inconsistency:** a person is considered unrelated to the head of the household (CD_REL_HH_HD==24), although both are married.
   Solution: Replace the link to the head of the household (CD_REL_HH_HD==2 (husband, wife)) for people who are married (cd_civ=2) and sharing the same date of marriage (acheciv, mcheciv and jcheciv) as the head of household.
7. **Inconsistency:** Incorrect or missing partner's ID (ID_DEMO_PTNR_C) for married partners.
   Solution: Correct the partner's ID (ID_DEMO_PTNR_C) for couples that are married (cd_civ=2), living in the same household and sharing the same date of marriage (acheciv, mcheciv and jcheciv).
8. **Inconsistency:** A person is recoded as a spouse to the head of the household (CD_REL_HH_HD==2) while unmarried.
   Solution: CD_REL_HH_HD=2 (husband, wife) recoded to unrelated CD_REL_HH_HD=24 (unrelated, older than 15) or CD_REL_HH_HD=12 (unrelated, 15 and younger).
9. **Inconsistency**: For years (1992-2000, 2008-2009, 2012-2018) the household ID (ID_HH_C) was different for distinct members of a household who nonetheless shared the same head of household (ID_DEMO_HH_HD_C).
   Solution: We attributed the ID of the head of the household (ID_HH_C when CD_REL_HH_HD=1) to all individuals sharing the same household ID.
10. **Inconsistency**: Differences in the marriage date (acheciv, mcheciv or jcheciv) for married partners. As it is not possible to identify which partner has the correct information, the original values are maintained.
11. **Inconsistency:** In some households, there is no identified head of household (CD_REL_HH_HD=1 is absent). It might refer to situations where foreigners are on an alternate register, waiting to be regularised (for example, asylum seekers), but whose children appear in the "regular" national register.

Some other inconsistencies are acknowledged but could not be solved due to insufficient information/data or alternative coding.

4.3. Flow files

4.3.1. Variables description

Flow files cover the 1990-2021 period and give the status changes between the two stock files, i.e. between January 1st of year A and January 1st of year B. The flow files are divided into several datasets according to the nature of the event.

Table 1. Flow file. List of existing variables.

Variable label	*Variable name*
Individual ID	ID_DEMO_C
The REFDATE variable refers to the date of the type of move/event that occurs.	DT_REFDATE
· Date of intra-municipal move · Date of birth · Date of death · Date of entry in the waiting register · Date of exit from the waiting register · Date of deletion from the register · Date of emigration · Date of immigration · Date of re-registration after deletion	
In the inter-municipal moves flow file, it refers to the municipality of original residence before inter-municipal move. In the immigration flow file: the municipality of destination after immigration	CD_REFNIS
Municipality of destination after inter-municipal move	CD_REFNIS_D

Source: DEMOBEL database.

To study one year (e.g. 2000), we then rely on several databases:

• The stock file that gives individual's and household's characteristics at the beginning of the year, on January 1st 2000;

• The stock file gives individual and household characteristics at the end of the year, on January 1st 2001.

• The flow files with all changes occurring in 2000. Several files correspond to different types of information:

- Birth
- Death
- Internal inter-municipal migration

- Internal intra-municipal migration
- International emigration
- International immigration
- Change of nationality
- Deregistration and new registration;

• The stock file gives individual and household characteristics at the end of the year, on January 1st 2001.

The overview of the existing variables from the different flow datasets is presented in Table 1. Note that each type of event (migration, birth, death, etc.) is associated with one specific dataset, hence the absence of one variable that presents the type of event.

4.3.2. Intra-municipality moves

Information about intramunicipal moves (moves within the same municipality, as defined by the 5-digit code of municipality in Belgium) is only available between 2000 and 2019. In previous years, these moves have not been captured.

5. Identifying the household composition using the stock file

5.1. A new typology

After implementing these corrections, one of our objectives is to create a new household composition variable with additional categories to provide detailed information about the residential and familial situation. We want to verify the quality of the existing LIPRO-based household typology and integrate more categories to make other household compositions more visible in the data: intergenerational households, same-sex couples, parents, etc.

The newly created variable *typmendet* indicates the household composition as of the 1st of January of each year. This variable is made based on the size of the household (hh_size), the relationship between the household members (CD_REL_HH_HD), the civil status of household members (CD_CIV), their sex (cd_sex) and age (MS_AGE).

Table 2 below compares the new *typmendet* typology to the original LIPRO typology, and highlights the more detailed categories we came up with. In the Appendix, Table A3 describes the categories of the new variable *typmendet* and their detailed definition.

Registers and administrative data fail to identify the nature of the relationships between unrelated individuals living together. It is, therefore, impossible to know whether these persons are couples, friends, roommates, etc. We have to rely on assumptions to match two potential unmarried partners together. If an unmarried head of household (CD_REL_HH_HD=1) aged 16 or more lives with an unrelated unmarried individual aged 16 and more in the household (CD_REL_HH_HD=24), this is a considered cohabitation, in cases where there are no other unrelated individuals present in the household. We decided to extend the definition of cohabiting relationships to same-sex couples and partnerships with large age differences (above 16 years). In specific household compositions, e.g. with several other unrelated individuals in the household, it can be difficult to understand what is the link between the head of the household and an unrelated individual (CD_REL_HH_HD=24), as well as the relationship between household members.

A typical example is the situation where you have:

- A head of the household (CD_REL_HH_HD=1);
- An unrelated individual that meets the assumptions of an unmarried partner (CD_REL_HH_HD=24), i.e., an unrelated individual aged 16 and more;
- A young adult, child of the head of household (CD_REL_HH_HD=3);
- A young adult, unrelated to the head of the household (CD_REL_HH_HD=24).

In this case, the young adult who is unrelated to the head of the household might be either the child of the non-married partner, and the step-child of the head of the household, or the unmarried partner of the head's child, and so the "child-in-law". We can only assume relationships between the individuals. Those interpretations may cause an underestimation/overestimation of specific familial and partnership situations.

Table 2. Description of the categories on the new variable typmendet, compared with the preexisting LIPRO typology, and distribution of* typmendet *in 2009.

LIPRO typology	New typology	Label	% in 2009
Living alone	Living alone - Man	IH	6.73
	Living alone - Woman	IF	7.64
Single parent	Single parent - Man (s)	MHs	1.59
	Single parent - Man (i)	MHi	0.04
	Single parent - Woman (s)	MFs	8.25
	Single parent - Woman (i)	MFi	0.12
Married couple with children	Married couple with children (s)	CAEs	38.07
	Married couple with children (i)	CAEi	0.52
	Multiple generations (hhh is married)	Multi_MA	1.76
Married couple without children	Married couple without children (s)	CSEs	17.41
	Married couple without children (i)	CSEi	0.52
	Older adult and married couple	O_MA	0.25
Cohabiting couple with children	Cohabiting couple with children (hetero)	CoA	7.19
	Cohabiting couple with children (homo)	HoA	0.14
	Multiple generations (hhh is cohabiting)	Multi_Co	0.15
Cohabiting couple without children	Cohabiting couple without children (hetero)	CoS	4.11
	Cohabiting couple without children (homo)	HoS	0.39
	Older adult and cohabiting couple	O_Co	0.03
Collective household	Collective household	Coll	1.18
Other	Several couples in the household	Pluri	0.17
	Brothers and sisters	FS	0.34
	Flat sharing	Colo	0.07
	Multiple generations (hhh is single)	Multi_Solo	0.67
	Older adult with single child	O_Solo	0.27
	Other	Aut	1.18

Notes: hhh: head of the household.
** s: simple household (restricted definition); i: complex household (the definition can allow the presence of related or unrelated extra members in the household, as long as it does not change the category to which the household belongs)*
*** hetero: different-sex; homo: same-sex.*

5.2. Assumptions about non-marital partnerships

The categories, including cohabiting couples, result from assumptions about the relationship between unrelated individuals (CD_REL_HH_HD=1 and CD_REL_HH_HD=12 for unrelated individuals aged under 16; CD_REL_HH_HD=24 for unrelated individuals aged 16 or more):

• Childless cohabitant (non-marital) couple household (CoS):

- 1 head of household (CD_REL_HH_HD = 1) aged 16+;
- 1 different-sex unrelated individual (CD_REL_HH_HD = 24) aged 16+;
- No other unrelated individual in the household;
- There is no age difference limit between partners.

• Household of cohabitants with child(ren) (CoA):

- 1 head of household (CD_REL_HH_HD = 01) aged 16+;
- 1 different-sex unrelated individual (CD_REL_HH_HD = 24) aged 16+;
- At least 1 (step-)child related to the head of household (CD_REL_HH_HD = 3 or 4);
- AND/OR at least 1 unrelated individual (CD_REL_HH_HD = 12) aged 15 or less, who is assumed to be the child of the head's unmarried partner;
- There is no age difference limit between partners.

• Same-sex couples HoSs and HoAs:

- 1 head of household (CD_REL_HH_HD = 1) aged 16+;
- 1 different-sex unrelated individual (CD_REL_HH_HD = 24) aged 16+;
- No other unrelated individual in the household;
- There is no age difference limit between partners.
- If people are of the same sex and unrelated, they are identified as cohabitant couples, which is questionable given that few of them are still in a same-sex couple one or two years later;
- There is no age difference limit between partners.

Same-sex couples were allowed to marry in Belgium from 2003 onwards. We do not explicitly distinguish categories for different-sex married couples and for same-sex married couples; this was impossible before 2003. Still, register data can allow this distinction from 2003 onwards.

"Living apart together" (LAT) couples who are not married are not considered here as register data does not include this type of information.

5.3. Several generations in one household

Some households include three generations (grand-parent(s) + parent(s) + child(ren)), others two generations of adults (parent(s) + adult child(ren)). These generations must be biologically or legally related. As there are several adults in the household, identifying the head of the household is not systematic, i.e., the head of the household may be the oldest or part of the middle generation. One of the difficulties is identifying the same household structure while the head of the household might be part of a different generation. Table A4 in the Appendix summarises the various types of two- or three-generational households, depending on the identification of the head of the household. Given these uncertainties, can we trust our typology? We have assumed that the decision of the head of the household is not entirely random. If one individual was already head of the household and is joined by other members, we can assume that this first individual will keep his or her position as a head of the household and present a certain authority – from an administrative, symbolic or decision-making point of view. The same multigenerational household composition does not have the same meaning and function: an adult child returning to the parental home is not in the same position as an adult child welcoming an ageing parent at their residence. We reckon that

the information about the head of the household is helpful to understand better the reality of the household, and our detailed household typology takes advantage of this information to underline the complexity of multigenerational families under the same roof, which makes this category more reliable and representative of the household situation.

Additionally, two dummy variables were created to identify multigenerational households in which the head of the household is married (Multi_MA) or cohabiting (Multi_Co). These variables are presented in the Appendix (Table A5).

5.4. Comparing old and new household typologies

Table 3 compares the new *typmendet* categories and the existing typologies for 1992. No differences are to be noted for some categories, such as one-person households. For married couples, little differences are to be reported. Some married couples are now recorded as cohabiting couples due to the corrections made to some inconsistencies: some individuals were noted as married while they were living in cohabitation with another unmarried partner. Reversely, some couples are now considered "married" in the new typology (while "cohabiting" in the LIPRO typology), also thanks to the corrections of some inconsistencies. For some couples, the spouse's identifier was not correct or reported. The variable *typmendet* also captures households composed of multiple couples: many of them are composed of two generations, parents living with their child and their partner.

A comparison with other data sources could also help assess the robustness of our definition of cohabiting partnerships. In 2009, the Belgian Gender and Generation Survey was conducted, with a representative sample of the population. Of all partnerships, 19% were non-marital partnerships. Using our definition for the same year, 1,309,735 partnerships out of 7,349,323 unions were non-marital partnerships accounting for 18% of them. If our estimation of partnerships aligns with findings from other data sources, it is to be noted that our new variable seems to overestimate same-sex couples. In our typology, same-sex couples represent 4,7% of unmarried couples; the literature has shown that this number is often under 2% (Rault, 2023).

Some of marital or nonmarital couples are now recoded as "with children" in the typmendet typology, due to the inclusion of stepchildren as children in the typology. In the LIPRO typology, if a child is not the natural or adopted child of the head of the household, the household is considered "without children".

From the "single parents" category in the LIPRO, we can draw other situations, such as cohabiting heterosexual and same-sex partnerships, but also three-generational households ("Multi" categories). Previously, the presence of related or unrelated members in the household was not considered. Further, some of the inconsistencies described in section 2.1.2. could distort the LIPRO typology. Some of the previous "single parents" (single individuals with children) are now recoded as childless households ("CoS", "HoS"): This might be explained by some individuals being coded as children of the head of the household while the age differences between the two individuals could not support this relationship (See 2.1.2, inconsistency 3).

The most significant difference comes from the "other" category. By including additional information, we were able to identify and distinguish or correct certain household types in this category. We may overestimate cohabiting couples, especially when no children live in the household. Out of the 12,000 individuals that went from the "other" category to the "cohabiting couple", we can find households of two unrelated adults living together without being in a partnership (e.g., in a flat-sharing situation). This is especially the case for the 11,646 same-sex couples living without children. There is no way to identify who is actually in a relationship. From the original "other" category of LIPRO, we could also distinguish the households made of siblings, flat-sharing situations and intergenerational compositions. Flat-sharing

includes households with at least 3 unrelated individuals with an age difference under 8 years between the oldest and the youngest members. The number of collective households remains similar in both typologies. This comparison allowed us to compare the assumptions surrounding classification of cohabiting couples: we estimate that 93% of the unmarried couples identified with the *typmendet* variable were already captured in the LIPRO category. This difference is explained by the inclusion of same-sex couples, couples with large age differences, or individuals living without being in a relationship.

Table 3. Comparison of distributions of the LIPRO typology and the newly created* typmendet *typology, year 1992.

		LIPRO typology							
		Living alone	Married with children	Married without children	Cohabiting with children	Cohabiting without children	Single parent	Other	Collective
IH	Living alone - Man	502,565	0	0	0	0	0	0	0
IF	Living alone - Woman	69,487	0	0	0	0	0	0	0
MHs	Single parent - Man (s)	0	0	0	0	0	123,262	0	0
MHi	Single parent - Man (i)	0	0	0	0	0	3,267	0	0
MFs	Single parent - Woman (s)	0	0	0	0	0	599,512	0	0
MFi	Single parent - Woman (i)	0	0	4	0	0	9,015	13	0
CAEs	Married couple with children (s)	0	0	5,135,963	0	878	64	0	0
CAEi	Married couple with children (i)	0	0	68,832	0	102	0	234	0
Multi_MA	Multiple generations (hhh is married)	0	0	218,141	0	4	0	0	0
CSEs	Married couple without children (s)	0	1,758,056	0	992	0	12	12	0
CSEi	Married couple without children (i)	0	49,444	6,448	7	179	0	230	0
O_MA	Older adult and married couple	0	49,092	0	3	0	0	0	0
CoA	Cohabiting couple with children (hetero)	0	0	4,888	0	179,457	419	64	0
HoA	Cohabiting couple with children (homo)	0	0	12	0	0	5,158	0	0
Multi_Co	Multiple generations (hhh is cohabiting)	0	0	33	0	2,771	973	0	0
CoS	Cohabiting couple without children (hetero)	0	148	0	153,062	0	294	8	0
HoS	Cohabiting couple without children (homo)	0	8	0	0	0	164	11,646	0
O_Co	Older adult and cohabiting couple	0	15	0	1,042	0	9	209	0
Coll	Collective household	0	0	0	0	0	0	0	94,767
Pluri	Several couples in the household	0	0	25,089	0	180	71	0	0
FS	Brothers and sisters	0	0	0	0	0	0	41,445	0
Coloc	Flat-sharing	0	6	0	0	3	0	1,486	0
Multi_Solo	Multiple generations (hhh is single)	0	0	0	0	0	61,703	0	0
O_Solo	Older adult with single child	0	0	0	0	0	0	21,621	0
Aut	Other	14,287	5,082	61,751	2,718	39,935	22,537	46,403	0

Source: DEMOBEL database, 1992.

6. Identifying the household composition using the stock file

In this section, we identify union transitions (i.e. partnership formation and dissolution, distinguishing between widowhood and separation) using internal and international migration data. All individuals' residential moves are recorded in the flow files of the register data. The information on residential moves includes, for all types of moves:

- municipality/country or origin;
- municipality of destination;
- date of move (in day format).

We appended the stock data with the flow files to determine the moves between the yearly stock files. Consequently, each move occurring between the years is represented as a new line in the dataset, i.e. as a new observation. Appending rather than merging the data proved a more efficient strategy for identifying the partnership transitions.

6.1. Partnership formation

In this work, all union transitions are based on the cohabitation of partners: non-cohabiting relationships are not considered "couples". Union formations are defined by the start of a cohabitation. The first step in identifying couple formation is spotting the couples in the stock files. Marital couples are determined based on the married partner identifier (ID_DEMO_PTNR_C). As there is no similar variable for cohabiting non-married partners, we created a variable named codernPNM (=codern Partner Non-Married) which identifies the ID of an unmarried partner. Unmarried partners are identified and coded through the household type variable (typmendet), when the household is classified as: "CoAs", "CoAi", "CoSs", "HoAs", "HoSs", "Multi_Co", "O_Co" and "Pluri". Please note that, unlike marital couples, non-marital couples are identified by the presence of one unrelated individual, in addition to the head of the household, and they are only assumed to be a couple (please refer to the description of the household type variable for more information).

In the second step, a new variable "codecouple" is created by merging the individual identifier (ID_DEMO_C) and the partner identifier (ID_DEMO_PTNR_C/codernPNM). The identifier first in alphabetical order appears first to ensure the code is the same for both partners.

In the third step, we identify an individual's partnership status. A new variable, "couple," is created and includes four categories: 1-"marital couple," 2-"non-marital couple," 3-"married partner but the partner is not in the household," and 9-"not in a couple relationship." Note that for cohabiting couples, only couples who live together are considered.

Finally, the information is compared from one year to another. We identify two categories of couple formation: 1) when an individual is not in a couple or in a couple but not living with the partner in *t-1*, and is living together in a couple in *t;* and 2) when an individual is in a couple both in *t-1* and in t, but with a different partner (different ID_DEMO_PTNR_C/codernPNM). If an individual immigrates from abroad, and we have no information on the partnership situation in *t-1*, we derive information on partnership formation from the partner in t.

The flow files are used to identify the precise date of partnership formation. To do so, we follow two main rules. First, we define the last date of move among the two (assumed) partners as the couple formation date. Second, if both partners have a common date of move and it is not the last move, we define it as the couple's formation date.

There are different pathways to couple formation:

1) An individual moves during the year, and the partner does not move → the couple formation date is the last date of a move of the individual;

2) An individual does not move, and the partner does → the couple formation date is the last date of a move of the partner;

3) Both the individual and his/her partner move, either on the same date or not → the couple formation date is the last common date of the latest move date among the two partners;

4) None of the individuals move between the two years, yet a union formation is identified. This situation may arise for several reasons: a non-marital couple that was not identified as a couple (e.g. because of the complex household structure), gets married during the year and appears as a couple in the second year; a third person moves out from the complex household and the new household composition identifies a non-marital couple. Further, this situation may occur if partners do not register as living in the same household (possibly for the tax relief), but the correction is made in the second year.

This classification also depends on the time of the year the events happen and relies on calendar years. For instance, if an individual moves to a new place in December and is joined by their partner in January, they will be classified within the second situation (the partner moves). If one individual moves in April and is joined by their partner in May, they will be considered both moving, i.e. the third situation.

Note that some inconsistencies can remain in defining a non-marital partnership. This definition depends on the household composition and relies on the presence of only two adults in the household. In a year *t-1*, a couple can be in a household but not be captured due to the presence of a third adult within this household. In year t, the departure of this third individual can allow observing the existing couple.

6.2. Partnership dissolution

Union dissolutions are defined as the end of a cohabitation. The logic behind the identification of couple dissolution is the same as couple formation, comparing the "couple" variable between *t* and *t-1*. However, in this case, we include information related to individuals' death to distinguish a union dissolution from widowhood. Then, we create a new variable for union dissolution, "end_couple". This variable comprises five categories: (0) "No End" when the individuals do not experience partnership dissolution from *t-1* to *t;* (1) "End, single" when an individual separates from their partner from *t-1* to *t* and remains single until *t;* (2) "End, repartner" when dissolution is followed by a new partnership during the same year; (3) "Widow, single" when the loss of a partner between *t-1* and *t* is followed by singlehood; (4) "Widow, repartner", when the individual loses their partner and then re-partners within the same year. It is to be noted that the likelihood of repartnering during a year depends on the existence of another relationship at the end of the previous relationship and the timing of the separation: a union dissolution early in a year can be followed by a new partnership later that same year. The distinction between individuals who are still single or have already repartnered can be important in some further analyses, such as understanding who is at risk of separating again or is susceptible to entering a new union. This variable allows identifying different pathways of couple dissolution. However, it does not distinguish the dissolution of people who move out of the country during the year from other separations. When an individual moves out of Belgium and is no longer registered in a Belgian household, we assume their partner to be unpartnered. Still, there is a possibility that their relationship continues even though they are registered in two different countries.

To measure the exact date of union dissolution - defined as the end of the cohabitation

between partners -we first need information on the moves of the individual and the ex-partner. It is important to recall that the date of separation is identified based on the date of the move, even though the union dissolution may have occurred earlier. Once this information was added, it was then possible to create the variable "migend" which distinguishes for each couple whether: 1) an individual moves out, and the ex-partner stays in the home (category 1 "Ego moves"), 2) the ex-partner moves out, and the individual stays in the home (category 2 "Ex-partner moves"), 3) both the individual and the ex-partner moves out into two different homes at the same date (category 3 "Both same date"), 4) neither the individual nor the ex-partner moves out (category 4 "No moves"), 5) both the individual and the ex-partner move out during the year but not at the same date (category 5 "Both no same date"). The estimated date "date_diss" of the union dissolution is then retrieved from both information: the moving date of ego and/or the moving date of the (ex-) partner. In the Appendix, Table A6 presents all the newly created variables and their definitions.

For union formations and dissolution, some strategies can be used to avoid incoherence, especially when a couple is observed in *t-1* but not in t, due to the addition of a new member (e.g., the parent or the adult child of the non-married partner who is not the head of the household). The opposite situation, in which a couple appears after the leaving of one member, can also be considered as "going back in time". However, these decisions depend on the researcher's objectives, and we did not provide any universal solution in this report.

7. Conclusion

This technical report presents a new typology of household variables and a strategy for identifying partnership trajectories that can be determined using register-based datasets from the DEMOBEL database (Statbel, 2021), built and provided by Statbel. We have described and discussed all relevant variables from the stock files that we have at our disposal – the population structure at the beginning of each year – and the flow files – which capture the course of the population, the changes and the moves during a year. In these files, we have acknowledged the possible inconsistencies and suggested solutions in most cases. This report aims to better understand the technical aspects of Belgian administrative data.

Our first objective was to propose a new typology of household composition. While the LIPRO typology is particularly useful for characterizing household and family compositions, it might be less sensitive to distinguishing less traditional or complex household situations, such as non-marital partnerships, blended families, intergenerational cohabitation, or same-sex unions. We propose a typology that distinguishes between simple and complex households, to account for situations where the definition of a household type is respected, despite additional members (non-related persons, partner's children, adult children, etc.). This typology also encompasses a range of new complex households ("other" category) that were not previously taken into account: households composed of siblings, collective households of more than 16 individuals, roommates, etc. Additionally, we have introduced new categories for same-sex couples and multigenerational households, recognising the arbitrary choice of the head of the household, as the main reference of the household.

This new composition is based on several assumptions and has limitations. First, we do not have much information about the less traditional or more complex households, which are more common in our current society. To define a (non-marital) cohabitation, whether between different-sex or same-sex partners, we had to rely on assumptions,

such as having only two unrelated adults within a household. These assumptions can be seen as rather too broad and can overestimate non-marital partnerships. Nevertheless, this new typology can be appropriate for the contemporary Belgian landscape, marked by the Second Demographic Transition (Lesthaeghe, 2010) and a high representation of non-marital partnerships, union dissolutions, lone-parents and stepfamilies. Using its elements in more usual contexts can also be envisaged, as we also help capture information about multigenerational households and the cohabitation of several partnerships in the same residence.

We did not include information on filiation, i.e., the direct identification of parents and their offspring. This led to some ambiguity in the categories dealing with stepfamilies. This information should be taken into account as a future step.

Our second objective was to develop a strategy to study union formation and dissolution using the DEMOBEL dataset. For this purpose, a comparison of the household composition between two years was taken as a reference, as well as the marital status of each individual. We chose this approach to offer a flexible way to work with the years covered. We defined formation as the day the two individuals moved in together, and the separation as the day they started to live apart. The flow files helped identify those moves, enabling us to know the specific day they occurred and their context. Although this estimate suffers from uncertainty over the household composition typology, it appears like a solid starting point in the study of partnership histories in Belgium, which researchers can tailor to their own purposes. A limitation of our approach to consider the changes within each calendar year separately is that changes at the end of the calendar year may have a higher probability of specification error. We also know that having access to exact dates in the DEMOBEL file is not standard; adaptations would need to be made to convey our approach to monthly dates.

In the context of a growing open science paradigm, the transparency of data management should become an integral step of every research project. This document supports this initiative and presents a standard and common ground for future projects conducted by researchers from the Research Centre for Demographic Research (DEMO) at UCLouvain that rely on partnership histories. This work also integrates a questioning of the definition of the family and the inclusion of more complex households that need to be pursued.

However, this technical report should not be considered as a strict guideline. First, Belgian administrative datasets define household compositions based on one referent member in the housing. All relationships within the households are then given from the point of view of this referent member, and no strict rule defines the head of the household. As a result, two identical households can have two different classifications depending on who is the referent member. We accounted for this difficulty, but the current structure still makes it difficult to capture the reality of the household and asks for rather large assumptions that all users of this code must question.

Several changes can be suggested to reduce uncertainty over the future household composition typologies. First, at the level of statistical work, the addition of the filiation dataset can give information about parenthood and better describe different family structures, such as step-families. Furthermore, access to information about registered partnerships can reduce the uncertainty surrounding the definition of unmarried partnerships. At the administrative level, one could include another possible relation to the head of the household. So far, only relatives and partners (especially married) can be declared, while unmarried partners are often considered "unrelated individuals" living in the same household. A new category could also help recognise the status of unmarried partners.

References

Bernard, A., & Vidal, S. (2020). Does moving in childhood and adolescence affect residential mobility in adulthood? An analysis of long-term individual residential trajectories in 11 European countries. *Population, Space and Place*, *26*(1), e2286. https://doi.org/10.1002/psp.2286

de Regt, S., Mortelmans, D., & Marynissen, T. (2013). Financial Consequences of Relationship Dissolution : A Longitudinal Comparison of Formerly Married and Unmarried Cohabiting Men and Women. *Sociology*, *47*(1), 90-108. https://doi.org/10.1177/0038038512453793

Kalmijn, M., Loeve, A., & Manting, D. (2007). Income dynamics in couples and the dissolution of marriage and cohabitation. *Demography*, *44*(1), 159-179. https://doi.org/10.1353/dem.2007.0005

Kulu, H., Mikolai, J., Thomas, M. J., Vidal, S., Schnor, C., Willaert, D., Visser, F. H. L., & Mulder, C. H. (2021). Separation and Elevated Residential Mobility : A Cross-Country Comparison. *European Journal of Population*, *37*(1), 121-150. https://doi.org/10.1007/s10680-020-09561-1

Lesthaeghe, R. (2010). The Unfolding Story of the Second Demographic Transition. *Population and Development Review*, *36*(2), 211-251. https://doi.org/10.1111/j.1728-4457.2010.00328.x

Lodewijckx, E., & Deboosere, P. (2008). LIPRO : Een classificatie van huishoudens. *SVR-Technisch rapport*, *2*.

Marteau, B. (2021). *Rompre une union, poursuivre sa jeunesse : La première séparation conjugale dans les parcours d'entrée dans l'âge adulte en France et en Belgique* [PhD Thesis, UCL-Université Catholique de Louvain]. https://dial.uclouvain.be/pr/boreal/object/boreal:252000

Perelli-Harris, B., & Lyons-Amos, M. (2015). Changes in partnership patterns across the life course : An examination of 14 countries in Europe and the United States. *Demographic Research*, *33*, 145-178. https://doi.org/10.4054/DemRes.2015.33.6

Raeymaeckers, P., Snoeckx, L., Mortelmans, D., & Van Ourti, S. (2006). Marriage and Divorce in Belgium : The Influence of Professional, Financial and Educational Resources on the Risk for Marriage Dissolution. *Journal of Divorce & Remarriage*, *46*(1-2), 151-174. https://doi.org/10.1300/J087v46n01_09

Rault, W. (2023). Les couples de même sexe dans les pays occidentaux : Mieux reconnus et plus nombreux
. *Population & Sociétés*, *607*(1), 1-4. https://doi.org/10.3917/popsoc.607.0001

Rutigliano, R., Schnor, C., & Zilincikova, Z. (2023). Moving Closer for the Grandchild? Fertility and the Geographical Proximity of a Mother and Her Adult Daughter in a Dynamic Perspective. *Demography*, *60*(3), 785-807. https://doi.org/10.1215/00703370-10670420

Statbel. (2019). *Demobel : New demographic database*. Statbel, Belgium in Figures. https://statbel.fgov.be/en/news/demobel-new-demographic-database

Statbel. (2023a, juin 22). *2022 : The year when people could finally get married*. Statbel, Belgium in Figures. https://statbel.fgov.be/en/themes/population/partnership/marriages#news

Statbel. (2023b, juin 23). *Declarations of legal cohabitation stabilise and terminations increase*. Statbel, Belgium in Figures. https://statbel.fgov.be/en/themes/population/partnership/declarations-legal-cohabitation#news

Theunis, L., Eeckhaut, M. C. W., & Van Bavel, J. (2018). Who Leaves the Joint Home after Separation? The Role of Partners' Absolute and Relative Education in Belgium. *European Sociological Review*, *34*(6), 659-674. https://doi.org/10.1093/esr/jcy035

Theunis, L., Schnor, C., Willaert, D., & Van Bavel, J. (2018). His and Her Education and Marital Dissolution : Adding a Contextual Dimension. *European Journal of Population*, *34*(4), 663-687. https://doi.org/10.1007/s10680-017-9448-y

Van Den Berg, L., & Mortelmans, D. (2022). Variation in the link between income position and union dissolution : An analysis of couples with and without a migrant background in Belgium. *Journal of Ethnic and Migration Studies*, 1-21. https://doi.org/10.1080/1369183X.2022.2132380

Van Imhoff, E. (1992). A General Characterization of Consistency Algorithms in Multidimensional Demographic Projection Models. *Population Studies*, *46*(1), 159-169. https://doi.org/10.1080/0032472031000146066

Wunsch, G., & Gourbin, C. (2018). Mortality, morbidity and health in developed societies : A review of data sources. *Genus*, *74*(1), 2. https://doi.org/10.1186/s41118-018-0027-9

Zilincikova, Z., Caceres, G., & Schnor, C. (2023). Stability in children's residential arrangements and distance to nonresident parents in the 10 years after parental separation. *Demographic Research*, *49*, 295-308. https://doi.org/10.4054/DemRes.2023.49.12

Zilincikova, Z., Linares, I. P., Artamonova, A., Brandén, M., & Schnor, C. (2023). Residential choice following separation and widowhood in middle and later life in Belgium and Sweden. *Population, Space and Place*, *e2709*. https://doi.org/10.1002/psp.2709

Zilincikova, Z., & Schnor, C. (2023). Trends in Distance Between Non-resident Parents and Minor Children Following Separation : Analysis of the Belgian Case, 1992–2018. *European Journal of Population*, *39*(1), 27. https://doi.org/10.1007/s10680-023-09674-3

Appendix

Table A1. Basic file. List of original variables.

Variable label	Variable name		Label
Individual ID	ID_DEMO_C		
Sex	cd_sex	1	Man
		2	Woman
Date of birth (day format	dt_bth		
Country of birth (3-digit code)	cd_cntry_bth		
Municipality of birth, if born in Belgium (5-digit code)	CD_REFNIS_D		

Source: DEMOBEL database.

Table A2. Stock file. List of original variables.

Variable label	Variable name	Code	Label
Identification variables			
Individual ID	*ID_DEMO_C*		
Household ID	*ID_HH_C*		
Head of household ID	*_ID_DEMO_HH_HD_C*		
Married partner ID	*ID_DEMO_PTNR_C_*		
Individual characteristics			
Year of birth	***anaiss***		
Month of birth	***mnaiss***		
Day of birth	***jnaiss***		
Sex	***cd_sex***	1	Man
		2	Woman
Civil status	*CD_CIV*	10	Single
		20	Married
		30	Widowed
		40	Divorced
Date of civil status change	*DT_STRT_CIV_STS_RRN (date)*		
Nationality	*CD_NATLTY*		
Link to the head of household	*CD_REL_HH_HD*	1	Reference person
		2	Husband, wife
		3	Son, daughter
		4	Son-in-law, daughter-in-law
		5	Granddaughter, grandson
		6	Father, mother
		7	Father-in-law, mother-in-law
		8	Grandfather, grandmother
		9	Brother, sister
		10	Brother-in-law, sister-in-law
		11	Other, related
		12	Other, unrelated
		13	Step-son, step-daughter (children of the wife/husband)
		14	Great-granddaughter/grandson
		15	Uncle, aunt (since 1995)
		16	Nephew, niece (since 1995)
		17	Cousin (since 1995)
		20	Community home
		21	Partner (since 2018)
		22	Legal cohabitant (since 2018)
		23	Comaternity (in the data since 2018)
Household characteristics			
Type of household	*HH_TYPE_LIPRO*	1	Living alone
		2	Marital couple without child
		3	Marital couple with children
		4	Non-marital cohabitants without children
		5	Non-marital cohabitant with children
		6	Single-parent families
		7	Other types of private household
		8	Collective households
Household size	*hh_size*		Number of individuals
Municipality	*CD_REFNIS*		See Appendix, Table A2

Source: DEMOBEL database

Table A3. Description of the categories on the new variable typmendet

	Short description	Label	Who is in the household
Single	Solo living man	IH	1 man
	Solo living woman	IF	1 woman
	Standard single-parent family with a man HH	MHs	Man + children
	Complex single-parent family with a man HH	MHi	Man + children + other related individuals (except grandchildren, parents and spouses of children) AND/OR unrelated individuals younger than 16
	Standard single-parent family with a woman HH	MFs	Woman + children
	Complex single-parent family with a woman HH	MFi	Woman + children + other related individuals (except grandchildren, parents and spouses of children) AND/OR other unrelated individuals younger than 16
Couple	Standard childless marital couples	CSEs	Marital couple without children
	Complex childless marital couples with related or young unrelated individuals	CSEi	Marital couple + other related individuals (except children, stepchildren, grandchildren, (in-law) parents) AND/OR unrelated individuals
	Standard marital couples with children	CAEs	Marital couple + children AND/OR stepchildren
	Complex marital couples with children with related or young unrelated individuals	CAEi	Marital couple + children AND/OR stepchildren + other related individuals (except grandchildren, (grand)parents and spouses of children) AND/OR unrelated individual younger than 16
	Standard childless different-sex non-marital couple	CoSs	2 unrelated different-sex individuals 16+
	Standard non-marital different-sex couples with children	CoAs	2 unrelated different-sex individuals 16+ + children AND/OR stepchildren of the head AND/OR unrelated individuals younger than 16
	Standard childless same-sex non-marital couple	HoSs	2 unrelated same sex individuals 16+
	Standard same-sex non-marital couples with children	HoAs	2 unrelated same-sex individuals + children/step-children of the head or unrelated individuals younger than 16
Multi-generational families	3 generational households (grandparent + parent + child) where the head of the household is married whether this is the parent or the grandparent	Multi_MA	Marital couple + parent(s) + children AND/OR stepchildren + other related AND/OR *unrelated individuals younger than 16 if any* OR Marital couple + children AND/OR stepchildren + grandchildren + *other related AND/OR unrelated individuals younger than 16 if any*
	3 generational household (grandparent + parent + child) where the head of the household is cohabitating (non-married) with a partner whether this is the parent or the grandparent	Multi_Co	Non-marital couple + parent(s) of the head + children AND/OR stepchildren + *other related AND/OR unrelated individuals younger than 16 if any* OR Non-marital couple + children + grandchildren + *other related AND/OR unrelated individuals younger than 16 if any*
	3 generational household (grandparent + parent + child) where the head of the household is single whether this is the parent or the grandparent	Multi_Solo	Man/woman + parent(s) + children + *other related AND/OR unrelated individuals younger than 16 if any* OR Man/woman + children + grandchildren + *other related AND/OR unrelated individuals younger than 16 if any*

►►

	Short description	Label	Who is in the household
Other types	2 generational household where married child is the head of the household	O_MA	Marital couple + parent(s) + other related without unrelated individuals less than 16 or children
	2 generational household where a child in non-marital cohabitation is the head of the household	O_Co	Non-marital couple + parent(s) + other related without unrelated individuals less than 16 or children
	2 generational households where a single child is the head of the household	O_Solo	Man OR woman + parent(s) + other related without unrelated individuals less than 16 or children
	Brothers and sisters only	FS	Only siblings
	Two couples household (parents + children and their married partners) where the parent is the head of the household	Pluri	Parents married + children married OR Parents non-married + children married
	Flat-sharing	Coloc	Men OR woman + from 3 to 16 unrelated individuals aged 16+ (8 years +/- mean age difference)
	Collective households and institutions, determined by regional administrative offices (e.g. retirement/ nursing homes or boarding schools)	Coll	
	Other households	Aut	Other household compositions that do not match the *typmendet* variable categories.

Source: DEMOBEL database

Note: Household members *in italics* are possible additional members, but are not necessary to define each category.

Table A4. Categorisation of multigenerational households according to the head of the household (h).

Grand-parent	Parent	Child	typmendet
Married (h)	Married	Yes	Multi_MA
Married	Married (h)	Yes	Multi_MA
Married (h)	Married	No	Pluri
Married	Married (h)	No	O_MA
Married (h)	Cohab	Yes	Multi_MA
Married	Cohab (h)	Yes	Multi_Co
Married (h)	Cohab	No	CAE
Married	Cohab (h)	No	O_Co
Married (h)	Single	Yes	Multi_MA
Married	Single (h)	Yes	Multi_Solo
Married (h)	Single	No	CAE
Married	Single (h)	No	O_Solo
Cohab (h)	Married	Yes	Multi_Co
Cohab	Married (h)	Yes	Multi_MA
Cohab (h)	Married	No	Pluri
Cohab	Married (h)	No	O_MA
Cohab (h)	Cohab	Yes	Multi_Co
Cohab	Cohab (h)	Yes	Multi_Co
Cohab (h)	Cohab	No	CoA
Cohab	Cohab (h)	No	O_Co
Cohab (h)	Single	Yes	Multi_Co
Cohab	Single (h)	Yes	Multi_Solo
Cohab (h)	Single	No	CoA
Cohab	Single (h)	No	O_Solo
Single (h)	Married	Yes	Multi_Solo
Single	Married (h)	Yes	Multi_MA
Single (h)	Married	No	MH or MF
Single	Married (h)	No	O_MA
Single (h)	Cohab	Yes	Multi_Solo
Single	Cohab (h)	Yes	Multi_Co
Single (h)	Cohab	No	MH or MF
Single	Cohab (h)	No	O_Co
Single (h)	Single	Yes	Multi_Solo
Single	Single (h)	Yes	Multi_Solo
Single (h)	Single	No	MH or MF
Single	Single (h)	No	O_Solo

Table A5. Categorisation of multigenerational households with at least two couples.

3 generational household (grandparent + parent + child) where both the head of the household (parent or grandparent) and the second couple are married	Multi_MA	Marital couple + married parents + children AND/OR stepchildren + *other related AND/OR unrelated individuals younger than 16 if any* OR Marital couple + married children AND/OR stepchildren + grandchildren + *other related AND/OR unrelated individuals younger than 16 if any*
3 generational household (grandparent + parent + child) where the head of the household (parent or grandparent) is cohabitating (non-married) with a partner and the second couple is married	Mullti_Co	Non-marital couple + married parent(s) of the head + children AND/OR stepchildren + *other related AND/OR unrelated individuals younger than 16 if any* OR Non-marital couple + married children + grandchildren + *other related AND/OR unrelated individuals younger than 16 if any*

Table A6. New variables created in the flow file.

Variable label	Variable name	Code	Label
Identifier of the non-marital partner	codernPNM		
Identifier of the couple	codecouple		
Type of partnership	couple	1	Marital couple
		2	Non-marital couple
		3	Married partners but not living together
		9	Not in a partnership
Formation of a couple *(or new cohabitation of an already marital couple)* between *t-1* and *t*	form_couple	0	No couple formation
		1	New couple, single in *t-1*
		2	New couple, repartnered
Commune of origin	commig_dep		
Commune of destination	commig_arriv		
Country of origin	pays_dep		
Country of destination	pays_arriv		
Number and rank of move(s) during a year	nmigyear		
Change of residence between *t-1* and *t*	chgres	0/1	Yes/No
Exact date of the first move between *t* and *t+1*	date_first		
Exact date of the last move between *t-1* and *t*	date_last		
Date of partnership formation	date_partner		
Type of partnership formation	migform	1	Ego moves to a partner's residence
		2	Partner moves to the individual's residence
		3	Both on the same date
		4	No moves
		5	Both not on the same date
Exact date of death between *t* and *t+1*	date_death		
Death of the partner between *t* and *t+1*	death_partner	0/1	Yes/No
Exact date of death of the partner between *t* and *t+1*	datedeath_partner		
Partnership separation/widowhood (or end of cohabitation of two married partners) between *t-1* and *t*	end_couple	0	No separation
		1	Separation, single in t
		2	Separation, new couple in t
		3	Widowhood, single in t
		4	Widowhood, repartnered in t
Move of the (ex-)partner between *t* and *t+1*	move_partner	0/1	Yes/No
Date of the first move of the (ex-)partner between *t* and *t+1*	datemove_partner		
Exact date of the union dissolution	date_diss		
Type of partnership separation	migend	1	Ego moves from the shared residence
		2	Partner moves for the shared residence
		3	Both the same date
		4	No moves
		5	Both not the same date