# DEMOGRÁFIA

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# A FŐSZERKESZTŐ ELŐSZAVA

A *Demográfia* a KSH Népességtudományi Kutatóintézet (NKI) és a Magyar Tudományos Akadémia Demográfiai Bizottságának lektorált és nyílt hozzáférésű tudományos folyóirata, amely a tágan vett népesedési kérdésekkel kapcsolatos cikkeket közöl. A lap első száma 1958-ban jelent meg, így hazánk legrégebbi társadalomtudományi szakfolyóiratai közé tartozik. Az indulás óta eltelt évtizedek alatt több tartalmi és formai átalakuláson esett át, és a 67. évfolyamába lépve ismét elérkezett a megújulás ideje. Ezeket a változtatásokat ismertetjük most röviden az Olvasókkal.

A Demográfia számára a kezdetektől fontos volt a *nemzetközi tudományossághoz való kapcsolódás.* Teret adott külföldi szerzők elemzéseinek, a demográfiához kapcsolódó híreknek, külföldi eseményekről, konferenciákról szóló beszámolóknak, és részletesen ismertette a legfrissebb idegen nyelvű könyveket és szakcikkeket a világ minden tájáról. A nemzetközi kapcsolódás módja azonban a technológiai lehetőségek, a nemzetközi tudományos mező és Magyarország ebben elfoglalt helyének változásai következtében időről időre módosul. Például az 1960-as és az 1970-es években nagyban növelte a Demográfia nemzetközi jelentőségét, hogy a szocialista tábor szinte egyetlen, magas tudományos mércéknek megfelelő demográfiai szakfolyóirata volt, és a többi szocialista ország vezető demográfusainak publikációt is közölte. Emiatt a nyugati államok demográfusai számára a magyar nyelvű Demográfia cikkeinek angol nyelvű feliratokkal ellátott táblái és ábrái, illetve a cikkekhez közölt részletes angol nyelvű absztraktok igen fontos információforrást jelentettek nemcsak Magyarország, hanem az egész keleti blokk népesedési helyzetéről. Ez az egyedi helyzet aztán olyan ismertséget jelentett a folyóirat számára, amely miatt a világ több vezető demográfusa is publikált a hasábjain. Szintén a folyóirat nemzetközi jelenlétének növelését szolgálta, hogy 2003 és 2023 között évi egy számmal megjelent a Demográfia English Edition – a folyóirat angol nyelvű változata – is, mely a

hazai és külföldi szerzők angol nyelvű, népesedési kérdéseket érintő elemzéseinek adott teret.

A 2024-es évtől a Demográfia kétnyelvű lapként működik tovább, *magyar és angol nyelvű* cikkeket is közöl. Ez az átalakulás egyben azt is jelenti, hogy a Demográfia English Edition (DEE) ezután nem jelenik meg külön, hanem beolvad a Demográfiába, a DEE pedig az adott évfolyam ötödik számaként található meg az online archívumban. A szerkesztőség magyar és angol nyelvű kéziratokat egyaránt vár; a cikk a beadás nyelvén fog megjelenni. A közlés egyéb feltételeiről a szerzői útmutató nyújt tájékoztatást:
https://demografia.hu/demografia/index.php/demografia/szerzoiutm.

További fontos változás, hogy – a 21. század kihívásainak megfelelve és a változó olvasó szokásokra reflektálva – a Demográfia mostantól *kizárólag online*, elektronikus formában jelenik meg. Cikkeink továbbra is szabad hozzáférésűek és ingyenesen olvashatók, és megjelenés után azonnal letölthetők a folyóirat honlapjáról: www.demografia.hu/demografia. Ugyanitt az 1958 óta megjelent minden szám összes tanulmánya elérhető az archívum menüponton keresztül. A nyomtatott kiadás megszűntével előfizetésre azonban már nincs lehetőség (gyakran ezek közül kettő összevontan) jelent meg. Az online folyóirattá alakulás mellett a Demográfia ezentúl évente *két számmal* jelenik meg.

Amennyiben szeretne értesülni a Demográfia friss megjelenéseiről, javasoljuk, hogy iratkozzon fel a Népességtudományi Kutatóintézet havonta megjelenő elektronikus *hírlevelére* az nki@demografia.hu e-mail címre küldött üzenettel. A feliratkozáshoz kérjük, adja meg teljes nevét és e-mail címét.

Végül változott a lap kiadásában közreműködők köre is. 2023-ban Kapitány Balázst Murinkó Lívia váltotta a *főszerkesztői* székben, és ekkor a *szerkesztőség* is részben megújult. Jelenlegi tagjai a következők: Bálint Lajos (PhD; NKI; Pécsi Tudományegyetem, Bölcsészet- és Társadalomtudományi Kar, Szociológia Tanszék), Boros Julianna (PhD; NKI; Semmelweis Egyetem, Általános Orvostudományi Kar, Magatartástudományi Intézet), Melegh Attila (PhD, MTA doktora; NKI; Budapesti Corvinus Egyetem, Társadalom- és Politikatudományi Intézet, Szociológia Tanszék) és Murinkó Lívia (főszerkesztő, PhD; NKI). A demográfia és a társtudományok neves szakértőiből álló *szerkesztőbizottság és nemzetközi tanácsadótestület* is megújul. Elnöke Spéder Zsolt (PhD, MTA doktora; NKI; Pécsi Tudományegyetem, Bölcsészet- és Társadalomtudományi Kar, Szociológia Tanszék), tagjai pedig leképezik a demográfia tudományának különböző területeit, sokszínű interdiszciplináris kapcsolódásait és hazai intézményeit.

Bízunk benne, hogy a folyóiratot érintő változások kedvező fogadtatásra találnak olvasóink körében, és hozzájárulnak ahhoz, hogy a Demográfia a jövőben

még szélesebb körben elérhető és szakmailag releváns maradjon. Az elmúlt évtizedek alatt felépített olvasói bizalom és a lap eddigi szakmai irányvonala reményeink szerint továbbra is biztosítja, hogy a Demográfiát értékes és megbízható forrásként forgassák mind a kutatók, mind a szakpolitikai döntéshozók, mind pedig a társadalom népesedési kérdései iránt érdeklődő szélesebb közönség.

Köszönjük, hogy a folyóiratunk olvasói között tudhatjuk!

Murinkó Lívia
főszerkesztő

# FOREWORD BY THE EDITOR-IN-CHIEF

*Demográfia* is the peer-reviewed, open access journal of the Hungarian Demographic Research Institute (HDRI) and the Demographic Committee at the Hungarian Academy of Sciences. Demográfia publishes scholarly articles on demographic issues. First published in 1958, it is one of the oldest social science journals in Hungary. Since its launch, the journal has undergone several transformations in terms of its content and format. As it enters its 67th volume, it is time for renewal once again. These changes are presented briefly to our readers below.

From its inception, Demográfia has been dedicated to fostering close *ties with the international academic community.* The journal has provided a platform for studies by foreign authors, news related to demography, coverage of events and conferences abroad, and detailed reviews of the latest foreign-language articles and books from around the world. However, the way in which international links are established evolves over time due to technological advancements, changes in the global scientific landscape, and Hungary's position within it. For example, Demográfia's international importance was greatly enhanced in the 1960s and 1970s by the fact that it was one of the few demographic journals in the socialist bloc to meet high scientific standards. In addition, it published studies by leading demographers from other socialist countries during this period. The Hungarian articles, which included tables, figures, and detailed abstracts in English, were valuable sources of information for Western scholars on the demographic situation in Hungary and in the wider Eastern Bloc. This unique situation gave the journal such visibility that many of the world's leading demographers contributed original articles to Demográfia. To further increase the journal's international presence, the Demográfia English Edition (DEE) was published annually from 2003 to 2023, offering English-language analyses of population issues by local and international authors.

From 2024 onwards, Demográfia will continue to operate as a *bilingual* journal, publishing articles in either *Hungarian or English*. As part of this transformation, DEE is no longer published separately, but it is instead incorporated into the main journal. Issues of DEE are available in the online archive as the fifth issue of each volume. The editorial team welcomes manuscripts in both English and Hungarian, and articles will be published in the language of submission. For details of our conditions of publication, please refer to the authors' guidelines: https://demografia.hu/demografia/index.php/demografia/szerzoiutm.

In response to the challenges of the 21st century and changing reading habits, another important change is that Demográfia is now published *exclusively online* in electronic format. Our articles will remain freely accessible and can be downloaded immediately after publication from the journal's website: www.demografia.hu/demografia. The archive on the same website contains all the studies from every issue since 1958. Subscribers should be aware that, consequent to the discontinuation of the print edition, subscriptions are no longer available. Alongside the transition to an online journal, Demográfia will now be published *twice a year.*

To receive notifications about the latest issues, we encourage readers to subscribe to the monthly electronic *newsletter* of the Hungarian Demographic Research Institute by sending an e-mail to nki@demografia.hu. When subscribing, please provide your full name and e-mail address.

Finally, the journal's editorial team has also changed. In 2023, Lívia Murinkó took over from Balázs Kapitány as *Editor-in-Chief*, and several new *editors* joined the team. The current editors are: Lajos Bálint (PhD; HDRI; University of Pécs, Faculty of Humanities and Social Sciences, Department of Sociology), Julianna Boros (PhD; HDRI; Semmelweis University, Faculty of Medicine, Institute of Behavioural Sciences), Attila Melegh (PhD, DSC; HDRI; Corvinus University of Budapest, Institute of Social and Political Sciences, Department of Sociology) and Lívia Murinkó (Editor-in-Chief, PhD; HDRI). *The Editorial Board* and the *International Advisory Board*, composed of renowned experts in demography and other disciplines, will also be renewed. Zsolt Spéder (PhD, DSc; HDRI; University of Pécs, Faculty of Humanities and Social Sciences, Department of Sociology) continues to serve as the Head of the Editorial Board. Board members represent the various fields of demography and its interdisciplinary links. They maintain and expand the network of contacts that links the journal to universities and research institutions in Hungary and abroad.

We hope that our readers will welcome the changes to the journal and that they will help ensure Demográfia's continued popularity and professional rele-

vance. We hope that the trust built up with authors and readers over the past decades will ensure that Demográfia continues to be a valuable and reliable resource for researchers, policymakers, and the wider public interested in population issues.

Thank you for being one of our readers!

Lívia Murinkó
Editor-in-Chief

# PHYSICAL INACTIVITY DURING PREGNANCY: ITS ASSOCIATIONS WITH SOCIO-DEMOGRAPHIC BACKGROUND AND MENTAL HEALTH[1]

Nikolett Gabriella Sándor – Julianna Boros – Krisztina Kopcsó – Beatrix Lábadi

## ABSTRACT

Exercise during pregnancy is known to have positive effects on both maternal and foetal health. Despite international recommendations advocating regular exercise for healthy pregnant women, survey data indicate that physical activity decreases during pregnancy, particularly in the third trimester. This study aims to assess the physical activity levels of pregnant women in Hungary in a representative sample and to explore the association between physical inactivity, socio-demographic characteristics, and mental health. Utilizing data from the Cohort '18 Hungarian Birth Cohort Study, our analysis encompasses 6,121 pregnant women. Maternal physical activity was assessed in the third trimester, both for the time of the interview and retrospectively for the pre-

[1] The Cohort '18 Growing Up in Hungary research was financed within the framework of the EFOP-1.9.4.–VEKOP-16-2016-00001 invitation (Renewing methodology and informatics in the social sector), issued by the Hungarian Ministry of Human Capacities.
We would like to thank all the health visitors and the mothers who participated in the Cohort '18 Growing Up in Hungary research. Furthermore, we would like to thank Róbert Urbán for his invaluable methodological advice provided for the analysis.

pregnancy period. Mental health was evaluated through the CES-D-8 and GAD-2 questionnaires. The inactivity rate (defined as less than 1 hour per week) in the third trimester was 70% for walking, 92% for cycling, and 90% for sports. Inactivity increased across all forms of physical activity during pregnancy. The socio-demographic determinants influencing physical activity during pregnancy varied for different activities. The examined socio-demographic variables explained 3.5–4.7% of the variance in walking, 3.3–7.8% in cycling, and 7–14% in doing sport during pregnancy. Mental health was only significantly associated with sport activity. These findings underscore the importance of raising awareness about physical activity in antenatal care, particularly targeting at-risk populations.

Keywords: pregnancy, physical activity, socio-demographic background, mental health

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# INTRODUCTION

## EXERCISE DURING PREGNANCY

Physical activity (PA) is defined as exercise that involves movement of the skeletal muscles that requires energy expenditure. This encompasses a diverse array of activities, such as movement during various leisure activities, transportation, and even work. Regular PA at moderate to high intensity has been established to yield favourable health outcomes (Mottola et al., 2018). There are guidelines for prescribing exercise in specific populations and age groups (World Health Organization, 2022). One such distinctive life situation that merits consideration is pregnancy (Davenport et al., 2018).

During pregnancy, the body undergoes numerous changes (Dagher et al., 2021; Soma-Pillay et al., 2016). However, exercise is recommended during pregnancy unless there is any medical contraindication (e.g. high-risk pregnancy) (Peters & Brazeau, 2019).

The American College of Obstetricians and Gynecologists (ACOG) recommends that pregnant women should get at least 150 minutes of moderate-intensity exercise per week. ACOG recommends at least 20–30 minutes of exercise on most or all days of the week (see ACOG Opinion Committee, 2020).

PA during pregnancy may prevent excessive gestational weight gain (Ruchat et al., 2018; Watson et al., 2018), gestational diabetes (Dipla et al., 2021; Laredo-Aguilera et al., 2020; Peters & Brazeau, 2019), high neonatal birth weight – also known as macrosomia – (Nguyen & Ouzounian, 2021), and gestational hypertension (Magro-Malosso et al., 2017; Witvrouwen et al., 2020; Yeo et al., 2000). Excessive gestational weight gain, gestational diabetes and macrosomia are often related (Davenport et al., 2018).

PA during pregnancy may also exert a positive effect on the wellbeing of the future baby (Mudd et al., 2013; Nascimento et al., 2015).

Previous international research has demonstrated a general decline in PA during pregnancy (Borodulin et al., 2008), a trend that becomes particularly pronounced in the third trimester (Downs et al., 2012). A 2014 study conducted in the United States revealed that only 32% of pregnant women met recommended levels of exercise in the early stages of pregnancy. This rate fell further to 12% in late pregnancy (Ruifrok et al., 2014). Similarly, a study of PA patterns among pregnant women in Singapore also revealed a decreasing trend in PA

frequency across the trimesters of pregnancy (Padmapriya et al., 2015). Another study of Chinese women found that only 11.1% of pregnant women exercised at the recommended level (Zhang et al., 2014).

Results from an extensive cohort study found that nearly 60% of New Zealand women maintained an active lifestyle during their pregnancy. Among those who were physically active, 40% decreased the amount of activity during the first trimester and a subsequent 30% further reduced PA in the later trimesters. Notably, only 4% of the initially inactive mothers started the recommended level of activity in the first trimester of pregnancy. The researchers concluded that the probability of women who were inactive before pregnancy getting the right amount of exercise and becoming active during pregnancy was negligible (Morton et al., 2010).

A large-sample cohort study in Denmark also assessed pregnant women's frequency of exercise. The study of nearly 8,000 participants shows that 38% of Danish mothers adhered to the recommended exercise guidelines in early pregnancy. The study found that the four most popular forms of exercise in early pregnancy were cycling, running, walking and strength training. In early pregnancy, 30% of women cycled, 22% did brisk walking, 10% ran and 8% performed strength training (Broberg et al., 2015).

A Spanish study found that 20.3% of pregnant women at 20 weeks' gestation met the ACOG recommendation for PA (Amezcua-Prieto et al., 2011).

Results from a cohort study that was conducted in Norway between the 17th and 21st gestation weeks found that 14.6% of pregnant women exercised the adequate amount during pregnancy. The study used the Norwegian recommendations of at least 20 minutes of moderate-intensity PA three times a week as a reference. 31.3% of the women in the study did less than one session of PA per week (Gjestland et al., 2013).

International results show similarly low levels of PA during pregnancy. However, detailed comparisons of the results are complicated because the studies used different measurement methods, examined women in different trimesters of pregnancy and in some cases referred to national rather than international recommendations, making it difficult to interpret the results.

Except for the Cohort '18 Hungarian Birth Cohort Study discussed in the present paper, no previous representative study has specifically investigated data on the frequency of PA during pregnancy in Hungary. According to the 2014 European Health Interview Survey, 15% of men and 10% of women exercise at least 150 minutes a week, based on the PA of the total Hungarian population (Bíró & Tokaji, 2018). The 2019 wave of the European Health Interview

Survey found that three out of ten Hungarian adults exercised in their leisure time in line with the World Health Organization (WHO) recommendations for PA for adults (Hungarian Central Statistical Office, 2019).

Drawing on insights from global findings, we expect the overall level of PA to decrease during pregnancy among women in Hungary.

## EXERCISE AND MENTAL HEALTH

In mood disorders, female gender is associated with increased sensitivity (American Psychiatric Association, 2013). The multifaceted physical (Soma-Pillay et al., 2016), psychological (Meltzer-Brody & Stuebe, 2014) and social (Slomian et al., 2019) transformations during pregnancy and childbirth can impose significant challenges on women going through this period. Notably, depression emerges as a frequent serious complication during pregnancy (Dagher et al., 2021). Peripartum depression, i.e. depression during pregnancy, childbirth and the puerperium, is a condition affecting up to one in seven women, according to international data (Langan & Goodbred, 2016). A large-sample study in the Netherlands found that 4% of women experienced symptoms of depression in each trimester of pregnancy. Perinatal depression in any trimester was associated with previous mental health problems, multiparity and unplanned pregnancy (Truijens et al., 2017).

Many women also experience anxiety during the antenatal period because, as mentioned above, pregnancy brings about many changes. Anxiety is a normal emotional response, but it can become abnormal if it is exaggerated and interferes with the mother's daily life. Anxiety symptoms can have negative effects on both the mother and the foetus (Ding et al., 2014; Rubertsson et al., 2014). Perinatal anxiety may be caused by generalised anxiety disorder.

Antenatal depression and anxiety may go unnoticed, often resulting in a lack of treatment. This happens because depressive symptoms may be found among the many changes associated with pregnancy, leaving pregnant women and professionals to identify depressive symptoms with the transient changes associated with pregnancy. These symptoms typically include weight changes, appetite changes and sleeping problems (Coates et al., 2004). Depression and anxiety in the peripartum period have negative effects on both the child and the mother (Ruchat et al., 2018; Waters et al., 2014; Weinstock, 2005). In particular, depression or anxiety disorder during pregnancy increase the likelihood of developing postpartum depression (Underwood et al., 2016).

Several previous studies have examined the association between PA and mental health during the perinatal period. A meta-analysis (Daley et al., 2015) identified significant reductions in depression scores attributable to exercise. However, the strength of these associations was found to be weak to moderate. A systematic review revealed that exercise during pregnancy reduced the odds of depression during pregnancy and mitigated the severity of the symptoms (Davenport et al., 2018). However, this beneficial effect did not extend to the postpartum period, and no association was found for anxiety in either the peri- or postnatal period. Sánchez-Polán and colleagues (2021) examined the effect of PA on the development of perinatal depression. Reviewing 15 studies, they found that physically inactive women were 16% more likely to develop perinatal depression and identified a negative association between depression and PA. The authors highlighted that all the reviewed studies examined healthy pregnant women, which enabled them to examine the onset of depressive symptoms but not the diagnosed depression and its impact. He et al. (2023) filled the gap of previous studies by conducting a meta-analytic study on the effect of exercise on depression. The uniqueness of this study is that both the level and duration of PA were included in the analysis. Their findings indicated that moderate exercise may decrease the risk of postpartum depression in the general pregnant population. They also found that both low and moderate intensity exercise had a positive effect on symptoms in women with postpartum depression.

According to the literature, the relationship between exercise and maternal mental health during pregnancy is complex (Takahasi et al., 2013). PA has a preventive effect on the development of mental problems (Goodwin, 2003; Mortazavi et al., 2012; Saxena et al., 2005), and PA can serve as an intervention to treat mental disorders (Conn, 2010; Dinas et al., 2011; Singh et al., 2023). Furthermore, lower levels of maternal mental health are associated with increased inactivity during pregnancy. This association may be attributed to the physical effort required by PA, which can be more challenging for mothers with poorer mental health, along with a potential decrease in their motivation to engage in exercise (Poudevigne & O'Connor, 2006; Takahasi et al., 2013).

## EXERCISE AND SOCIO-DEMOGRAPHIC BACKGROUND

Several studies on individual differences in exercise during pregnancy examined the role of socio-demographic background of pregnant women. The ef-

fects of education and household income on PA during pregnancy were identified. Studies have consistently confirmed that higher maternal education and higher household income are associated with more frequent PA during pregnancy (Fell et al., 2009; Gebregziabher et al., 2019; Larrañaga et al., 2013; Nascimento et al., 2015; Petersen et al., 2005). Larrañaga and colleagues (2013), comparing results of four cohort studies on pregnant women, found that inactivity rates were higher among mothers from low socio-demographic backgrounds. In a review study, Gaston and Cramp (2011) summarized the findings of 25 studies and identifies socio-demographic characteristics such as higher level of maternal education, household income, pre-pregnancy PA and having no children currently in the household as predictors of higher PA. However, there is a lack of consistency in the research results in terms of parity. Some studies found that primiparity was associated with lower levels of PA (Gebregziabher et al., 2019; Syed Nor et al., 2022), while others identified relationship between inactivity and multiparity (Davenport et al., 2018; Gaston & Cramp, 2011). Further research (Alghamdi, 2023) using structured interviews showed that age, body mass index and work status were also important predictors of PA during pregnancy.

Based on Hungarian population survey data, PA (not including walking and cycling) is associated with socio-demographic characteristics. More than half of individuals in the top income quintile and those with a tertiary degree perform the recommended amount of exercise per week, compared to only one-fifth of those in the bottom income quintile, women with up to eight years of primary education and men with vocational education (Bíró & Tokaji, 2018).

To date, no representative study has specifically investigated data on PA during pregnancy and its associations in Hungary. Given the risks associated with physical inactivity during pregnancy, the aim of this study is to assess the PA levels of pregnant women in Hungary using a representative sample of the Cohort '18 Hungarian Birth Cohort Study. Additionally, this study seeks to explore the association of socioeconomic status and mental health with physical inactivity during pregnancy.

## METHODS

### DESIGN AND SAMPLE

The present study analyses data from the first, prenatal wave of the Cohort '18 Hungarian Birth Cohort Study (abbreviated as Cohort '18), conducted by the

Hungarian Demographic Research Institute.[2] Cohort '18 is a longitudinal cohort study designed to examine a representative sample of children growing up in Hungary. The research adopts a multidisciplinary approach, with a particular focus on demographic characteristics, social, health-related, developmental and psychological factors. The study population consists of Hungarian mothers whose children were expected to be born between 1 April 2018 and 30 April 2019. Recruitment and data collection were conducted via the network of health visitors, who received preliminary training. In Hungary, the health visitor service provides an obligatory health service as part of the antenatal care. The one-time state allowance that mothers receive at the birth of their child is conditional on attending antenatal care. If the pregnant woman refuses to cooperate with the health visitors, they must report this to child protection services. They are responsible for following the pregnancy and examining pregnant women, and thus they are competent to assess the health or social risk of pregnancy.

The study sample is considered to be representative of the population of women giving birth in Hungary in 2018 in terms of maternal age, education, official marital status, place of residence and parity.

The research complied with both the Code of Ethics for Hungarian Psychologists and the Declaration of Helsinki. In addition to prior verbal information, participants were provided with written information on data protection and data management in all cases. Participation in the research was based on voluntary informed consent, which was signed in writing by the subjects (or by their legal guardian for participants under 18 years of age). Details of the legislation and the research are described in published technical reports (Szabó, 2021; Veroszta, 2018, 2019).

In the first wave of the study, pregnant women were contacted during the third trimester of their pregnancy (gestational weeks 28–31) by health visitors. In some cases ($n$ = 1668, percentage = 20.2%, minimum = 20th week, maximum = 40th week), the data were collected outside the specified gestational interval. In the present analysis, respondents beyond gestational weeks 28–31 are excluded to improve the interpretability of the data. We also exclude multiple pregnancies, as they are considered as pregnancies at risk (Buhling et al., 2003) (twin pregnancy $n$ = 120, percentage = 1.45%; triplet pregnancy = 1, percentage = 0.01%). The total number of participants is 6,121. We have not applied data replacement for missing data, so the sample size may vary.

[2] The public database of the study is available on reasonable request from the Hungarian Demographic Research Institute.

# MEASURES

## Socio-demographic and pregnancy-related data

In the analysis, socio-demographic and pregnancy-related data were used from the prenatal wave of the Cohort '18 survey (grouping certain categories together for the purposes of this analysis) and from the linked data of the Pregnancy Booklet, provided by health visitors with maternal consent.

The analysed socio-demographic background variables were maternal age (14–19; 20–24; 25–29; 30–34; 35–39; 40+ years), highest maternal educational attainment (up to 8 years of primary schooling; vocational training; secondary education; higher education), equivalent income quintiles[3] (1 = lowest; 5 = highest), parity (first child of the mother; not the first child), the population of settlement (up to 1,000; 1,001–4,999; 5,000–19,900; 20,000–49,999; 50,000–1,000,000 inhabitants; Budapest (capital of Hungary)), and work status[4] (unemployed; employed).

Regarding maternal health status, the analyses included pregnancy risk classification and mothers' subjective health assessment. The risk classification of pregnancy was based on the opinion of the local health visitors, as indicated by the official classification of mothers' pregnancy risk in the Pregnancy Booklet (need extra pregnancy care for health or social reasons; no need for extra care). The subjective health rating was measured on a Likert scale of 1 to 5 for the mother's assessment of her health (1 = very good; 5 = very poor).

## Depressive symptoms

Depressive symptoms were assessed using an 8-item version (Bracke et al., 2008) of the Center for Epidemic Studies Depression questionnaire (Radloff, 1977) (CES-D-8). The Hungarian translation of the questionnaire was done by Szeifert (2010). In the questionnaire, respondents indicate on a 4-point Likert scale how often they have experienced certain feelings or behaviour in the past week (0 = None or almost none of the time (less than one day), 3 = All or almost all of the time (5–7 days)). A higher score indicates a higher frequency of depressive experiences. The internal consistency of the scale was found to be good throughout the study (Cronbach's alpha = 0.755). Questions about depressive experiences were included in the self-administered paper-pencil

[3] The means of net monthly equivalent income, divided into equalised household income quintiles, calculated on the total sample. This is based on a square-root equivalence scale, following OECD practice.

[4] Based on employment, regardless of whether the woman is actively working or already on maternity leave.

questionnaire. Following the previous literature in Hungary (Kopcsó, 2020), the cut-point for CES-D-8 was set at ≥ 9, based on the stricter cut-off.

## Generalised anxiety

Generalised anxiety was measured using the Generalised Anxiety Disorder-2 scale (GAD-2) (Kroenke et al., 2007). The questionnaire can be used to screen anxiety symptoms. The measure uses a 4-point Likert scale (0 = Not at all; 3 = Nearly every day) to reveal how often the respondent's certain behaviour and feelings occurred over the past two weeks. The questionnaire consists of two items. The minimum score obtainable on the test is 0 and the maximum is 6. The higher the score, the more anxiety symptoms the respondent reports.

The measure is suitable for screening for generalised anxiety disorder, also in the population of pregnant women (National Institute for Health and Care Excellence, 2014). The questionnaire was found to be reliable (Cronbach's alpha = 0.702) in the Cohort '18 study. The assessment of generalised anxiety was part of the self-administered paper-pencil questionnaire. Following the previous literature in Hungary (Kopcsó, 2020), the GAD-2 cut-off point was defined at ≥ 3.

## Physical activity

PA during pregnancy was measured in the third trimester, as well as retrospectively for the pre-pregnancy period. A 4-point scale (1 = Not at all; 2 = Less than an hour; 3 = More than one but less than three hours; 4 = At least three hours) was used to indicate the mean duration of weekly PA of the mothers during these periods. The following activities were assessed: 1) physical activity, such as swimming, running, aerobics, and tennis (referred to henceforth as sport); 2) cycling, including cycling to work and outdoor activity; and 3) walking, including walking to work. The computer- or paper-assisted personal interviews were assisted by local health visitors (Szabó, 2021). For the analysis, the original four response categories of frequency have been merged into two categories (less than one hour per week; at least one hour per week). The cut-off point for PA during pregnancy is at least one hour per week. Thus, pregnant women who exercised less than one hour per week during the 28–31 weeks of gestation were included in the inactive category.

## DATA ANALYSIS

For the categorical variables, we report their frequencies and percentages. The CES-D-8 and GAD-2 scores were transformed from continuous to categorical variables. The four categories of the distress variable consisted of depressive and anxiety symptoms. *Sine morbo* meant the absence of these symptoms. The depressive symptoms category indicated a high-risk score only on the CES-D-8 scale, while anxiety symptoms indicated a high-risk score on the GAD-2 questionnaire. The comorbidity category included those who had both symptoms together.

The Pearson chi-square test was used to calculate the difference in the exercise frequency before and during pregnancy. Effect sizes are reported using Phi indices.

Firstly, three binary logistic regression models were applied for the multivariate analysis with activity as the dependent variable in the three PA forms (sports, walking, and cycling). The predictor variables included in the model were socio-demographic background variables, namely maternal age, equivalent income quintiles, population of settlement, highest maternal educational attainment, parity, and work status.

For the final model, we also used binary logistic regression analysis, in which we added the distress variable as an additional predictor. The independent variables were analysed using the ENTER method. In order to control for maternal health status, the model included pregnancy risk classification and mothers' subjective health assessment. We reported odds ratios and corresponding 95% confidence intervals (CI).

The accepted significance level was $p < 0.05$. Data was weighted for the statistical analysis in order to eliminate minor biases in the sample. Details of the weighting method is described in the technical report of Szabó (2021).

# RESULTS

## CHARACTERISTICS OF PARTICIPANTS

The maternal characteristics included in this study are presented in *Table 1*.

*Table 1: Descriptive characteristics of respondents*

| Maternal characteristics | *N* (%) |
|---|---|
| Age (*N* = 6121) | |
| 14–19 years | 333 (5.4) |
| 20–24 years | 918 (15.0) |
| 25–29 years | 1620 (26.5) |
| 30–34 years | 1854 (30.3) |
| 35–39 years | 1087 (17.8) |
| 40+ years | 309 (5.1) |
| Educational attainment (*N* = 6121) | |
| Up to 8 years of primary schooling | 1230 (20.1) |
| Vocational training | 732 (12.0) |
| Secondary education | 2103 (34.3) |
| Higher education | 2057 (33.6) |
| Equivalent income quintiles (*N* = 5498) | |
| 1 (lowest) | 1101 (20.1) |
| 2 | 1102 (20.1) |
| 3 | 1094 (19.9) |
| 4 | 1159 (21.1) |
| 5 (highest) | 1028 (18.7) |
| Relationship status (*N* = 6121) | |
| Married | 3321 (54.2) |
| Cohabiting | 2581 (42.2) |
| Single/LAT | 219 (3.6) |
| Parity (*N* = 6105) | |
| First child | 2831 (46.4) |
| Second child | 2018 (33.1) |
| Third child | 870 (14.3) |
| Fourth or subsequent child | 386 (6.3) |
| Population of the settlement (*N* = 6121) | |
| Up to 1,000 inhabitants | 633 (10.3) |
| 1,001–4,999 inhabitants | 1739 (28.4) |
| 5,000–19,999 inhabitants | 1252 (20.5) |
| 20,000–49,999 inhabitants | 595 (9.7) |
| 50,000–1,000,000 inhabitants | 920 (15.0) |
| Budapest | 983 (16.1) |
| Employment status (*N* = 6121) | |
| Unemployed | 1695 (27.7) |
| Employed | 4426 (72.3) |
| Self-perceived health (*N* = 5774) | |
| Very good | 1567 (27.1) |
| Good | 3390 (58.7) |
| Fair | 754 (13.1) |
| Poor | 55 (1.0) |
| Very poor | 9 (0.1) |
| Need for extra pregnancy care (*N* = 6080) | |
| Yes, for health reasons | 2228 (36.6) |
| Yes, for social reasons | 230 (3.8) |
| Yes, for health and social reasons | 230 (3.8) |
| No need for extra care | 3392 (55.8) |

*Source:* Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

The mean gestation age of pregnancy at the time of the survey was 29.5 weeks (*SD* = 1.09). The mean age of mothers at birth was 29.7 years (*SD* = 6.02). 56.8% of the respondents belonged to the 25–34 age group. In terms of educational attainment, one third of mothers had tertiary education, one third had completed secondary education, while the lowest level of education, eight grades or less, was found in one fifth of mothers.

Just over half of them were married, slightly fewer were in a cohabiting partnership, with only 3.6% single or living apart together (LAT). Almost half of the participants' children in the survey were the first of their mother. One in ten respondents lived in settlements with fewer than 1,000 inhabitants, while one in six mothers lived in the capital. According to the health visitors' opinion, more than one out of three mothers needed extra pregnancy care for health reasons.

## PHYSICAL ACTIVITY LEVELS

*Table 2* shows the PA levels among the participants, classified into domains and duration per week, before and during pregnancy. We examined three types of physical activities: walking, biking, and sport.

Two thirds of the respondents used to walk, more than one out of four used to bike, and one third used to do some kind of sports at least 1 hour per week before pregnancy. A significant decrease can be observed in all three areas during pregnancy, with medium to large effect sizes. While the majority maintained their walking activity, the decrease in cycling and sports was remarkable.

*Table 2: Physical activity levels before and during pregnancy*

| Physical activity levels among respondents | *N* (%) |
|---|---|
| Walking | |
| before pregnancy (*N* = 6121) | |
| less than 1 hour/week | 2036 (33.4) |
| at least 1 hour/week | 4068 (66.6) |
| during pregnancy (*N* = 6105) | |
| less than 1 hour/week | 2493 (40.8) |
| at least 1 hour/week | 3613 (59.2) |
| Pearson $\chi^2$ | 3130.520** |
| Phi | 0.716 |
| Biking | |
| before pregnancy (*N* = 6106) | |
| less than 1 hour/week | 4440 (72.7) |
| at least 1 hour/week | 1666 (27.3) |
| during pregnancy (*N* = 6103) | |
| less than 1 hour/week | 5607 (91.9) |
| at least 1 hour/week | 497 (8.1) |
| Pearson $\chi^2$ | 1240.351** |
| Phi | 0.451 |
| Sport | |
| before pregnancy (*N* = 6103) | |
| less than 1 hour/week | 4135 (67.7) |
| at least 1 hour/week | 1968 (32.3) |
| during pregnancy (*N* = 6107) | |
| less than 1 hour/week | 5487 (89.8) |
| at least 1 hour/week | 620 (10.2) |
| Pearson $\chi^2$ | 1036.705** |
| Phi | 0.412 |

*Note:* Significance levels: * $p < 0.05$, ** $p < 0.001$.
*Source*: Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

## MENTAL HEALTH PROBLEMS

*Table 3* shows the prevalence of mental health problems among the respondents. Based on self-report, three quarters of the mothers had no mental health problems. Every sixth mother showed depressive symptoms, and a similar rate had anxiety symptoms. As many respondents were affected by both mental health problems, we can observe a 7.7% prevalence of comorbidity.

*Table 3: Self-reported mental health problems among pregnant mothers*

| Mental health problems among respondents | *N* (%) |
|---|---|
| Depression symptoms (*N* = 6121) | |
| Yes | 941 (15.8) |
| No | 5027 (84.2) |
| Anxiety symptoms (*N* = 6121) | |
| Yes | 912 (15.5) |
| No | 4981 (84.5) |
| Distress (*N* = 6121) | |
| Sine morbo | 4498 (76.7) |
| Depression symptoms only | 462 (7.9) |
| Anxiety symptoms only | 452 (7.7) |
| Comorbidity | 453 (7.7) |

*Source:* Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

## DETERMINANTS OF PHYSICAL ACTIVITY DURING PREGNANCY

In order to explore the sociodemographic background of physical inactivity during pregnancy, three initial models were constructed, separately for walking, cycling, and sport. In all three cases, the outcome variable was whether the pregnant woman engaged in the activity for at least 1 hour per week. The explanatory variables were maternal age, education, parity, employment status, household income, and population of the settlement.

All three initial logistic regression models were found to be significant (walking: $-2LL = 7195.36$; $\chi^2(19) = 192.79$; $p < 0.001$; cycling: $-2LL = 2872.16$; $\chi^2(19) = 185.02$; $p < 0.001$; sport: $-2LL = 3234.77$; $\chi^2(19) = 386.71$; $p < 0.001$).

The examined socio-demographic variables explained 3.5–4.7% of the variance in walking, 3.3–7.8% in cycling, and 7–14% in doing sport during pregnancy.

Overall, household income, maternal educational attainment, parity, and the population of the settlement were found to be statistically significant in the models for walking and doing sport during pregnancy. In contrast, maternal education, employment status, and the population of the settlement had significant predictive power in the models for cycling during pregnancy. Maternal age was not significant in either model.

The model values are presented in detail in *Tables 4–6*.

*Table 4: Logistic regression to determine factors associated with walking activity during pregnancy*

| | *B* | *S.E.* | *OR* | CI 95% | | *p* |
|---|---|---|---|---|---|---|
| Equivalent income quintiles | | | | | | 0.003* |
| 1 (lowest) | −0.258 | 0.111 | 0.772 | 0.621 | 0.961 | 0.020 |
| 2 | −0.283 | 0.102 | 0.753 | 0.617 | 0.920 | 0.005 |
| 3 | −0.076 | 0.097 | 0.927 | 0.766 | 1.121 | 0.434 |
| 4 | 0.045 | 0.094 | 1.046 | 0.870 | 1.257 | 0.635 |
| 5 (highest; ref.) | | | | | | |
| Maternal age | | | | | | 0.059 |
| 14–19 years | 0.282 | 0.199 | 1.326 | 0.897 | 1.959 | 0.157 |
| 20–24 years | 0.286 | 0.158 | 1.331 | 0.977 | 1.815 | 0.070 |
| 25–29 years | 0.117 | 0.143 | 1.124 | 0.848 | 1.488 | 0.416 |
| 30–34 years | 0.035 | 0.141 | 1.036 | 0.785 | 1.366 | 0.805 |
| 35–39 years | −0.061 | 0.148 | 0.941 | 0.704 | 1.258 | 0.681 |
| 40+ years (ref.) | | | | | | |
| Population of the settlement | | | | | | 0.000** |
| Up to 1,000 inhabitants | −0.867 | 0.120 | 0.420 | 0.332 | 0.531 | 0.000 |
| 1,001-4,999 inhabitants | −0.808 | 0.098 | 0.446 | 0.368 | 0.540 | 0.000 |
| 5,000-19,999 inhabitants | −0.566 | 0.100 | 0.568 | 0.467 | 0.691 | 0.000 |
| 20,000-49,999 inhabitants | −0.527 | 0.119 | 0.590 | 0.468 | 0.745 | 0.000 |
| 50,000–1,000,000 inhabitants | −0.254 | 0.107 | 0.776 | 0.629 | 0.957 | 0.018 |
| Budapest (ref.) | | | | | | |
| Educational attainment | | | | | | 0.018* |
| Up to 8 years of primary schooling | −0.357 | 0.114 | 0.700 | 0.560 | 0.875 | 0.002 |
| Vocational training | −0.179 | 0.106 | 0.836 | 0.679 | 1.030 | 0.092 |
| Secondary education | −0.149 | 0.074 | 0.861 | 0.745 | 0.996 | 0.043 |
| Higher education (ref.) | | | | | | |
| Employment status | | | | | | |
| Unemployed | 0.013 | 0.081 | 1.014 | 0.865 | 1.188 | 0.868 |
| Employed (ref.) | | | | | | |
| Parity | | | | | | |
| First child of the mother | −0.191 | 0.063 | 0.826 | 0.730 | 0.935 | 0.002* |
| Not the first child (ref.) | | | | | | |
| Constant | 1.170 | 0.157 | 3.221 | | | 0.000** |

*Notes*: Abbreviations: OR – odds ratio, CI – confidence interval; ref. – reference category. Significance levels: * $p < 0.05$, ** $p < 0.001$.

*Source*: Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

*Table 5: Logistic regression to determine factors associated with cycling activity during pregnancy*

| | *B* | *S.E.* | *OR* | CI 95% | | *p* |
|---|---|---|---|---|---|---|
| Equivalent income quintiles | | | | | | 0.122 |
| 1 (lowest) | 0.344 | 0.220 | 1.410 | 0.917 | 2.169 | 0.118 |
| 2 | 0.537 | 0.206 | 1.711 | 1.142 | 2.563 | 0.009 |
| 3 | 0.360 | 0.204 | 1.433 | 0.961 | 2.138 | 0.078 |
| 4 | 0.300 | 0.202 | 1.350 | 0.909 | 2.006 | 0.137 |
| 5 (highest; ref.) | | | | | | |
| Maternal age | | | | | | 0.347 |
| 14–19 years | –0.271 | 0.352 | 0.763 | 0.383 | 1.520 | 0.441 |
| 20–24 years | –0.087 | 0.298 | 0.917 | 0.512 | 1.644 | 0.771 |
| 25–29 years | 0.134 | 0.277 | 1.144 | 0.664 | 1.969 | 0.628 |
| 30–34 years | 0.021 | 0.278 | 1.021 | 0.592 | 1.760 | 0.941 |
| 35–39 years | –0.169 | 0.296 | 0.845 | 0.472 | 1.510 | 0.569 |
| 40+ years (ref.) | | | | | | |
| Population of the settlement | | | | | | 0.000** |
| Up to 1,000 inhabitants | 0.050 | 0.265 | 1.051 | 0.625 | 1.767 | 0.852 |
| 1,001–4,999 inhabitants | 0.527 | 0.214 | 1.693 | 1.114 | 2.575 | 0.014 |
| 5,000–19,999 inhabitants | 1.227 | 0.206 | 3.410 | 2.275 | 5.110 | 0.000 |
| 20,000–49,999 inhabitants | 0.516 | 0.253 | 1.676 | 1.021 | 2.750 | 0.041 |
| 50,000–1,000,000 inhabitants | 0.145 | 0.247 | 1.156 | 0.712 | 1.878 | 0.558 |
| Budapest (ref.) | | | | | | |
| Educational attainment | | | | | | 0.000** |
| Up to 8 years of primary schooling | 0.649 | 0.193 | 1.913 | 1.309 | 2.795 | 0.001 |
| Vocational training | 0.593 | 0.181 | 1.810 | 1.270 | 2.579 | 0.001 |
| Secondary education | –0.109 | 0.151 | 0.897 | 0.667 | 1.206 | 0.471 |
| Higher education (ref.) | | | | 1.041 | 1.760 | |
| Employment status | | | | | | |
| Unemployed | 0.302 | 0.134 | 1.353 | 1.041 | 1.760 | 0.024* |
| Employed (ref.) | | | | | | |
| Parity | | | | | | |
| First child of the mother | 0.075 | 0.116 | 1.077 | 0.858 | 1.353 | 0.522 |
| Not the first child (ref.) | | | | | | |
| Constant | –3.679 | 0.335 | 0.025 | | | 0.000 ** |

*Notes*: Abbreviations: OR – odds ratio, CI – confidence interval; ref. – reference category. Significance levels: * $p < 0.05$, ** $p < 0.001$.

*Source*: Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

*Table 6: Logistic regression to determine factors associated with sport activity during pregnancy – initial model*

| | *B* | *S.E.* | *OR* | CI 95% | | *p* |
|---|---|---|---|---|---|---|
| Equivalent income quintiles | | | | | | 0.000** |
| 1 (lowest) | –0.776 | 0.206 | 0.460 | 0.308 | 0.689 | 0.000 |
| 2 | –0.789 | 0.171 | 0.454 | 0.325 | 0.635 | 0.000 |
| 3 | –0.693 | 0.144 | 0.500 | 0.377 | 0.664 | 0.000 |
| 4 | –0.415 | 0.122 | 0.660 | 0.519 | 0.839 | 0.001 |
| 5 (highest; ref.) | | | | | | |
| Maternal age | | | | | | 0.601 |
| 14–19 years | 0.030 | 0.404 | 1.031 | 0.466 | 2.277 | 0.941 |
| 20–24 years | –0.096 | 0.272 | 0.909 | 0.533 | 1.549 | 0.725 |
| 25–29 years | –0.124 | 0.225 | 0.884 | 0.569 | 1.373 | 0.583 |
| 30–34 years | –0.126 | 0.218 | 0.881 | 0.575 | 1.350 | 0.561 |
| 35–39 years | 0.095 | 0.226 | 1.099 | 0.706 | 1.713 | 0.676 |
| 40+ years (ref.) | | | | | | |
| Population of the settlement | | | | | | 0.007* |
| Up to 1,000 inhabitants | –0.420 | 0.225 | 0.657 | 0.423 | 1.021 | 0.062 |
| 1,001–4,999 inhabitants | –0.432 | 0.153 | 0.649 | 0.481 | 0.876 | 0.005 |
| 5,000–19,999 inhabitants | 0.006 | 0.140 | 1.006 | 0.765 | 1.325 | 0.964 |
| 20,000–49,999 inhabitants | 0.132 | 0.165 | 1.141 | 0.826 | 1.578 | 0.424 |
| 50,000–1,000,000 inhabitants | –0.127 | 0.145 | 0.881 | 0.663 | 1.170 | 0.381 |
| Budapest (ref.) | | | | | | |
| Educational attainment | | | | | | 0.000** |
| Up to 8 years of primary schooling | –1.043 | 0.245 | 0.352 | 0.218 | 0.570 | 0.000 |
| Vocational training | –1.484 | 0.254 | 0.227 | 0.138 | 0.373 | 0.000 |
| Secondary education | –0.775 | 0.116 | 0.461 | 0.367 | 0.578 | 0.000 |
| Higher education (ref.) | | | | | | |
| Employment status | | | | | | |
| Unemployed | –0.170 | 0.174 | 0.843 | 0.599 | 1.187 | 0.328 |
| Employed (ref.) | | | | | | |
| Parity | | | | | | |
| First child of the mother | 0.648 | 0.104 | 1.912 | 1.599 | 2.344 | 0.000** |
| Not the first child (ref.) | | | | | | |
| Constant | –1.328 | 0.226 | 0.265 | | | 0.000** |

*Notes*: Abbreviations: OR – odds ratio, CI – confidence interval; ref. – reference category. Significance levels: * $p < 0.05$, ** $p < 0.001$.

*Source*: Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

In the models for walking and cycling, the inclusion of depression and anxiety symptoms did not make a difference. Distress symptoms of the respondents did not significantly affect these two types of PA during pregnancy. However, in case of sports, distress was significantly associated with the outcome variable, even after controlling for perceived health and for the need for extra pregnancy care. Therefore, we present only the latter model. The model values are detailed in *Table 7*.

*Table 7: Logistic regression to determine factors associated with sport activity during pregnancy – final model*

| | *B* | *S.E.* | *OR* | CI 95% | | *p* |
|---|---|---|---|---|---|---|
| Equivalent income quintiles | | | | | | 0.000** |
| 1 (lowest) | −0.682 | 0.215 | 0.506 | 0.332 | 0.770 | 0.001 |
| 2 | −0.721 | 0.179 | 0.486 | 0.342 | 0.690 | 0.000 |
| 3 | −0.680 | 0.151 | 0.506 | 0.376 | 0.681 | 0.000 |
| 4 | −0.380 | 0.128 | 0.684 | 0.532 | 0.879 | 0.003 |
| 5 (highest; ref.) | | | | | | |
| Maternal age | | | | | | 0.249 |
| 14–19 years | −0.028 | 0.430 | 0.972 | 0.419 | 2.258 | 0.948 |
| 20–24 years | −0.088 | 0.293 | 0.916 | 0.515 | 1.627 | 0.764 |
| 25–29 years | −0.180 | 0.246 | 0.835 | 0.515 | 1.354 | 0.465 |
| 30–34 years | −0.191 | 0.239 | 0.826 | 0.517 | 1.320 | 0.425 |
| 35–39 years | 0.132 | 0.244 | 1.141 | 0.707 | 1.841 | 0.589 |
| 40+ years (ref.) | | | | | | |
| Population of the settlement | | | | | | 0.046* |
| Up to 1,000 inhabitants | −0.433 | 0.235 | 0.648 | 0.409 | 1.028 | 0.066 |
| 1,001–4,999 inhabitants | −0.385 | 0.158 | 0.680 | 0.499 | 0.928 | 0.015 |
| 5,000–19,999 inhabitants | −0.068 | 0.147 | 0.935 | 0.701 | 1.245 | 0.644 |
| 20,000–49,999 inhabitants | 0.106 | 0.173 | 1.112 | 0.793 | 1.559 | 0.540 |
| 50,000–1,000,000 inhabitants | −0.184 | 0.153 | 0.832 | 0.617 | 1.122 | 0.228 |
| Budapest (ref.) | | | | | | |
| Educational attainment | | | | | | 0.000** |
| Up to 8 years of primary schooling | −1.020 | 0.257 | 0.360 | 0.218 | 0.597 | 0.000 |
| Vocational training | −1.439 | 0.262 | 0.237 | 0.142 | 0.397 | 0.000 |
| Secondary education | −0.766 | 0.121 | 0.465 | 0.367 | 0.589 | 0.000 |
| Higher education (ref.) | | | | | | |
| Employment status | | | | | | |
| Unemployed | −0.123 | 0.179 | 0.884 | 0.622 | 1.256 | 0.492 |
| Employed (ref.) | | | | | | |
| Parity | | | | | | |
| First child of the mother | 0.638 | 0.109 | 1.892 | 1.528 | 2.343 | 0.000** |
| Not the first child (ref.) | | | | | | |
| Distress | | | | | | 0.020* |
| Sine morbo (ref.) | | | | | | |
| Depression symptoms only | −0.419 | 0.227 | 0.658 | 0.422 | 1.026 | 0.065 |
| Anxiety symptoms only | −0.335 | 0.224 | 0.715 | 0.461 | 1.110 | 0.136 |
| Comorbidity | −0.642 | 0.278 | 0.526 | 0.305 | 0.908 | 0.021 |
| Self-perceived health | | | | | | 0.155 |
| Very good | 0.049 | 1.242 | 1.050 | 0.092 | 11.979 | 0.818 |
| Good | 0.008 | 1.240 | 1.008 | 0.089 | 11.461 | 0.061 |
| Fair | 0.330 | 1.245 | 1.390 | 0.121 | 15.948 | 0.264 |
| Poor | −0.751 | 1.422 | 0.472 | 0.029 | 7.668 | 0.980 |
| Very poor (ref.) | | | | | | |
| Need for extra pregnancy care | | | | | | |
| No need for extra care (ref.) | | | | | | |
| Need for extra care | −0.166 | 0.105 | 0.847 | 0.689 | 1.041 | 0.114 |
| Constant | −2.159 | 0.046 | | | | 0.000** |

*Notes*: Abbreviations: OR – odds ratio, CI – confidence interval; ref. – reference category. Significance levels: * p < 0.05, ** p < 0.001. *Source*: Cohort '18 Hungarian Birth Cohort Study, prenatal wave, authors' own calculations.

This final model for sport activity during pregnancy was statistically significant (–2*LL* = 2965.189; $\chi^2(26) = 366.954$; $p < 0.001$). The explanatory variables explained 7–14% of the variance ($R^2 = 0.07$ (Cox and Snell), 0.14 (Nagelkerke)). In addition to income level, educational attainment, parity, population of the settlement, and distress were also significantly related to sport activity during pregnancy.

## DISCUSSION

This study aimed to explore the PA patterns of pregnant women in Hungary in a representative sample and to assess whether physical inactivity during pregnancy is associated with socio-demographic background and maternal mental health.

The findings indicated that the lowest inactivity rate (defined as less than 1 hour of activity per week) before pregnancy was for walking, at 33%. Contrastingly, the inactivity rate was higher for cycling (73%) and for sports (68%).

In comparison, a general population study identified a 70% inactivity rate in the Hungarian adult population (Hungarian Central Statistical Office, 2019). However, it is crucial to note that the reference interval in that particular study was 150 minutes of PA per week, whereas the present study employed a more permissive interval of 60 minutes. The determination of the lower threshold value in this research was justified by the fact that, based on the original four categories (none; less than one hour per week; at least one hour but less than 3 hours per week; at least 3 hours per week), we could not separate 150 minutes of weekly exercise frequency according to the international recommendation. In addition, the low physical activity rate of Hungarian mothers justified the more permissive 60-minute threshold, similar to the study by Gjestland et al. (2013) in Norway. For the aforementioned categorization reasons, the original four categories have been converted into two categories along the 60-minute per week physical activity limit.

Physical inactivity during pregnancy showed a significant increase across all three categories of PA from pre-pregnancy to the third trimester, in line with the consistent trend identified in previous studies documenting an increase in inactivity during pregnancy (Borodulin et al., 2008; Morton et al., 2010; Nascimento et al., 2015), especially in the third trimester (Downs et al., 2012; Padmapriya et al., 2015; Ruifrok et al., 2014). Walking was identified as the most prevalent form of PA during pregnancy, with 59% of mothers walking at least

1 hour a week. Notably, the surge in inactivity during pregnancy was more pronounced for the other two forms of PA, with an outstanding inactivity rate of 92% for cycling and 90% for sports among mothers.

It is noteworthy that no large-sample representative study of PA during pregnancy has been conducted in Hungary prior to this investigation. When compared to international findings, a Chinese study also identified walking as the most common form of PA (Zhou et al., 2022). A cross-sectional study also identified walking as the most common form of exercise during pregnancy, with an observed inactivity rate of 87% in the third trimester (Domingues & Barros, 2007). Similar trends were noted in the United States, where inactivity in late pregnancy was reported at 88% (Ruifrok et al., 2014), while in China the inactivity rate was 89% (Zhang et al., 2014).

In Spain, the prevalence of inactivity during the second trimester was 80% (Amezcua-Prieto et al., 2011). The prevalence of inactivity among pregnant women in Hungary is similarly high, particularly in the case of vigorous physical activities such as playing sports or cycling. It is important to note that the reference value in the aforementioned research was the ACOG-recommended 150 minutes of weekly PA. The present study set the reference value at 60 minutes, thus the inactivity of pregnant women in Hungary is considered to be higher. In the aforementioned Norwegian study, 60 minutes of PA were also measured in the second trimester, with the results showing an 86% inactivity rate (Gjestland et al., 2013).

A number of factors may contribute to the high inactivity rate during the third trimester. Pregnant women may place greater emphasis on rest during pregnancy, especially in the last trimester. In their study, Clark and Gross (2004) interviewed mothers about PA during pregnancy. Mothers mentioned the importance of rest and fear of miscarriage or pregnancy complications as reasons for inactivity. Apart from these factors, inactivity may be caused by mothers' malaise, such as fatigue or nausea (Duncombe et al., 2009; Ribeiro & Milanez, 2011). A further reason for inactivity may be a lack of information received during the antenatal care process about the recommended amount and form of PA during pregnancy and its positive effects (Clarke & Gross, 2004). A study by Nascimento and colleagues (2015) found that only 47% of women received instructions on PA during the antenatal care process.

The results of our study indicated that maternal mental health is associated with physical inactivity. However, this association was only significant for sport as a form of vigorous PA. Compared with mothers with no distress symptoms, those with comorbid symptoms were 0.5 times less likely to be engaged in

sport activity. Mental health was not a significant predictor of walking and cycling inactivity during pregnancy. Sánchez-Polán and colleagues (2021) found that mothers who were inactive during pregnancy were more likely to experience perinatal depression. He et al. (2023) highlighted the beneficial effect of PA on perinatal depression. The study also drew attention to the intensity of PA. Similarly, we also found that only intense forms of PA, such as doing sports, were positively associated with mental health during pregnancy. Previous studies showed that aerobic exercise was associated with a reduced risk of depressive symptoms during pregnancy (Koniak-Griffin, 1994; Robledo-Colonia et al., 2012). Several studies have highlighted the importance of differentiating between the form and intensity of PA, revealing that low intensity activities, such as housework, was associated with higher anxiety (Gebregziabher et al., 2019; Kaur et al., 2019; Syed Nor et al., 2022; Takahasi et al., 2013).

In line with the findings of our study, many studies have not explicitly addressed the proportion of time spent on leisure activities within the overall spectrum of physical activities. Notably, this study encountered challenges in separating walking and cycling as activities for transport purposes from those undertaken for leisure. However, the results of this paper align with the observation that only a lack of sport activities emerged as a predictor of mental health problems. Furthermore, the measurement specifically focused on intense PA as a leisure pursuit, which reinforces previous research showing an association between intense leisure-time PA and mental health during pregnancy.

The socio-demographic characteristics of mothers were found to be predictors of inactivity during pregnancy. Overall, socio-demographic variables explained sport activity to the greatest extent.

For walking and sport, maternal education, income status, population of settlement and parity were associated with physical inactivity. Pregnant women without a university degree were 0.2–0.5 times less likely to engage in sports, while 0.7–0.9 times less likely to walk actively, compared to mothers with a degree. Lower household income was also associated with inactivity during the third trimester. Compared with respondents with the highest income, those in the lowest two quintiles were 0.8 times less likely to walk actively and 0.5 times less likely to be active in sports. For sport activity, the third (0.5 times) and fourth (0.7 times) quintiles were also at risk. These results were consistent with previous research that found that higher maternal education and higher household income were associated with more frequent PA during

pregnancy (Fell et al., 2009; Larrañaga et al., 2013; Nascimento et al., 2015; Petersen et al., 2005).

Regarding the size of the settlement, people living in smaller settlements were more inactive. Compared to those living in Budapest, pregnant women in settlements with less than 50,000 inhabitants were 0.4–0.6 times less likely to walk actively, and the odds were 0.8 times lower in larger cities. Sport activity was reduced by 0.7 times in settlements with 1,000–5,000 inhabitants.

Another significant factor was primiparity. Women who were pregnant with their first child were 0.8 times less likely to walk actively, but 1.9 times more likely to be active in sports. Our results align with previous research in which multiparity has been identified as a predictor of inactivity (Davenport et al., 2018; Gaston & Cramp, 2011). The main possible explanation is the responsibility of caring for older children. Multiparous women engage in a variety of activities with their children, including visits to playgrounds, play, and walks. While these activities may contribute to an increase in overall walking time, they may leave mothers with less time available for more vigorous exercise.

However, in the case of cycling, education, occupational status, and size of settlement showed a different pattern. The odds of being active in cycling were 1.8–1.9 times higher for mothers with the lowest two levels of education (compared to those with a university degree) and 1.4 times higher for unemployed mothers. In addition, active cycling was 1.7–3.4 times more common in settlements with 1–50 thousand inhabitants than in Budapest, and was the most common (*OR* = 3.4) in settlements with 5–20 thousand inhabitants. The results therefore suggested that cycling is a distinct form of PA among pregnant women in Hungary. We concluded that cycling is more likely to be considered as a means of transportation for mothers in the analysis, which is more typical of mothers with lower education and living in small and medium-sized settlements where public transportation options are limited. Moreover, cycling is still a less popular form of transportation in large cities in Hungary than in other European urban areas. Broberg et al. (2015) identified a much higher prevalence of cycling among pregnant women in Denmark. This suggests cultural differences in bicycle use (Oosterhuis, 2016). Therefore, we consider it necessary to analyse the correlates of cycling for leisure purposes in future analyses and to examine the different forms of PA separately.

Our analysis revealed that maternal age was not a significant predictor of either form of PA during pregnancy. Our results are not consistent with the majority of previous findings. Alghamdi (2023) conducted structural interviews with a small number of participants, where maternal age emerged as a

significant predictor of physical activity during pregnancy. Similarly, Fell (2009) identified maternal age as a predictor in his large sample cohort study, whereby younger mothers were more likely to stop exercising during pregnancy. Gebregziabher and colleagues (2019) identified a higher likelihood of inactivity among mothers under 19 years of age. However, a Swedish study found similar results to ours, where the predictive power of maternal age on physical activity during pregnancy was not confirmed. However, there was a positive relationship between maternal age and sedentary time (Meander et al., 2021).

## LIMITATIONS AND STRENGTHS

A fundamental limitation of this study is the reliance on self-reported data for the measurement of PA. We did not use a minute-based measurement, thereby precluding the adherence to the international recommendation of 150 minutes of PA per week. Instead, we determined a cut-off point of 1 hour based on a 4-point scale, a more permissive criterion than the international recommendation. While some studies have also adopted a 60-minute threshold for inactivity, in alignment with their respective national recommendations, it is important to acknowledge that the broad interpretability of the results may be constrained.

A further limitation of our analysis pertains to the method employed for identifying mental health problems. The survey used short screening tools, which had no diagnostic validity. Furthermore, the administration of the survey at a single point in time during the third trimester limits a comprehensive understanding of mental health dynamics throughout the entirety of the pregnancy.

We did not investigate the specifics of pregnancy histories, potential complications or symptoms experienced during pregnancy, such as nausea, fatigue, and limb pain, which can affect both PA and mental health. Despite these limitations, a notable strength of our study lies in its use of nationally representative data, allowing for the generalization of our results to a broader context.

## CONCLUSION

Considering the acknowledged limitations, our study provides insight into the rates of third trimester physical inactivity among pregnant women in Hungary, using representative data. Furthermore, it elucidates the association of inactivity with socio-demographic background and mental health.

It is important to raise awareness about PA in antenatal care, especially among the at-risk populations. Health education should be expanded in the antenatal care process to highlight the importance of PA during pregnancy, especially for low-income, low-educated primigravida mothers. It is also recommended to emphasize the benefits of vigorous PA for mothers with depressive or anxiety symptoms, considering its positive impact on mental health. In light of our findings, we recommend that professionals involved in antenatal care prioritise the promotion of more intensive PA for pregnant women, especially those with depressive and anxiety symptoms. A range of more intense exercises recommended during pregnancy is thoroughly detailed in the ACOG (2023) recommendation.

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# GENDER ROLES AND THE DIVISION OF HOUSEHOLD LABOUR BY FAMILY TYPE IN THREE DIFFERENT WELFARE STATES

Adrienn Glázer-Kniesz – Zsuzsanna Makay

## ABSTRACT

This study examines patterns of gender roles and division of household labour in Hungary, France, and Sweden, representing three different welfare regimes. The gender revolution has significantly changed the distribution of household tasks, but these changes have occurred to different degrees across countries.

The research aims to explore the patterns of household labour division and to investigate how attitudes towards gender roles and individual characteristics influence the distribution of household tasks. Particular attention is given to the differences between families with and without children.

Using cluster analysis and multinomial logistic regression models based on data from the Generations and Gender Survey (GGS), we analyse the distribution of household tasks and the effects of individual factors and gender attitudes among partnered respondents aged 18–49.

The findings indicate that gender role attitudes in Sweden are more modern than in the other two countries, especially among women. Household tasks are also shared more equally in this social-democratic welfare state. In Hungary attitudes are the most traditional, while France lies between the other two countries. In Sweden individual attitudes towards gender roles do not influence the daily division of household tasks, while in the other two countries they do: women and men with more modern views tend to share household tasks more equally. The division of household labour also depends on background factors such as women's labour market status and the number of children. Even in Sweden, the presence of young children in the household pushes women to do more house-

work than if there were no children, and this is also true – to different degrees and depending on the age and number of children – in the other two countries. Despite progress in the gender revolution and greater equality in the labour market, educational attainment also continues to have a significant impact on the division of domestic tasks.

Keywords: division of household labour, international comparison, gender roles, Generations and Gender Survey

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## INTRODUCTION

As a result of the second demographic transition and the gender revolution, women's participation in education and employment has undergone significant changes (Goldscheider et al., 2015; Van de Kaa, 1987). This means that the time women spend on household tasks has significantly decreased, a shift that has been greatly aided by technological advancements (Bianchi et al., 2000). At the same time, gender roles and expectations have also evolved (Gubernskaya, 2010), with changes in education and labour market participation—while themselves outcomes of broader demographic processes—playing a crucial role in driving these shifts (Shorrocks, 2018).

However, while the "gender revolution" has already taken place in the public sphere (education, employment), it has not yet been fully realized in the private sphere but it remains "unfinished" (Gerson, 2009; England, 2010). This means that significant inequalities in the division of household labour persist within families and households, with women still bearing a disproportionately higher burden than men (Altintas & Sullivan, 2016). Although men's participation in household labour is increasing, there are still considerable differences between countries.

The aim of our study is to examine how opinions about gender roles and the related practices manifest themselves in the family sphere. We seek to identify the differences in attitudes and the division of household labour in Hungary,

France, and Sweden, and to determine whether more traditional or modern individual views on gender roles are reflected in the everyday lives of partnered couples with and without children. We analyse three European countries with significantly different welfare regimes, which also allows us to explore the impact of varying social contexts. Indeed, in different welfare regimes, social policies and cultural norms influence family dynamics and the distribution of household labour in different ways (Daly, 2015; Goldscheider et al., 2015; Robila, 2014). Our analyses are based on data from round 1 of the Generations and Gender Survey.[1]

Our article is structured as follows. First, we present the theoretical approaches and previous research findings related to the division of household labour and gender roles. Next, we briefly introduce the welfare characteristics of the three countries, which is essential to place our research questions in context. We then outline the research questions and hypotheses, followed by a description of the data and our methods. Afterwards, we proceed with the analyses and present the results. Finally, we discuss the findings and draw conclusions in the closing section of the article.

## THEORETICAL APPROACHES TO THE DIVISION OF HOUSEHOLD LABOUR

One of the fundamental theoretical approaches to the division of household labour is Gary Becker's new household economics (1981). According to this idea, a household is not only a consumer unit but also a productive unit that combines its resources to achieve production and makes decisions based on the principle of cost efficiency (Becker, 1981; Bauer, 2016; Mencarini &Vignoli, 2017). Therefore, a household can function most efficiently when the division of labour is based on specialization and comparative advantages: household members distribute tasks among themselves according to who is most efficient at each task (Solaz, 2015; Kitterød & Rønsen, 2013; Kitterød & Lappegård, 2012). Time plays a significant role in this framework, as the time-intensive nature of household tasks and the flexibility of working hours influence how household members share responsibilities (Hofäcker et al., 2013).

Two theoretical approaches linked to Becker's ideas provide further explanations for the dynamics of household labour division. The first is the relative resources theory, which posits that the division of labour within households is significantly influenced by the resources of individual household members (Aassve

1 https://www.ggp-i.org/data/

et al., 2014; Bauer, 2016). Resources in this context include income, education, professional skills, labour market experience, and social networks (Lappegård et al., 2012). The core principle of the theory is that household members with greater resources possess stronger bargaining power, enabling them to secure a more advantageous position in the division of domestic labour. Conversely, the partner with fewer resources typically performs more household tasks due to their weaker bargaining position (Régnier-Loilier, 2015a). According to the theory, this dynamic equilibrium determines the distribution of tasks within the household, where the balance of relative resources shapes the specific form of labour division (Kitterød & Lappegård, 2012). The theory also accounts for the fact that resources can change over time. For instance, if one partner receives a promotion or acquires additional training, the division of household labour may shift as the relative balance of resources changes (Campolo et al., 2020; Lachance-Grzela & Bouchard, 2010).

The theory of time allocation, also introduced by Becker, suggests that the division of household labour is primarily influenced by the amount of time each household member spends on paid work and the free time they have left (Becker, 1981; Aassve et al., 2014). The partner who spends less time in paid work generally has more time available for household tasks (Lappegård et al., 2012; Lachance-Grzela & Bouchard, 2010). In other words, within a partnership, factors such as education, other forms of capital, and labour market participation all influence the division of labour. At the same time, social factors also play a role in shaping how household responsibilities are distributed.

The gender ideology perspective posits that the division of household labour is shaped by traditional gender roles and societal expectations (Aassve et al., 2014; Lappegård et al., 2012). Historically, women were responsible for household chores and childcare, while men were tasked with the financial maintenance of the household (Kitterød & Lappegård, 2012). These traditional gender roles continue to exert a strong influence on the division of household labour: household members shape their identities and perform household tasks in accordance with societal expectations (Bauer, 2016). For instance, women often take on more household responsibilities because they perceive these tasks as integral to their role and identity. However, this dynamic can change with the evolution of individual attitudes, suggesting that the ongoing redefinition of gender roles has an impact on labour division (Brugeilles & Sebille, 2015).

## THE RELATIONSHIP BETWEEN GENDER ROLES AND THE WELFARE STATE

Previous research on the relationship between the welfare state and gender roles has examined how welfare state policies, as structural factors, influence the development of attitudes toward gender roles. Additionally, these studies explore whether there is an ideological orientation (e.g., towards gender equality) explicitly supported by social policies. The Esping-Andersen typology of welfare states is commonly used as a framework when exploring the role of the social context in shaping demographic behaviour and attitudes toward gender relations (Neyer, 2003).

The policies of welfare states can significantly influence societal behaviour, particularly in the areas of gender equality and women's economic autonomy. Universal welfare states, such as those in Scandinavia, typically promote gender equality and support women's economic independence. In contrast, conservative welfare states tend to prioritize the preservation of traditional family models. Liberal welfare states primarily rely on the market to provide welfare services, offering minimal state support, which encourages individual autonomy and responsibility. Considering political institutions and cultural contexts is therefore crucial for understanding the effectiveness of welfare state measures (Neyer, 2003).

The transformation of gender roles and the division of household labour is fundamentally influenced by the policies of welfare states, particularly in contexts where the promotion of gender equality plays a central role. The concept of the "gender revolution," analysed by Goldscheider and colleagues (2015), is closely related to how different welfare systems encourage the active participation of both genders in the labour market and family life.

The "gender revolution" unfolds in two major stages. The first stage involves the mass participation of women in the labour market, which accelerated in the second half of the 20th century. This led to what has been termed a "second shift," as women not only worked outside the home but also remained primarily responsible for the majority of household tasks. This dual burden often delayed marriage and childbearing and created tensions within partnerships. In the second phase of the revolution, men increasingly take on a larger share of family responsibilities, particularly in childcare and household chores. This shift is particularly evident in Scandinavian countries, where welfare states actively encourage the involvement of both parents in childcare through various support mechanisms. This second stage can have a positive impact on family stability, the durability of

marriages, and fertility rates. Promoting gender equality through family policy measures not only increases women's participation in the labour market, but also encourages men to take on more responsibilities at home. Over the long term, this can lead to more stable and cohesive family units that are less prone to dissolution, as well as help stabilize or raise fertility rates (Goldscheider et al., 2015).

Nevertheless, the gender revolution remains incomplete. While equality has been achieved in many aspects of the labour market – where women are now as present as men, albeit with persistent disparities such as wage gaps –, changes in the domestic sphere have been less pronounced. Despite progress, the roles of men and women at home remain markedly different. Moreover, even in countries leading in gender equality, the proportion of women in leadership and political positions still lags behind that of men. This highlights the ongoing challenges in achieving full social equality (European Institute for Gender Equality, 2024).

Significant differences exist in how changes in gender roles have unfolded between Western and former socialist countries. In Western European nations, the transformation of markets and the growing prominence of the service sector opened up opportunities for women to enter the workforce. Concurrently, though to varying degrees, societal attitudes toward gender roles began to shift (Neyer, 2003; Prskawetz et al., 2008). In contrast, in Hungary before the political transition, the socialist regime mandated near-universal employment for women due to economic necessity, without any genuine consideration for gender equality. After the transition, the mass disappearance of jobs led to a significant decline in women's (and men's) employment, which reinforced conservative attitudes and traditional gender roles. Blaskó's analysis (2005) highlights two distinct phases in the evolution of attitudes toward gender roles and female employment. In the first phase (1988–1994), a clear shift towards more traditional gender roles was observed, as the economic crisis and labour market insecurity led society to increasingly support the domestic role of mothers with young children. In the second phase (1994–2002), a slow modernization occurred, characterized by a growing acceptance of flexible labour divisions and part-time employment. This mild liberalization reflected a convergence toward Western European values, accompanied by a decline in support for the ideal of "full-time" motherhood (Blaskó, 2005). Between 2002 and 2013, modern family life and gender equity continued to be supported (Spéder, 2023). Due to differing historical backgrounds and societal developments, the level of gender equality continues to vary across countries, and the same applies to the division of household labour. In the following, we will examine how previous research describes the distribution of domestic work at the individual and societal levels.

## DIVISION OF HOUSEHOLD LABOUR, GENDER ROLES, AND RELATIONSHIP DYNAMICS

Previous research has identified a strong link between the division of household labour, attitudes toward gender roles, and relationship stability. Aassve and colleagues (2014) found that couples who value gender equality tend to divide household tasks more equitably. However, the desire for equality is typically stronger at the beginning of a relationship and tends to diminish over time. In addition, men with higher levels of education, those living in urban areas, and those in registered partnerships are more likely to seek equality in household labour compared to married men (Rault & Letrait, 2015; van Damme et al., 2022).

The time spent on household chores continues to differ between women and men and individual background still plays a role in the division of labour. Higher levels of education and women's participation in the labour market have a positive impact on more equitable task sharing and a negative effect on the time women dedicate to household chores (Evertsson, 2014; Fahlén, 2016). Additionally, in families where women contribute significantly to the household income, the division of domestic labour tends to be less unequal. This is particularly evident among well-educated, working couples, whereas the traditional division of labour is more common among less-educated couples (Kitterød & Lappegård, 2012).

In Scandinavian countries, where gender equality is more advanced, men typically take on a larger share of household chores (Aassve et al., 2014; Lappegård et al., 2012). In Sweden, the institutionalized tradition of gender equality further contributes to more equitable divisions of household labour, particularly among childless, higher-income, and well-educated couples (Bernhardt et al., 2008).

In Hungary, society is fundamentally closer to traditional gender roles, where men are primarily seen as breadwinners and women as caregivers, responsible for household tasks and child-rearing (Makay & Spéder, 2018). This remains true despite the prevalence of the dual-earner family model. Consequently, childcare and household responsibilities are traditionally seen as falling more heavily on mothers, while fathers primarily engage in interactive activities with children, such as playing together. The extended parental leave policy and limited institutional childcare options further reinforce women's roles within the family and keep them distanced from the labour market (Makay, 2023). According to the results of Murinkó (2014), the majority of Hungarian society accepts the current division of labour, which reflects the dominance of traditional gender ideologies; however, this hinders the promotion of gender equality. Although egalitar-

ian values are increasingly espoused, these often do not translate into everyday practice, leaving women with a significantly higher workload than men. Greater involvement by fathers, more flexible work opportunities, and improved childcare services would support efforts to achieve a more balanced division of labour between genders (Murinkó, 2014).

In France, a reform introduced in the early 2000s reduced the standard workweek from 39 to 35 hours, providing an opportunity to study its impact on time use. A study on the effects of the reform revealed that men primarily devoted their extra free time to flexible household tasks such as repairs, gardening, and shopping, while women spent more time on household and childcare duties like cooking and dishwashing. On weekends, men spent less time on household chores and childcare, while women increased the time they dedicated to childcare. The reform reinforced traditional patterns of gendered labour division, as men took on new responsibilities during weekdays but reverted to traditional roles on weekends (Pailhé et al., 2019).

The division of labour and gender equality are closely tied to women's educational attainment and income, as other studies also suggest. The higher a woman's level of education and financial contribution, the more equitable the division of household tasks becomes (Solaz, 2015). Although Goldscheider's theory posits that women's increased labour force participation led to relationship instability in the first phase of the gender revolution, more recent research indicates that women's employment only destabilizes relationships if women continue to perform over 70% of household chores alongside their paid work. In contrast, significant male involvement in household labour can stabilize relationships by balancing shared leisure time and household responsibilities, which, in the long term, reduces the risk of divorce (Mencarini & Vignoli, 2014, 2017).

Among families with children, couples with egalitarian attitudes were found to have a fairer and less stereotypical division of household labour. Mothers and fathers tend to share responsibilities more equally, with fathers actively participating in tasks traditionally associated with the female role (Lachance-Grzela & Bouchard, 2010).

Grunow and Baur's study (2014) offers insights into how attitudes toward gender roles influence the division of household labour, with particular focus on men's participation in traditionally "female" tasks such as cooking, vacuuming, and laundry. One of the most significant predictors of men's active involvement in household chores is a positive attitude supporting men's unpaid domestic roles. However, the study also highlights that the division of household labour is not solely shaped by attitudes but also by family and household contexts. Traditional

gender role models often prevail, even when individual attitudes support equality. This research employs a multidimensional normative framework that examines not only the traditional male-breadwinner and female-homemaker model and the acceptance of women's employment but also the recognition of men's domestic roles. By doing so, it provides a deeper understanding of the relationship between gender roles and everyday practices (Grunow & Baur, 2014).

Recent research on the division of household labour between men and women has almost unanimously concluded that, despite short-term stagnation and slowdowns, the overall trend points toward a more equitable distribution of household tasks. This shift is expected to contribute to greater gender equality in the long run. The amount of time women spend on household chores has decreased, while men's participation has increased. However, the gender gap remains significant (Altintas & Sullivan, 2016; Bianchi et al., 2000; Lachance-Grzela & Bouchard, 2010).

## DIVISION OF HOUSEHOLD LABOUR IN FAMILIES WITH CHILDREN

The birth of a child further exacerbates inequalities in the division of household labour. Parenthood, the number of children, and their age have a significant impact on the division of labour within the family and influence the nature and intensity of parental responsibilities. These effects can persist in the long term (Régnier-Loilier, 2015b; Régnier-Loilier, 2009; Brugeilles & Sebille, 2015; Campolo et al., 2020). Household labour is distributed less equally in families with young children, as women's household burdens increase after the birth of a child. The most significant changes are observed in daily meal preparation, grocery shopping, and vacuuming. The birth of the first child has a particularly strong impact on the redistribution of tasks, while the arrival of a second child further intensifies the workload for women (Régnier-Loilier, 2015a; Zabel & Heintz-Martin, 2013). The number of children also increases women's involvement in household chores, especially in families with two or more children (Solaz, 2015). Fathers tend to participate less in daily household tasks, especially when the child is under six years old. Additionally, they are more likely to engage in leisure activities, particularly with sons, compared to daughters (Brugeilles & Sebille, 2015).

The birth of a child significantly affects women's paid and unpaid working hours, with paid work hours decreasing and unpaid work hours increasing. In contrast, for men, paid work hours increase, but unpaid work hours remain largely unchanged (Campolo et al., 2020). Greater paternal involvement in household

tasks not only contributes to relationship stability but can also increase fertility rates while enabling women to work full-time. Active participation by fathers helps ease the tension between having a second child and maintaining full-time employment, particularly in countries where female employment has traditionally been high but fertility rates are currently low. Overall, greater paternal involvement facilitates decision-making for career-oriented women regarding having a second child and supports less career-oriented women in pursuing full-time employment (Fanelli & Profeta, 2021).

Individual attitudes and satisfaction with the division of household labour play a crucial role in the concept of the household "gatekeeper." The phenomenon of maternal gatekeeping refers to the extent to which mothers regulate and influence fathers' involvement in childcare and household tasks. Allen and Hawkins (1999) found that mothers often limit fathers' participation in childcare due to various psychological and social reasons. Mothers may perceive themselves as more competent in childcare or fear that fathers may not perform tasks adequately.

Fathers' involvement is further hindered by societal expectations that place the primary caregiving role on mothers. Consequently, mothers' attitudes and behaviours significantly influence the degree and quality of fathers' involvement (Allen & Hawkins, 1999). The increasing labour market participation of women and the growing domestic role of men mutually reinforce each other, advancing the progress of the gender revolution. Promoting gender equality and implementing supportive policies are essential to maintaining and fostering these developments. Overall, changes in gender roles are beneficial not only economically but also socially, contributing to the stabilization of modern family structures (Goldscheider et al., 2015).

## COUNTRY CHARACTERISTICS

In this section, we describe the three countries included in the analysis, focusing on their welfare systems and gender related policies.

### HUNGARY

During its post-socialist transition, Hungary established a hybrid welfare system combining conservative-corporatist elements with state intervention and market economy demands. During this transitional period, the country faced significant challenges, such as ensuring the sustainability of the social welfare

system and addressing social inequalities. Although Hungary adopted certain elements of Western welfare models, it developed a unique mixed system heavily reliant on the state's role (Ferge, 2001). Since 2010, the Orbán governments have further shaped Hungary's welfare system, aiming to create a work-based society. Welfare benefits have been increasingly tied to employment, and access to needs-based social benefits has been reduced. Additionally, the welfare system has been centralized, favouring the higher and middle class through reforms in the pension and family support systems (Makay et al., 2024; Szikra, 2014). The welfare state plays a significant role in supporting childcare, but reintegration into the labour market after childbirth remains slow (Makay, 2023). Maternity and childcare leave policies mainly encourage women to stay at home with their children for a relatively long period, while men's roles in caregiving remain less emphasized (Sainsbury, 1999).

## FRANCE

France traditionally belongs to the conservative-corporatist welfare model, heavily rooted in the Bismarckian system, particularly in employment-based social insurance schemes. However, in recent decades, the country has implemented significant reforms aimed at improving the sustainability of the pension and healthcare systems while adapting to economic and social challenges. These reforms have sought to universalise the welfare state and reduce fiscal burdens, while maintaining a focus on social cohesion and reducing inequalities (Palier, 2010). The 1994 childcare support reform encouraged temporary labour market withdrawal for women, especially mothers of multiple children, by introducing three years of paid childcare leave for those with two children. As a result, labour force participation saw a sharp decline, particularly among mothers with two children, one of whom is under three years old. However, workplace absences tend to be relatively short: mothers of one child typically return to work after 18 months, while mothers of two or three children re-enter the labour market after an average of two years (Toulemon et al., 2008). Overall, about half of mothers return to work six months after childbirth, while the other half do so significantly later (Makay, 2023). This pattern reflects French family policies, which allow women greater flexibility in balancing work and family responsibilities. However, these policies may also contribute to the preservation of traditional gender roles (Toulemon et al., 2008).

### SWEDEN

Sweden is a classic example of a social-democratic welfare state. The social-democratic model aims to promote universalism and social justice through high levels of redistribution and efforts to reduce social inequalities. Despite facing significant economic challenges and reforms in recent decades, Sweden's welfare state has continued to enjoy strong public support. Although attitudes have shifted due to economic crises and globalisation, leading to reforms in pension systems and unemployment benefits, social cohesion has remained robust (Esping-Andersen, 1990).

Sweden's social-democratic welfare system strongly supports gender equality, primarily through universal social policy measures. Comprehensive childcare services, parental leave policies, and workplace supports enable women to become less constrained by family responsibilities and actively participate in the labour market (Sainsbury, 1999).

In summary, the welfare systems of France, Hungary, and Sweden have taken different paths, each shaped by the countries' unique historical and economic contexts. The connections between welfare systems and attitudes toward gender roles differ significantly among the three countries, highlighting the role of welfare states in shaping gender equality and economic independence.

## RESEARCH QUESTIONS AND HYPOTHESES

In our study, we aim to answer the following research questions:

(1) What patterns can be observed in the division of household labour in the three countries? Based on the literature review, we expect that the division of domestic labour between women and men is more equitable in Sweden than in the other two countries. This expectation stems from the longstanding support for such a model by Sweden's welfare state system and gender-related attitudes (Hypothesis 1).

(2) How does the division of household labour differ in families with children compared to childless families across these three countries? We hypothesize that the division of household labour is less equitable in families with children than in childless families (Hypothesis 2). Furthermore, based on the comparison of the family policy regimes of the three countries, we expect that the distribution of household tasks in families with children will vary significantly across the three countries. This expectation is based on two key factors: First, couples with children often have been together for a longer time, and as noted in the literature

review, more equitable labour division tends to be characteristic of the earlier stages of a relationship. Second, after the birth of children, couples typically experience changes in their working hours – men often work more, while women work less in paid work –, which, according to the relative resources theory, alters their bargaining positions.

(3) Do individual attitudes toward gender roles translate into everyday practices? In other words, do men and women with more modern views share household tasks more equally? We hypothesize that individuals' attitudes toward gender roles influence the daily practice of household labour division in all three countries. Couples in which either the man or the woman holds more modern, egalitarian views are more likely to share household tasks more equally. Conversely, among respondents who prefer traditional gender roles, household responsibilities are expected to remain primarily the woman's domain. This hypothesis assumes a positive correlation between egalitarian attitudes and the actual division of household labour (Hypothesis 3).

## DATA AND METHODOLOGY

### DATA AND SAMPLE

We use data from the first round of the Generations and Gender Survey (GGS). This is a large-scale follow-up survey conducted in multiple countries using a standardized questionnaire during the 2000s. Its primary aim is to describe demographic behaviour and explore the underlying factors driving recent changes.

In this study, we use data from the first wave of the GGS round I for France (2008), and Sweden (2011). The samples are representative of the population aged 18–75 in the respective years.[2] The Hungarian data are also part of the international GGS database (also known as "Turning Points of the Life Course Panel Survey"). The first Hungarian data collection was conducted in 2001, followed by four additional waves with the same respondents. In 2012 (at wave 4), the original panel sample was refreshed, and new respondents aged 18–49 were included.[3] The combined cross-sectional dataset of the original and the refreshment sample is representative of the Hungarian population aged 18–79, and we used this wave 4 database in our analysis to ensure comparability with the other two countries.

2 https://www.ggp-i.org/data-portal/

3 The new sample is not included the international database on the GGP Portal; it is accessible via the Hungarian Demographic Research Institute.

For our analysis, we included respondents aged 18–49 from all three countries who fulfilled the following criteria: They live in a cohabiting or marital union[4], as examining the division of household tasks is only meaningful in this context. We included couples who do and who do not have at least one biological child under the age of 14 in the household. It was not a requirement to have a biological child with the partner. The significance of differentiating between families with and without children has been highlighted in the previous literature review. This approach enables us to determine whether the presence of young children is as influential a factor as prior studies have indicated. In the final sample thus constructed, the number of cases in the three countries is as follows: 3,182 for Hungary; 2,596 for France; and 1,676 for Sweden.

## MEASUREMENT OF THE DISTRIBUTION OF HOUSEHOLD TASKS AND CLUSTERING

The GGS questionnaire includes a block of questions regarding who does the following tasks in the household5: preparing daily meals, vacuum cleaning the house, doing the dishes and laundry, shopping, doing small repairs in and around the house, paying bills and keeping financial records, organising joint social activities. The response options were as follows: Always the respondent, Usually the respondent, Respondent and partner about equally, Usually the partner, Always the partner, Always or usually other persons in the household, Always or usually someone not living in the household. These responses were first recoded as follows: 1 – Always performed by the woman; 2 – Usually performed by the woman; 3 – Shared equally; 4 – Usually performed by the man; 5 – Always performed by the man. We then transformed the variables to reflect the level of men's contribution: 1 = 0%, 2 = 25%, 3 = 50%, 4 = 75%, 5 = 100%. The transformation replicates the interval scale based on the inherent structure of the original variable. The GGS response categories form a logically ordered sequence that implicitly reflects increasing levels of the partner's contribution. Our recoding leverages this quasi-metric structure by assigning proportional values to reflect men's share of responsibility. This approach maintains the ordinal ordering while facilitating quantitative analysis and comparability across tasks.

4 We excluded same-sex couples since we examine gender relations and we only had 63 individuals who lived in a same-sex relationship. This low sample size would not have permitted to analyse their attitudes and behaviour separately.
5 The question was formulated as follows: 'Now I would like to ask you some questions about who does what in your household. Please tell me who does the following tasks in your household'.

We excluded respondents who indicated that any household task was carried out by someone else. In the case of Hungary, this represented 598 individuals; in the case of France, 759 individuals; and 197 individuals in the case of Sweden.

In the first step of our analysis, we created a typology using cluster analysis, examining how domestic labour is divided between female and male partners. Separate female and male clusters were established for each country to gain a precise understanding of respondents' experiences, and hierarchical cluster analysis was conducted to determine the optimal number of clusters. The separation of genders is fundamental because women and men perceive the amount of household work they perform differently (Geist, 2010).

Using hierarchical clustering (Ward's method), we analysed dendrograms to identify the optimal number of clusters, concluding that three clusters should be formed for female respondents and two for male respondents in all three countries. To enhance the interpretability of results and verify the identified clusters, we subsequently applied the K-means clustering method with Euclidean distance settings (Sarstedt & Mooi, 2018). Not only statistical considerations but also the necessity of ensuring meaningful differentiation among clusters guided the decision on the number of clusters. This distinction was visually evident in the cluster plots.

The adequacy of the clusters was assessed by examining the ratio of between-cluster variance (BCSS) to total variance (TSS). As shown in *Table A2*, the BCSS/TSS ratio indicates somewhat greater differentiation among male and Hungarian female clusters. The Euclidean distance values further support this observation. Beyond statistical justification, the decision to establish these clusters was also made by a research-driven approach: even if the identified clusters do not exhibit stark differences, their interpretation highlights the significance of subtle variations in household labour division.

As an outcome variable, we first analyse the clusters using descriptive analysis to highlight the key differences and similarities in the division of household labour across the three countries. Subsequently, we examine the relationships between the explanatory variables and the clusters using Spearman's rank correlation analysis (*Table A3*), as the dependent variable is categorical and the independent variables are ordinal.

Next, incorporating demographic background variables and attitudes toward gender roles, we conduct regression analysis to determine which individual characteristics influence the likelihood of cluster membership, that is, the extent to which women and men share household tasks in daily life. We estimate separate models for female and male respondents, controlling for background vari-

ables and distinguishing between families with and without young children. Additionally, special emphasis is placed on attitudes toward gender roles, for which we constructed a continuous variable based on the following criteria.

## ATTITUDES TOWARDS GENDER ROLES

To examine attitudes toward gender roles, we selected six variables that measured the agreement with the following statements: In a couple, it is better for the man to be older than the woman; If a woman earns more than her partner, it is not good for the relationship; On the whole, men make better political leaders than women do; Women should be able to decide how to spend the money they earn without having to ask their partner's permission; Looking after the home or family is just as fulfilling as working for pay; A pre-school child is likely to suffer if his/her mother works. Answer categories were the following: strongly agree (1), agree (2), neither agree not disagree (3), disagree (4), and strongly disagree (5).

The selection of these variables was based on two main criteria. First, we considered their relevance to addressing our research questions. Second, we assessed how frequently these variables have been used in previous studies on similar topics. By applying these selection criteria, we ensured that the variables used in our analysis were not only relevant but also comparable to other research studies.

The scales of the selected variables did not always align with the usual "modern–traditional" distinction. Therefore, we recoded the variables where necessary, thus the values of 1 and 2 were recoded as 4 and 5, and vice versa. As a result of this recoding, a value of 1 represents traditional gender role attitudes, while a value of 5 indicates modern, egalitarian attitudes in the case of each variable. We then aggregated these six attitude variables to create a composite variable. The values of the newly constructed variable thus ranged from 6 to 30, where lower values reflected traditional gender role attitudes, while higher values indicated modern perspectives. This transformation allowed us to develop a comprehensive, continuous indicator, suitable for measuring respondents' attitudes along the traditional–modern spectrum. To ensure comparability, we rescaled the continuous variable using min-max scaling. The transformation was performed using the formula:

$$X_{scaled} = \frac{X - X_{min}}{X_{max} - X_{min}}$$

After rescaling, our composite variable of gender role attitudes ranges from 0 to 1, where 0 corresponds to the original minimum and means rather traditional gender roles, and 1 to the original maximum, meaning a more modern attitude towards gender roles.

## CONTROL VARIABLES

We included a range of control variables in the analysis. We have also recoded and harmonized them, with their distributions presented in *Table A1*.

Labour market status was categorized as follows: employed; unemployed or inactive; on parental leave (included only in the female models). For educational attainment, we established three categories: low, medium, and high. Individuals with at most primary education are in the first category, while those with vocational training or secondary education were classified under the medium education level category. Those having any kind of tertiary education belong to the category of "high" level of education.

We only take into account co-resident couples and distinguish between married and not married ones. The number of the children and the age of the youngest child were recoded into one variable, where we distinguished between the following categories: no child below the age of 14 in the household; one child who is below the age of six; one child who is older than six but younger than 14; two or more children and the youngest is below 6; two or more children and the youngest is older than six but younger than 14. The literature review has indeed shown that the age and number of children are likely to shape the distribution of household chores in the couple. We also control for the age of the respondent (aged 18–25, 26–34, 35–42, and 43–49).

We applied multinomial logistic regression with cluster membership as the dependent variable, which categorized respondents into distinct groups. Multinomial regression allowed us to simultaneously assess the impact of independent variables on each category and to estimate the probability of respondents belonging to a given category compared to the reference group. The use of this method was justified by the non-ordinal nature of our dependent variable, meaning that we did not need to assume a hierarchical order among the categories. Additionally, multinomial regression offers flexibility in handling a wide range of independent variables, including both continuous and categorical predictors, enabling us to incorporate a broad set of control variables into the analysis. Estimates are presented as relative risk ratios in order to facilitate comparison across variables and models.

## RESULTS

In the results section, we first compare the division of household labour across the three countries. We then present the female and male clusters, incorporating demographic variables to highlight key patterns. This is followed by the presentation of the descriptive results regarding gender roles and then results from the regression analyses.

### THE DIVISION OF HOUSEHOLD TASKS IN THE THREE COUNTRIES

The analysis of the division of household labour in Hungary, France, and Sweden reveals that while traditional division of work is present in all three countries, its extent and the level of male participation vary significantly (*Table 1*).

*Table 1: Distribution of household chores within couples in Hungary, France, and Sweden (%)*

| | | Hungary | France | Sweden |
|---|---|---|---|---|
| Who prepares daily meals? | Always the woman | 43.9 | 37.3 | 6.6 |
| | Usually the woman | 29.9 | 30.6 | 41.0 |
| | Shared equally | 22.8 | 21.1 | 37.2 |
| | Usually the man | 2.2 | 7.7 | 13.8 |
| | Always the man | 1.2 | 3.2 | 1.4 |
| Who does the dishes and the laundry? | Always the woman | 35.6 | 24.6 | 3.5 |
| | Usually the woman | 28.6 | 20.8 | 24.4 |
| | Shared equally | 32.2 | 39.8 | 55.7 |
| | Usually the man | 2.6 | 10.2 | 15.2 |
| | Always the man | 1.0 | 4.6 | 1.1 |
| Who does the shopping? | Always the woman | 16.9 | 26.8 | 5.8 |
| | Usually the woman | 15.3 | 20.0 | 30.1 |
| | Shared equally | 58.2 | 42.6 | 46.7 |
| | Usually the man | 7.3 | 7.1 | 15.9 |
| | Always the man | 2.3 | 3.5 | 1.4 |

| | | Hungary | France | Sweden |
|---|---|---|---|---|
| Who does the vacuum cleaning in the house? | Always the woman | 30.6 | 31.4 | 7.5 |
| | Usually the woman | 29.3 | 23.2 | 37.0 |
| | Shared equally | 38.3 | 33.1 | 36.6 |
| | Usually the man | 1.1 | 8.0 | 16.8 |
| | Always the man | 0.7 | 4.4 | 2.1 |
| Who does small repairs in and around the house? | Always the woman | 1.9 | 4.1 | 0.6 |
| | Usually the woman | 1.8 | 3.3 | 3.4 |
| | Shared equally | 7.9 | 15.8 | 21.6 |
| | Usually the man | 36.4 | 25.1 | 51.4 |
| | Always the man | 52.0 | 51.7 | 23.0 |
| Who pays bills and keeping financial records? | Always the woman | 18.7 | 30.1 | 11.3 |
| | Usually the woman | 12.0 | 10.9 | 14.8 |
| | Shared equally | 53.6 | 35.5 | 37.6 |
| | Usually the man | 7.1 | 7.9 | 20.8 |
| | Always the man | 8.5 | 15.6 | 15.6 |
| Who organises joint social activities? | Always the woman | 8.2 | 9.7 | 7.6 |
| | Usually the woman | 11.1 | 15.1 | 34.2 |
| | Shared equally | 73.3 | 69.1 | 53.9 |
| | Usually the man | 4.5 | 4.3 | 3.8 |
| | Always the man | 2.9 | 1.8 | 0.5 |
| n | | 3,182 | 2,596 | 1,676 |

*Source:* Generations and Gender Survey - I, own calculations.

In Hungary, household labour division strongly adheres to traditional gender roles. Preparing daily meals and dishwashing are predominantly performed by women, and cleaning also remains largely their responsibility. Shopping is often a shared activity, but women still play a dominant role. Minor repairs are almost exclusively handled by men, whereas financial management is a more shared responsibility. Organizing shared activities is more of a joint responsibility and is distributed more evenly compared to the other two countries.

In France, the division of household labour is more balanced, although the influence of traditional gender roles is still noticeable. Cooking and dishwashing are more often performed by women, but gender equality is more apparent in these areas compared to Hungary. Shopping and cleaning are still primarily associated with women, though shared responsibility is more common. Minor repairs remain predominantly a male task but are distributed more equally between partners than in Hungary. Financial management is more balanced, and the organization of shared activities is also a more evenly distributed responsibility.

In Sweden, household labour division is the most balanced among the three countries. Cooking, dishwashing, shopping, and cleaning are largely shared responsibilities, and men's participation in these activities is significantly higher than in Hungary or France. Moreover, more men are responsible for minor repairs and financial management than women. The organization of shared activities in Sweden is less balanced compared to France, but overall, household labour follows traditional gender roles to a much lesser extent.

A common pattern in all three countries is that repairs are mostly assigned to men, while cooking and cleaning remain primarily female tasks. However, while women's dominance is more pronounced in Hungary and France, Sweden exhibits greater shared responsibility in several tasks, such as dishwashing and shopping. Financial responsibility is partially shared in all three countries, though women's dominance remains evident, particularly in France and Hungary.

## DESCRIPTIVE ANALYSIS OF CLUSTERS AND THEIR DEMOGRAPHIC CHARACTERISTICS

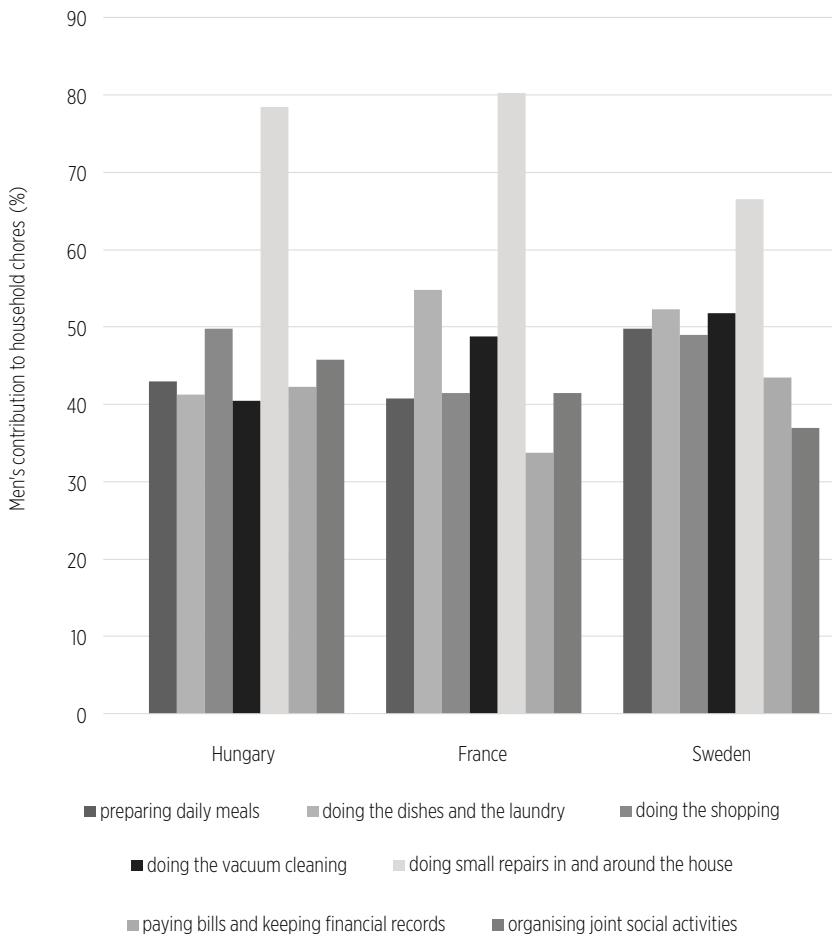
### Female clusters

The cluster analysis identified three main types of household task distribution among women in Hungary, France, and Sweden: the "Shared," the "Woman dominated," and the "Men helpers" clusters. While these clusters are present in all three countries, their internal composition, prevalence, and the social profiles of women within them vary, reflecting broader cultural, social, and policy differences.

The "Shared" cluster represents (*Figure 1*) the most balanced division of household labour, where men participate more actively in domestic tasks. However, the degree of equality differs substantially. In Sweden, men are routinely involved in shopping, dishwashing cooking, cleaning, and even repair work; they almost assume half of these tasks. In France, men are mostly involved in vacuum cleaning and dishwashing (besides repairs), but cooking and paying bills

still largely fall on women. In Hungary, traditional female tasks—especially cooking and cleaning—are still primarily performed by women, even in this "shared" model. This cluster is most common in Sweden (45.2%), less so in France (36.7%), and the least frequent in Hungary (28.5%) (*Table 2*). The "Shared" cluster is most strongly characterized by higher educational attainment and employment across all three countries, but these features are particularly pronounced in Sweden. Respondents in this cluster tend to be in their late twenties to early forties, with childless households being most common in Sweden and France, while in Hungary, a slightly higher proportion have children (*Tables A4–A6*).

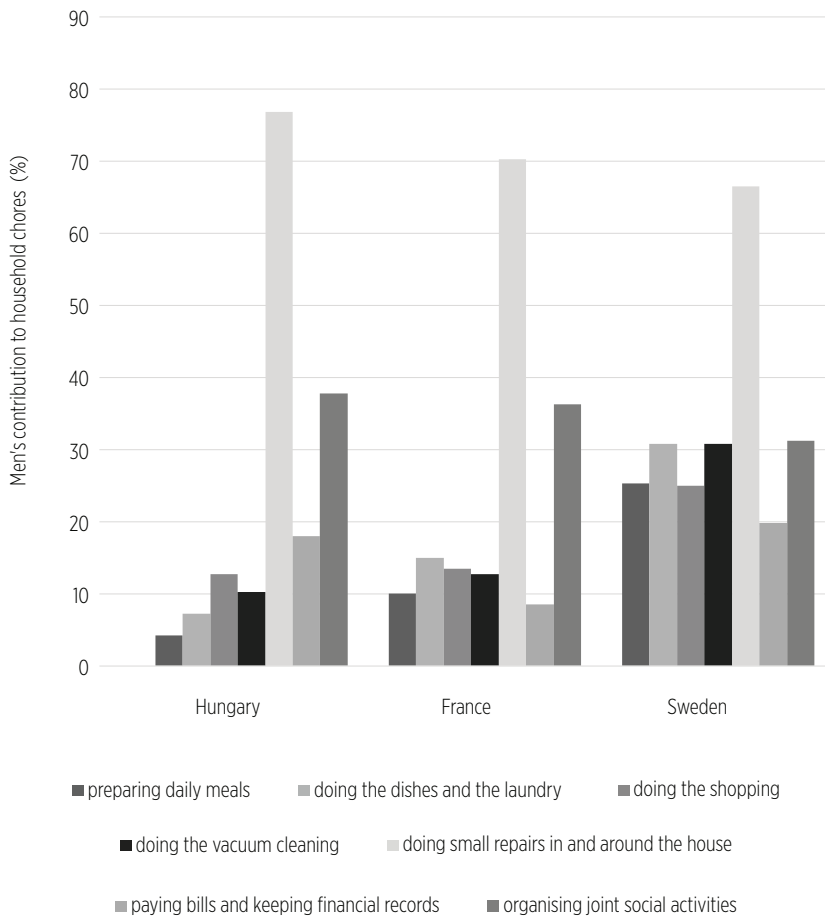
*Figure 1: "Shared" female cluster by country*




*Source:* Generations and Gender Survey - I, own calculations.

The "Women dominated" cluster (*Figure 2*) is defined by a strong persistence of traditional gender roles, with women performing nearly all domestic work. In Hungary and France, the participation of men rarely exceeds 10% in the traditional tasks, while it is higher when it comes to organising joint activities and doing the repairs around the house. In Sweden men's participation is between 20% and 30%, thus considerably higher than in the other two countries.

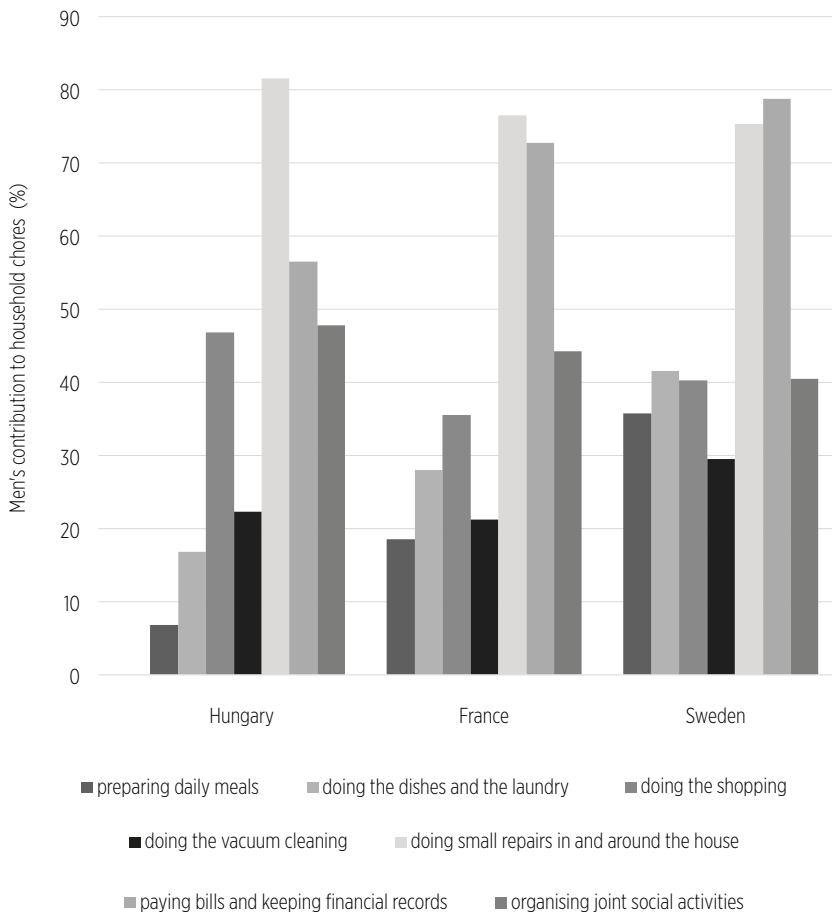
*Figure 2: "Woman dominated" female cluster by country*




*Source:* Generations and Gender Survey - I, own calculations.

This cluster is most prevalent in Hungary (33.1%), slightly less frequent in France (31.4%), and least common in Sweden (24.3%), indicating weaker traditional norms in the Swedish context (*Table 2*). The "Women dominated" cluster is most prevalent among women with medium educational attainment and reduced labour market participation across all three countries. This cluster is particularly associated with mothers of young children, especially in Hungary and France, where parental leave and inactivity rates are higher. Swedish women in this cluster still show relatively higher education and employment levels (*Tables A4–A6*).

*Figure 3: "Men helpers" female cluster by country*




*Source:* Generations and Gender Survey - I, own calculations.

In the case of the "Men helpers" cluster (*Figure 3*), men in Sweden demonstrate a higher level of involvement across all types of household chores than in the other two countries, with particularly notable participation in daily meal preparation and in doing the dishes and the laundry. In contrast, men in Hungary and France tend to be relatively more active in tasks traditionally perceived as "masculine," such as carrying out small repairs or handling bill payments, while their engagement in everyday domestic duties remains significantly lower. In Hungary, men's participation in cooking, doing the dishes and the laundry, and vacuum cleaning is especially limited, whereas their involvement in repairs and financial responsibilities exceeds 50%. France occupies an intermediate position: male participation is more balanced across various tasks compared to Hungary, yet still falls short of the levels observed in Sweden. "Men helpers" in all three countries are predominantly in their late twenties to early forties, typically married, and possess medium to high levels of education. While Hungarian and French cluster members are more likely to be on parental leave and less active in the labour market, their Swedish counterparts are overwhelmingly employed (*Tables A4–A6*).

Despite the shared typology, national variations reveal important trends. Across countries, women in the "Shared" cluster tend to be younger, more educated, while the "Women dominated" cluster is associated with older, less educated women (*Tables A4–A6*). Notably, Swedish men participate more actively in domestic work across all clusters, while Hungarian women carry a disproportionate share of tasks, even in "shared" arrangements. In France, male involvement – particularly in the "Men helpers" cluster – is more common among mothers with young children (*Table A4*), a pattern that is less evident in Hungary.

*Table 2: Distribution of respondents in the female clusters*

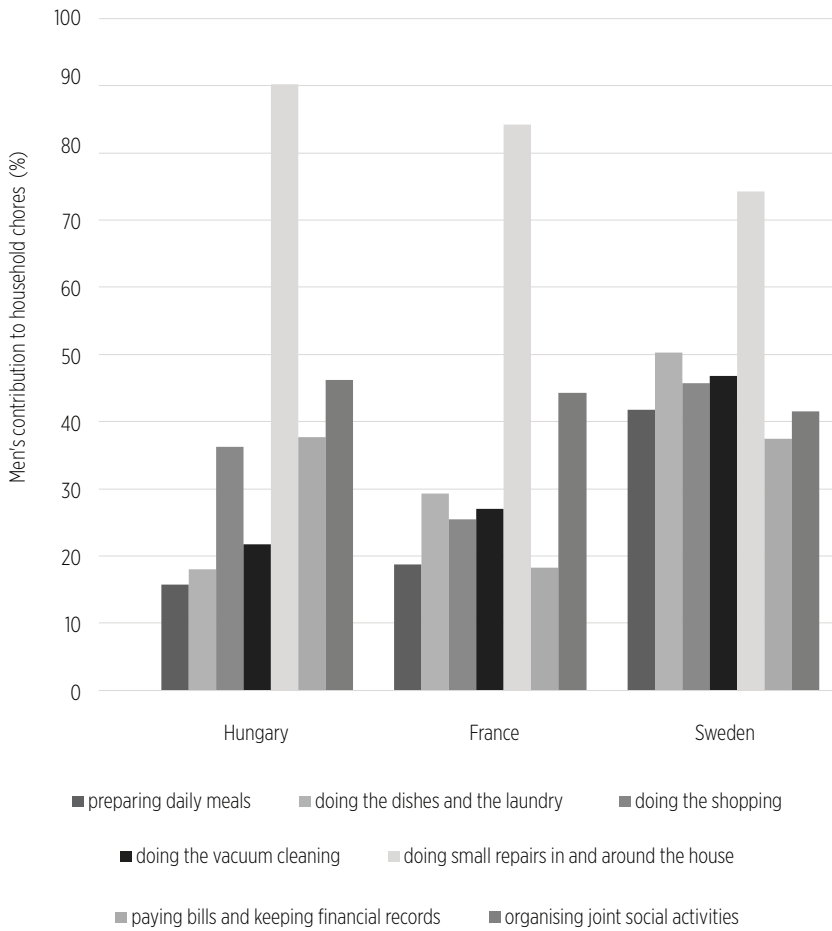
| Female clusters | Hungary | | France | | Sweden | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Shared | 470 | 28.5 | 494 | 36.7 | 419 | 45.2 |
| Woman dominated | 545 | 33.1 | 423 | 31.4 | 226 | 24.3 |
| Men helpers | 633 | 38.4 | 429 | 31.9 | 283 | 30.4 |
| **Total** | **1,648** | **100.0** | **1,346** | **100.0** | **928** | **100.0** |

*Source:* Generations and Gender Survey - I, own calculations.

## Male clusters

Cluster analysis among men revealed two main types of household task arrangements: the "Women dominated" and the "Participating men" clusters. While these categories appear consistently across countries, the extent of men's involvement in domestic tasks and the interpretation of "helping" vary significantly, shaped by differing social norms and expectations.

*Figure 4: "Woman dominated" male cluster by country*




*Source:* Generations and Gender Survey - I, own calculations.

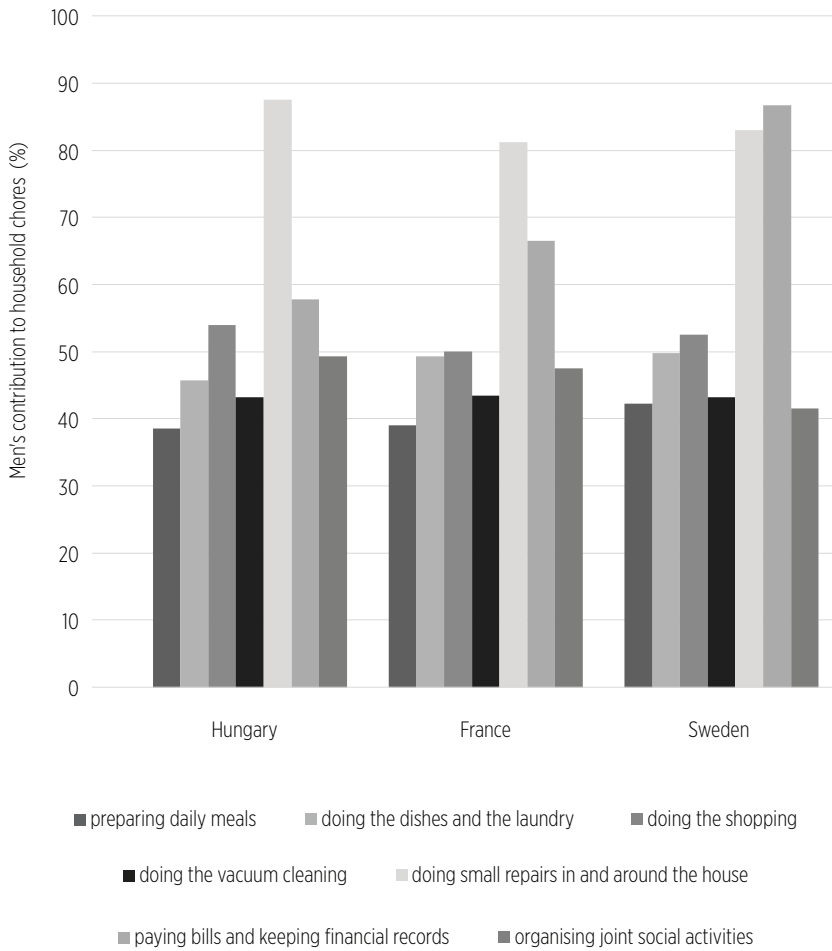
The "Women dominated" cluster (*Figure 4*) reflects a traditional gender role distribution, where household tasks such as cooking, dishwashing, and cleaning are primarily performed by women, and men's participation is largely limited to repair work. In Hungary shopping and financial management are somewhat more shared, though still leaning towards women. This cluster is most common in Sweden (56.6%), followed by Hungary (48.9%) and France (44.9%) (Table 3). Interestingly, despite Sweden's reputation for gender equality, men in this group still acknowledge women's dominant role in household labour—although they report higher participation in certain tasks, such as cooking and shopping, than their French and Hungarian counterparts. Members of the "Woman dominated" male cluster in Hungary and France are more often of lower educational attainment and are more likely to be inactive or unemployed, whereas in Sweden, the majority are employed. This cluster is also characterized by a high proportion of men raising at least two children, often including young ones (*Tables A4–A6*).

The "Participating men" cluster (*Figure 5*) represents a more balanced approach to domestic labour, where men take on greater responsibility in tasks like cooking, dishwashing, shopping, and financial management, while repair work still remains predominantly male. This cluster is most prevalent in France (55.1%), slightly less so in Hungary (51.1%), and least common in Sweden (43.4%) (*Table 3*). Overall, the three clusters exhibit strong similarities. French men in this group stand out for their active engagement in day-to-day housework, including organizational responsibilities. In Hungary, male participation is also higher than in the more traditional cluster, particularly in financial and shopping tasks, and also core chores like cooking and cleaning are more frequently shared. In Sweden, men in this cluster show the highest levels of involvement across almost all household activities (also in the other cluster, where only the indicators related to repairs and bill payments exhibit lower values), though the smaller size of the group may reflect a stricter personal standard for what constitutes "helping". Members of the "Participating men" cluster are predominantly employed in all three countries (over 80%) and typically have secondary or higher education. While some of them are raising two or more children—often younger ones—most have no children below 15 (*Tables A4–A6*).

Notably, the higher proportion of "Participating men" in Hungary and France compared to Sweden runs counter to conventional expectations about gender equality. This discrepancy may suggest that Hungarian and French men consider even occasional or selective involvement in household tasks as sufficient to regard such helping behaviour as joint work or that social desirability influences

their self-reporting. In Sweden, by contrast, a higher threshold for what counts as equal participation might explain the smaller size of the cluster.

*Figure 5: "Participating men" male cluster by country*




*Source:* Generations and Gender Survey - I, own calculations.

It is important to highlight that in the case of Sweden, the difference between the two clusters is minimal, with the most notable distinction being men's significantly higher involvement in financial management. Furthermore, among men, the "Participating men" cluster represents a higher level of male participation in all aspects compared to the corresponding female clusters.

In summary, while the two-cluster structure is stable across countries, the interpretation and lived reality of men's domestic involvement differ significantly. The findings highlight that quantitative similarities in cluster size may mask important qualitative differences in how "helping" and "sharing" are defined, pointing to broader national variations in gender norms, family roles, and expectations around masculinity and domestic responsibility.

*Table 3: Distribution of respondents in the male clusters*

| Male clusters | Hungary | | France | | Sweden | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Woman dominated | 750 | 48.9 | 561 | 44.9 | 423 | 56.6 |
| Participating men | 784 | 51.1 | 689 | 55.1 | 325 | 43.4 |
| Total | 1,534 | 100.0 | 1,250 | 100.0 | 748 | 100.0 |

*Source:* Generations and Gender Survey - I, own calculations.

## ATTITUDES TOWARDS GENDER ROLES – DESCRIPTIVE RESULTS

Next, we examine the extent to which individual factors influence cluster membership. As mentioned earlier, attitudes toward gender roles play a key role in this analysis. The distribution of individual opinions on gender roles across the three countries is presented in this section.

The continuous gender roles variable, which ranges from 0 to 1 (see the methods section for the construction of the variable), indicates that Hungary exhibits the most traditional gender role attitudes among the three countries (women: 0.527; men: 0.511). The median values are identical (0.5), indicating that half of the respondents hold more traditional views, while the other half exhibit more modern attitudes. The standard deviation is relatively high (women: 0.156; men: 0.163), suggesting greater variability in perspectives than in the other two countries (*Table 4*).

In France, the average values are higher than in Hungary (women: 0.683; men: 0.685), indicating more modern attitudes. The median value is also higher (0.667), demonstrating that most respondents lean towards more egalitarian

views. The standard deviation is about the same as in Hungary (somewhat lower among French men), suggesting a similar variability in opinions.

Sweden exhibits the most modern gender role attitudes, with the highest average values for both women (0.764) and men (0.693). This is the only country where a notable difference can be observed between the two sexes: Swedish women held visibly more modern views than Swedish men, whose views are more similar to that of French men. The median values for men are however a bit higher than in France. The standard deviation is lower than in the other two countries, implying a greater societal consensus on gender equality.

The differences among the three countries indicate that Sweden has the most modern gender role attitudes, especially in the case of women, while Hungary remains the most traditional. France represents an intermediate position, displaying more progressive views but still exhibiting some degree of gender-based variation.

*Table 4: Descriptive statistics on gender role attitudes in Hungary, France and Sweden*

| | Hungary | | France | | Sweden | |
|---|---|---|---|---|---|---|
| | Women | Men | Women | Men | Women | Men |
| Mean | 0.527 | 0.511 | 0.683 | 0.685 | 0.764 | 0.693 |
| Median | 0.500 | 0.500 | 0.667 | 0.667 | 0.792 | 0.708 |
| Standard deviation | 0.156 | 0.163 | 0.150 | 0.156 | 0.135 | 0.139 |

*Source:* Generations and Gender Survey – I, own calculations.

*Note:* See the subsection "Attitudes towards gender roles" in the section "Data and methodology" for the construction of the variable.

## REGRESSION RESULTS

In the following section, we present the results of the multinomial regression analyses. Our dependent variable can take three values in the case of women and it measures the likelihood of respondents belonging to the "Women dominated" or the "Men helpers" category compared to the "Shared" reference group. In the case of male clusters, the dependent variable takes two values and measures the likelihood of respondents belonging to the "Women dominated" cluster compared to the reference group of "Participating men. We included the con-

tinuous gender role attitude variable as an independent predictor, along with the demographic background variables described in the methods section. Separate models were run for each country and for women and men. For clarity and readability, the figures present only the statistically significant variables.

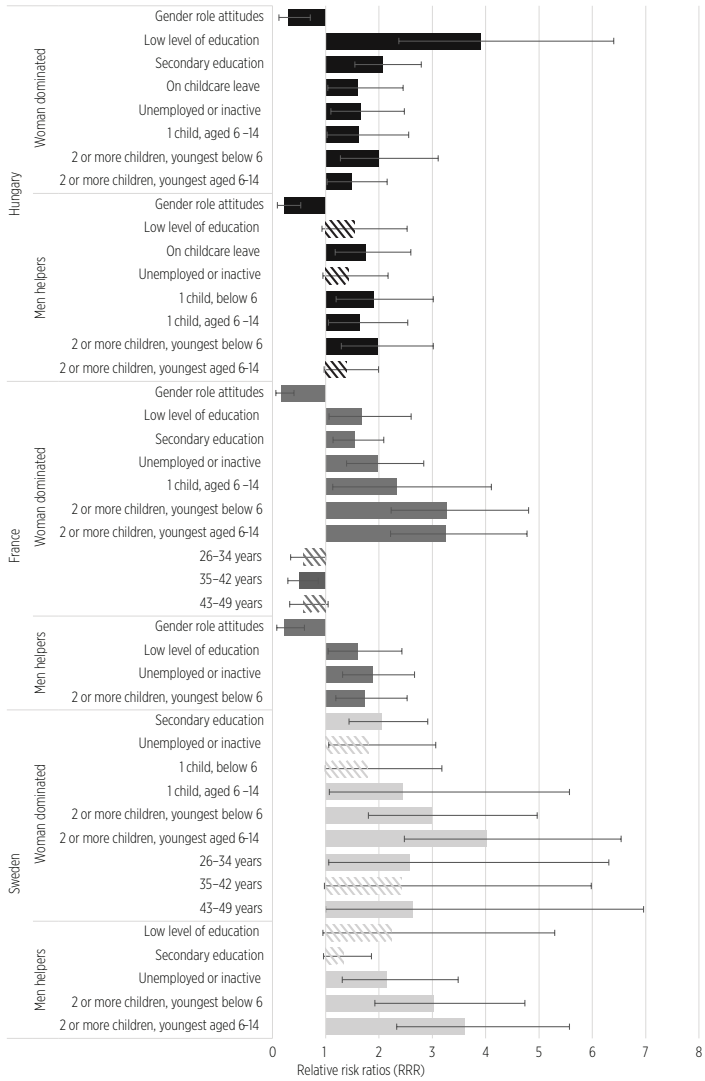
## Factors influencing female cluster membership

The results show that female cluster membership is influenced by multiple factors and the impact of these factors varies across countries (*Figure 6*).

The regression results show that more egalitarian gender role attitudes, as indicated by a higher score on the gender role scale, decreases the probability of belonging to the "Women dominated" and the "Men helpers" clusters, compared to the "Shared" group. Education also plays a crucial role, as lower educated women are more likely to belong to the "Women dominated" or the "Men helpers" category instead of the "Shared" group, while women with secondary education also belong more often to the "Women dominated" category instead of sharing the tasks with their partner. Similarly, employment status has a notable effect: unemployed and inactive women, as well as those on parental leave, are less likely to share the household tasks with their partner compared to working women.

The number and the age of the children also influence cluster membership. Compared to households with no child below the age of 14, household tasks are more often shared traditionally among couples with young children in Hungary. Women are almost twice as likely to belong to the "Women dominated" or the "Men helpers" clusters as to divide the tasks more equally if there are at least two children in the family and the youngest is under 6 years old. If there is only one child aged under 6, women also have a higher probability (rrr = 1.90) of belonging to the "Men helpers" category instead of sharing the tasks. If the children are all above the age of 6, the relative risk decreases somewhat, but the probability of belonging to any other cluster then the "Shared" is still higher.

*Figure 6: Factors influencing the relative risks of female cluster membership*




*Source:* Generations and Gender Survey - I, own calculations.

*Notes:* Multinomial regression results (relative risk ratios and 95% confidence intervals); reference cluster: "Shared".

Interpretation of bars: Filled bars indicate variables significant at the 5% level ($p < 0.05$); striped bars indicate variables significant at the 10% level ($p < 0.1$).

Explanatory variables included in the analysis and their reference categories: age group (18–25 years), relationship status (cohabiting), educational attainment (high), employment status (working), number of children and age of the youngest child (no children below 15), gender role attitudes.

The effect of the number and the age of children is also visible in the two other countries and the relative risks are even higher than in Hungary. In France, the probability of belonging to the "Women dominated" cluster is 3.2 times higher if there are two or more children in the household, irrespective of the age of the youngest child. In Sweden the relative risk of belonging to any other category than the "Shared" is also three times higher if there are two or more children and the probability of belonging to the "Women dominated" category is even four times higher if there are two or more children and the youngest is older than 6. It seems that in the two countries where the household tasks are more often shared, the presence of young children has a more important effect on the gendered division of household tasks than in Hungary.

In both Sweden and France, women's age significantly affects cluster membership, but not in the same way. In France, women aged above 25 (compared to the reference group of women aged 18–25) are more than 40% less likely to be in the "Women dominated" category than to share the tasks with their partner. This result may be surprising, yet several possible explanations arise. Young women tend to take on more housework at the beginning of cohabitation, even if they strive for equality, as social norms continue to reinforce women's household roles. Additionally, they face a dual expectation: they aim for equality while also conforming to the role of the "good housewife". They may also constitute a selected group since many young women between the age of 18 and 25 are not yet in a co-resident relationship. Those who are may be less educated and hold more traditional views. In contrast, among women aged 26–49, a more balanced division of labour may develop over the course of a long-term relationship. In Sweden the results point to the opposite direction: women aged over 25 are more than two times more likely to be in the "Women dominated" category than in the "Shared". In Sweden women with secondary education (as opposed to a high level of education) are more likely to belong to the "Women dominated" or to the "Men helpers" category, while those with low education also more often belong to the "Men helpers" category. As opposed to the two other countries, there is no significant effect of individual gender attitudes on cluster membership in Sweden.

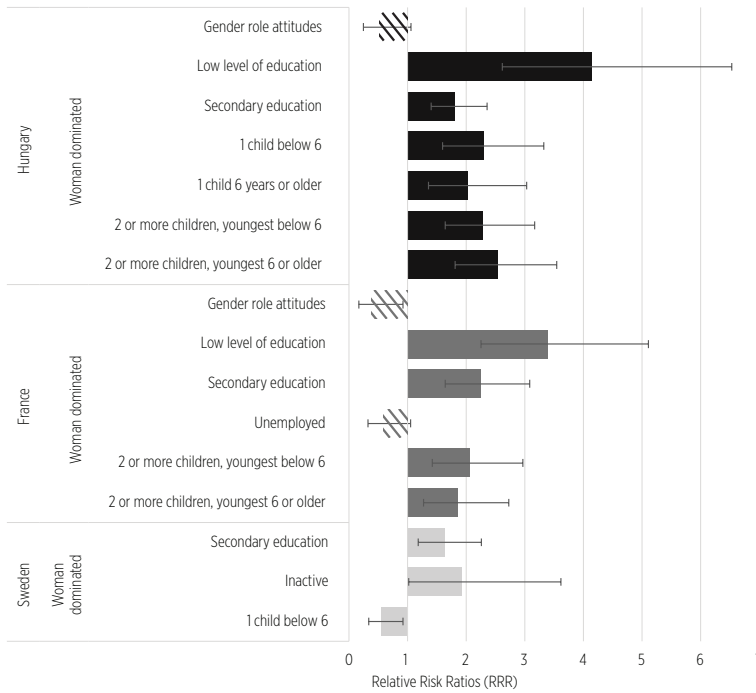
Overall, while education and employment status consistently shape household labour division in the three countries, gender role attitudes are important in Hungary and France, while women's age shapes labour market division in Sweden and France, and not in the same way. The presence of children below the age of 14 is important in all three countries, but its effect seems to be more

pronounced in the two Western countries, where these variables display the higher relative risks ratios.

## Factors influencing male cluster membership

The analysis of factors influencing men's household labour division in Hungary, France, and Sweden reveals both cross-country similarities and notable differences (*Figure 7*).

*Figure 7: Factors influencing the relative risk of male cluster membership*




*Source:* Generations and Gender Survey - I, own calculations.

*Notes:* Logistic regression results (relative risk ratios and 95% confidence intervals); reference cluster: "Participating men".

Interpretation of bars: Filled bars indicate variables significant at the 5% level ($p < 0.05$). Striped bars indicate variables significant at the 10% level ($p < 0.1$).

Explanatory variables included in the analysis and their reference categories: age group (18–25 years), relationship status (cohabiting), educational attainment (high), employment status (working), number of children and age of the youngest child (no children below 15), gender role attitudes.

For Hungarian and French men, more egalitarian gender attitudes (as indicated by higher values on the gender role scale) have a negative impact on the likelihood of belonging to the "Women dominated" category, as opposed to the "Participating men" cluster. In Sweden gender role attitudes have no significant effect on cluster membership. This suggests that men with more egalitarian views tend to participate more in household chores in the first two countries. The absence of this result for Sweden does not mean the opposite; it may be explained by the fact that the overall acceptance of modern gender roles is higher and men participate more in domestic work, regardless of their gender role attitudes.

Men with primary or secondary education are also more likely than highly educated men to share housework unequally in Hungary and in France. In Sweden there is no effect of low education, while the result regarding secondary education is similar.

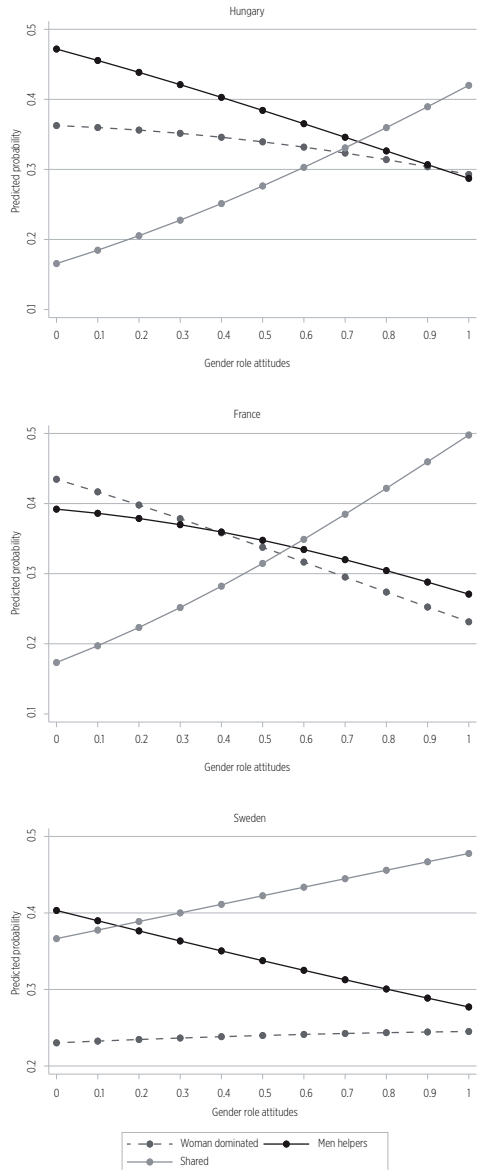
In Hungary, men's labour market status does not have any significant effect on cluster membership, while in France, unemployed men are more likely to help their partner with the housework, compared to those who are working. In Sweden, the opposite is true: inactive men, rather than those who are working, are almost two times more likely to be in the "Women dominated" category than in the "Participating men" category.

The presence and the age of children influence cluster membership in the three countries, but not in the same way. While in Sweden the presence of one child who is below the age of 6 decreases the probability of men to belong to the "Women dominated" category (which means that they are more likely to share the household tasks with their partner), the opposite is true in Hungary (rrr = 2.3). In the latter country the presence of young children increases the likelihood of being in the "Women dominated" category and this is also true in France if there are two or more children.

## The influence of gender role attitudes on the division of household tasks

To better interpret the impact of gender role attitudes on cluster membership, we computed marginal effects using STATA's margins command following the regressions. The resulting predicted probabilities confirm that gender role attitudes significantly influence the division of domestic work, especially in Hungary and France.

*Figure 8: Predicted probability of belonging to each female cluster according to gender role attitudes by country*




*Source:* Generations and Gender Survey - I, own calculations.
*Note:* Marginal effects from the regression results.

In the case of Hungary, women holding very traditional gender role attitudes (with a score between 0 and 0.1 on the gender roles continuous variable) have a probability of less than 20% to belong to the most modern, "Shared" category, while they have a probability of 36% to belong to the "Women dominated" and 46% to the "Men helpers" clusters (*Figure 8*).

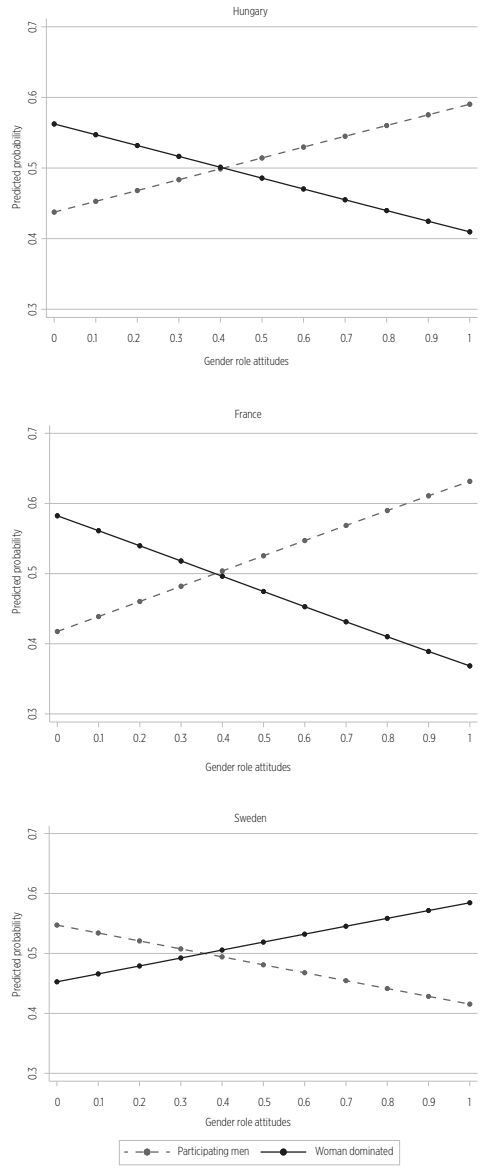
More egalitarian gender attitudes are on the other hand associated with higher probability of belonging to the "Shared" category: those having a score of 1 on the gender roles variable have a probability of 42% to belong to this most 'modern' category.

Similar results are found in France, where the traditional attitudes also increase the probability of belonging to one of the two more traditional clusters. In the meantime, there is less difference in predicted probabilities between these two groups than in Hungary. More modern views increase the probability of the "Shared" cluster membership: those scoring the highest on gender role attitudes have a 50% probability to divide household tasks more equally in the couple.

In Sweden the gender role attitudes variable do not have a significant effect on cluster membership, and the graph clearly shows that gender role attitudes scores indeed play a smaller role. The predicted probability of belonging to the most traditional cluster is overall low (below 30%), while the probability of dividing the household tasks is 37% in the case of women holding the most traditional views on gender roles, and 47% for those who are the most liberal from this point of view. This means that even Swedish women holding more traditional views tend to share household tasks more equally than Hungarian or French women.

In the case of men, the predicted probability of belonging to the two clusters by gender role attitudes is very similar in Hungary and in France (Figure 9). Men with the most traditional views have a probability of 44% to belong to the women dominated cluster in Hungary and 42% in France. The probability of belonging to the "Shared" category becomes higher than that of belonging to the more traditional category among those who reach a score of 0.5 on the gender attitudes scale in Hungary, while this is already the case among those who have a scale of 0.4 in France. Among those who express the most modern gender roles views, the probability of belonging to the "Shared" category is 59% in Hungary and 63% in France. Among Swedish men, gender role attitudes do not significantly influence cluster membership (see *Figure 7*) and the predicted probabilities show a contradictory picture of gender role attitudes.

*Figure 9: Predicted probability of belonging to each male cluster according to gender role attitudes by country*




*Source:* Generations and Gender Survey - I, own calculations.
*Note:* Marginal effects from the regression results.

## DISCUSSION AND CONCLUSIONS

This study examines the division of household labour in Hungary, Sweden, and France within the context of various demographic characteristics and gender roles, closely linking them to differences in welfare state systems. The analysis revealed notable differences among the three countries: Sweden is characterized by a more equal division of household tasks and a stronger presence of egalitarian attitudes, whereas Hungary remains dominated by traditional gender roles. France represents an intermediate case, where household labour is partially shared but still follows a predominantly traditional pattern.

The first part of the study provided a theoretical foundation for interpreting the results, presenting theories of household labour division, such as Becker's New Household Economics and the Relative Resources Theory. According to these theories, the distribution of household tasks is determined by the resources and time management of household members. The findings of the analysis large ly align with these theories, particularly in highlighting that women with higher educational attainment occupy a stronger bargaining position, which can facilitate a more equal division of household labour.

The interpretation and distribution of clusters confirmed that household labour is more equally shared among couples in Sweden than in the other two countries: approximately 45.1% of Swedish women belong to the "Shared" category, compared to 28.7% in Hungary and 38% in France. Moreover, even in this cluster, household tasks are more equally shared in Sweden than in the other two countries.

Regarding male clusters, the "Participating men" group represents a higher proportion in Hungary (51.5%) and in France (56.8%) compared to the "Women dominated" cluster. However, it is important to emphasize that men in no country reported being solely responsible for household tasks. The sharing of tasks rather implies a certain degree of contribution, as opposed to a complete lack of participation. Notably, Sweden has the highest proportion of men in the "Women dominated" category (54.5%), which is an unexpected finding, but if we take a closer look, we can see that the two clusters differ the least among Swedish men, which may be explained by the generally more equal distribution of household tasks in Sweden, as previously highlighted. It is also important to point out that the content of the Swedish male clusters differs slightly from the French and Hungarian ones, so this should also be taken into account when making comparisons.

According to a previous study by Herche (2010), Hungarian men's participation in household work is generally low and primarily limited to occasional, less routine-based tasks, such as minor repairs or gardening. The finding that men's involvement is often described as "helping" rather than fully taking over household responsibilities is consistent with the results of our study. Additionally, Herche (2010) also found that Hungarian men, in an international comparison, participate in household chores at a higher-than-average rate.

According to the study by Pongrácz and Murinkó (2009), traditional values in Hungary hinder the egalitarian division of labour, and men often do not perceive housework as a shared responsibility. However, this finding complements our result that Hungarian men "help out" at a higher rate compared to men in other countries. Based on the comparison of results, it appears that Hungarian men's participation in household chores reflects a change in frequency rather than a shift in responsibility—meaning that while they assist with tasks, the overall responsibility still falls on women.

The comparison of gender role attitudes across the three countries reveals significant differences. Hungary exhibits the most traditional views, with lower average values and greater variability. France represents an intermediate position, showing more egalitarian attitudes but still some degree of gender-based variation. Sweden stands out as the most progressive, especially in the case of women, while Swedish men held more similar views to French men. The difference between the two sexes is thus the most pronounced in Sweden.

The results highlight key differences in household task-sharing between Hungary, France, and Sweden. More egalitarian individual gender role attitudes reduce the likelihood of a gendered division of household tasks in Hungary and France, but not in Sweden, where the attitudes do not matter and where modern gender norms are already widely accepted. Education plays a crucial role, as lower-educated women in Hungary and France are more likely to fall into more traditional clusters, whereas in Sweden, secondary education increases the likelihood of a more balanced division.

The number and age of children influence cluster membership, as the traditional division of household tasks is more common in households with young children. This effect is present in all three countries, where the relative risks are even higher compared to childless respondents. In France and Sweden, where household tasks are generally more equally shared, the presence of young children has an even stronger impact on shifting towards a traditional division of labour than in Hungary. This suggests that, although the Swedish welfare system

strongly supports gender equality, the changes associated with having children often lead to a more traditional role distribution.

Among men, labour market status has different effects by country. In France, unemployed men are more likely to help with household tasks, while in Sweden, inactive men are almost twice as likely to be in the "Women dominated" category than to help with the household tasks. In Hungary, the presence of one or more young children below the age of 14 increases the likelihood of men falling into the traditional category, whereas in Sweden, the presence of one child below the age of 6 promotes more equal task-sharing. In France the effect is significant only in the case of two or more children, whose presence increases the domestic burden on women.

The findings support the theory of comparative advantages and Becker's New Household Economics, particularly in female regression models and – surprisingly – in the French male regression model. In the latter case, men's participation in housework is higher when they are unemployed, which in turn fosters a more egalitarian approach to household labour division. Additionally, this phenomenon can also be explained by the theory of time allocation, which suggests that the household work is primarily done by the person who has more time at home.

According to the doing gender approach, unemployed men do even less housework because their role as breadwinners is undermined, and they compensate for this by avoiding tasks perceived as feminine (Gough & Killewald, 2010). However, this pattern does not hold true for French men in this case.

Regarding the first research question about the patterns of household labour division, the findings indicate that household tasks are more equally shared in Sweden. In contrast, in Hungary and France, traditional gender roles play a stronger role in shaping the division of labour. In France, while some degree of balance can be observed, traditional task division remains prevalent. In Hungary, the "Women dominated" model is the most common, where men typically only engage in specific tasks, primarily household repairs. These results confirm that, in general, Sweden exhibits a more equal division of housework, reflecting an egalitarian approach reinforced by the country's welfare system. However, the presence of young children tends to push households towards a more traditional labour division, reinforcing gendered roles in domestic responsibilities.

Regarding the second research question, which examines how childrearing influences the division of household labour in the three countries, the following conclusions can be drawn. Women's domestic burdens are higher in all three countries in households with young children. In Sweden, men's participation in

housework is significantly higher when there is at least one child under the age of six in the household. In the Swedish female clusters, housework is relatively equally shared as long as there are no young children in the household; however, when there is, women's workload increases. In France, the division of labour becomes more traditional in families with young children, particularly in households with two children. In Hungary, both the female and male models indicate that the presence of young children strongly influences the emergence of gender inequalities in household tasks. Thus, the second hypothesis is confirmed, as childrearing contributes to a more traditional division of labour, reinforcing gendered household responsibilities.

Regarding the third research question, which investigates whether individual gender role attitudes are reflected in everyday household practices, the study's findings confirm that men and women who hold more modern, egalitarian views are generally more likely to share household tasks in Hungary and in France. In both countries this effect was observed for both men and women, whereas in Sweden, gender role attitudes had no significant effect, which can be explained by the generally higher level of gender equality.

Our study has some limitations. We analysed the division of household tasks in couples but were unable to include responses from both partners due to the lack of couple-based data. Additionally, the measurement of household task division is somewhat rough, as we could not account for the time spent on tasks or their relative importance within each household in our models. Finally, it was not possible to adopt a longitudinal approach to assess the impact of family events (e.g. childbirth or marriage) on the dynamics of household task division.

Overall, the results highlight that the division of household tasks not only depends on gender ideology but also on family status and the number of children, offering an opportunity to further develop theoretical models. Additionally, the role of educational attainment is prominent. The dissonance between attitudes and practice often reflects discrepancies between welfare systems and societal norms. These findings underscore the complex interplay between gender ideology, labour market factors, and welfare policies in shaping household labour division across different countries.

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# APPENDICES

*Table A1: The distribution of the sample by country and demographic characteristics*

| Variables | | Hungary | | France | | Sweden | |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % |
| Sex | Male | 1534 | 48.2 | 1250 | 48.1 | 748 | 44.6 |
| | Female | 1648 | 51.8 | 1346 | 51.9 | 928 | 55.4 |
| Age | 18–25 years | 328 | 10.3 | 220 | 8.5 | 104 | 6.2 |
| | 26–34 years | 961 | 30.2 | 828 | 31.9 | 561 | 33.5 |
| | 35–42 years | 1196 | 37.6 | 1026 | 39.5 | 751 | 44.8 |
| | 43–49 years | 697 | 21.9 | 522 | 20.1 | 260 | 15.5 |
| Relationship status | Cohabiting | 1308 | 41.1 | 1025 | 39.5 | 583 | 34.8 |
| | Married | 1874 | 58.9 | 1571 | 60.5 | 1093 | 65.2 |
| Level of education | Low | 420 | 13.2 | 465 | 17.9 | 94 | 5.6 |
| | Secondary | 1811 | 56.9 | 1238 | 47.7 | 838 | 50.0 |
| | High | 951 | 29.9 | 893 | 34.4 | 744 | 44.4 |
| Employment status | Working | 2352 | 73.9 | 2028 | 78.1 | 1379 | 82.3 |
| | Unemployed or inactive | 426 | 13.4 | 480 | 18.5 | 204 | 12.2 |
| | On parental leave | 404 | 12.7 | 88 | 3.4 | 93 | 5.5 |
| Number and age of children | No children below 15 | 783 | 24.6 | 739 | 28.5 | 555 | 33.1 |
| | 1 child, below 6 | 534 | 16.8 | 433 | 16.7 | 231 | 13.8 |
| | 1 child, aged 6–14 | 369 | 11.6 | 189 | 7.3 | 75 | 4.5 |
| | 2 or more children, youngest below 6 | 770 | 24.2 | 670 | 25.8 | 421 | 25.1 |
| | 2 or more children, youngest aged 6–14 | 726 | 22.8 | 563 | 21.7 | 394 | 23.5 |
| n | | 3,182 | | 2,596 | | 1,676 | |

*Source:* Generations and Gender Survey – I, own calculations.

*Table A2: Differences between clusters*

| Differences between clusters | Total sum of squares (TSS) | Within-cluster sum of squares | Between-cluster sum of squares (BCSS) | BCSS/TSS ratio (%) | Euclidean distance |
|---|---|---|---|---|---|
| Hungarian female clusters | 6549.88 | 5293.25 | 1256.63 | 19.2 | 2.189–2.929 |
| French female clusters | 10989.74 | 9129.19 | 1860.55 | 16.9 | 2.07–2.99 |
| Swedish female clusters | 4105.31 | 3446.93 | 658.38 | 16.0 | 1.878–2.388 |
| Hungarian male clusters | 6528.36 | 5313.62 | 1214.75 | 18.6 | 1.992 |
| French male clusters | 11664.17 | 9410.29 | 2253.87 | 19.3 | 2.539 |
| Swedish male clusters | 3808.83 | 3059.76 | 749.06 | 19.7 | 2.027 |

*Source:* Generations and Gender Survey – I, own calculations.

*Table A3: Spearman's rank correlation analysis between clusters and control variables*

| | Hungarian female cluster | Hungarian male cluster | French female cluster | French male cluster | Swedish female cluster | Swedish male cluster |
|---|---|---|---|---|---|---|
| Age | –0.018 | 0.034 | –0.007 | –0.030 | 0.026 | 0.017 |
| | (0.464) | (0.178) | (0.784) | (0.255) | (0.401) | (0.647) |
| Relationship status | –0.002 | –0.035 | 0.029 | –0.027 | 0.013 | –0.013 |
| | (0.922) | (0.171) | (0.248) | (0.314) | (0.679) | (0.722) |
| Level of education | 0.214 | –0.211 | 0.155 | –0.207 | 0.124 | -0.093 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.011) |
| Employment status | 0.140 | –0.051 | 0.127 | 0.054 | 0.051 | -0.101 |
| | (0.000) | (0.046) | (0.000) | (0.042) | (0.105) | (0.005) |
| Number and age of children | 0.007 | 0.034 | 0.004 | 0.039 | –0.021 | –0.048 |
| | (0.770) | (0.178) | (0.882) | (0.143) | (0.515) | (0.186) |
| n | 1,648 | 1,534 | 1,346 | 1,250 | 928 | 748 |

*Source:* Generations and Gender Survey – I, own calculations.
*Notes*: 2-tailed significance levels in parentheses.

*Table A4: The distribution of the Hungarian clusters by demographic characteristics (%)*

| | | Female clusters | | | Male clusters | |
|---|---|---|---|---|---|---|
| Variables | | Shared | Woman dominated | Men helpers | Woman dominated | Participating men |
| Age | 18–25 years | 8.7 | 9.4 | 11.0 | 10.2 | 11.4 |
| | 26–34 years | 27.3 | 31.6 | 28.7 | 30.4 | 31.8 |
| | 35–42 years | 42.7 | 37.1 | 39.3 | 36.8 | 34.3 |
| | 43–49 years | 21.3 | 21.9 | 21.0 | 22.6 | 22.5 |
| Relationship status | Cohabiting | 40.3 | 41.4 | 43.3 | 38.6 | 41.9 |
| | Married | 59.7 | 58.6 | 56.7 | 61.4 | 58.1 |
| Level of Education | Low | 7.9 | 22.5 | 13.6 | 16.9 | 6.2 |
| | Secondary | 47.6 | 55.0 | 50.3 | 65.1 | 61.3 |
| | High | 44.5 | 22.5 | 36.1 | 18.0 | 32.5 |
| Employment status | Working | 73.4 | 54.2 | 56.1 | 83.8 | 87.4 |
| | Unemployed or inactive | 11.1 | 20.0 | 14.2 | 13.4* | 8.5* |
| | On parental leave | 15.5 | 25.8 | 29.7 | 2.8** | 4.1** |
| Number and age of children | No children below 15 | 33.8 | 21.1 | 20.3 | 16.7 | 32.3 |
| | 1 child, below 6 | 14.4 | 14.0 | 20.7 | 18.4 | 15.9 |
| | 1 child, aged 6–15 | 11.4 | 12.4 | 11.3 | 12.4 | 11.0 |
| | 2 or more children, youngest below 6 | 16.6 | 26.7 | 26.0 | 27.1 | 22.6 |
| | 2 or more children, youngest aged 6–15 | 23.8 | 25.8 | 21.7 | 25.4 | 18.2 |

*Source:* Generations and Gender Survey – I, own calculations.

*Notes:* * Only unemployed; ** Inactive and on parental leave.

*Table A5: The distribution of the French clusters by demographic characteristics (%)*

| Variables | | Female clusters | | | Male clusters | |
|---|---|---|---|---|---|---|
| | | Shared | Woman dominated | Men helpers | Woman dominated | Participating men |
| Age | 18–25 years | 6.4 | 10.1 | 8.1 | 8.5 | 9.2 |
| | 26–34 years | 33.1 | 31.2 | 32.1 | 29.6 | 33.4 |
| | 35–42 years | 41.8 | 37.4 | 39.8 | 41.8 | 37.3 |
| | 43–49 years | 18.7 | 21.3 | 20.0 | 20.1 | 20.1 |
| Relationship status | Cohabiting | 42.2 | 38.8 | 38.8 | 35.3 | 39.8 |
| | Married | 57.8 | 61.2 | 61.2 | 64.7 | 60.2 |
| Level of education | Low | 11.7 | 20.0 | 19.5 | 24.5 | 14.5 |
| | Secondary | 41.3 | 49.6 | 42.5 | 56.2 | 48.1 |
| | High | 47.0 | 30.4 | 38.0 | 19.3 | 37.4 |
| Employment status | Working | 77.6 | 62.1 | 63.2 | 91.7 | 87.8 |
| | Unemployed or inactive | 17.8 | 31.3 | 29.9 | 6.7* | 8.2* |
| | On parental leave | 4.6 | 6.6 | 6.9 | 1.6** | 4.0** |
| Number and age of children | No children below 15 | 37.5 | 18.9 | 29.1 | 21.1 | 32.9 |
| | 1 child, below 6 | 18.7 | 8.4 | 16.9 | 16.6 | 19.8 |
| | 1 child, aged 6–15 | 7.0 | 8.7 | 8.5 | 6.6 | 6.4 |
| | 2 or more children, youngest below 6 | 18.3 | 32.6 | 26.5 | 31.2 | 22.9 |
| | 2 or more children, youngest aged 6–15 | 18.5 | 31.4 | 19.0 | 24.5 | 18.0 |

*Source:* Generations and Gender Survey – I, own calculations.

*Notes:* * Only unemployed; ** Inactive and on parental leave.

*Table A6: The distribution of the Swedish clusters by demographic characteristics (%)*

| | | Female clusters | | | Male clusters | |
|---|---|---|---|---|---|---|
| Variables | | Shared | Woman dominated | Men helpers | Woman dominated | Participating men |
| Age | 18–25 years | 6.5 | 3.0 | 5.0 | 6.4 | 8.7 |
| | 26–34 years | 32.8 | 33.6 | 32.4 | 36.0 | 32.4 |
| | 35–42 years | 43.8 | 45.1 | 47.6 | 44.6 | 43.7 |
| | 43–49 years | 16.9 | 18.3 | 15.0 | 13.0 | 15.2 |
| Relationship status | Cohabiting | 35.6 | 33.8 | 35.1 | 34.2 | 34.4 |
| | Married | 64.4 | 66.2 | 64.9 | 65.8 | 65.6 |
| Level of education | Low | 4.3 | 3.4 | 6.5 | 7.2 | 6.1 |
| | Secondary | 40.8 | 58.1 | 47.1 | 57.8 | 48.5 |
| | High | 54.9 | 38.5 | 46.4 | 35.0 | 45.4 |
| Employment status | Working | 80.1 | 75.6 | 72.6 | 87.5 | 92.8 |
| | Unemployed or inactive | 12.5 | 15.5 | 17.7 | 2.4* | 1.5* |
| | On parental leave | 7.4 | 8.9 | 9.7 | 10.1** | 5.7** |
| Number and age of children | No children below 15 | 44.2 | 23.7 | 27.1 | 34.3 | 29.5 |
| | 1 child, below 6 | 15.2 | 12.7 | 11.3 | 10.9 | 18.0 |
| | 1 child, aged 6–14 | 4.7 | 6.2 | 3.5 | 4.2 | 4.2 |
| | 2 or more children, youngest below 6 | 18.6 | 25.6 | 28.1 | 28.0 | 26.4 |
| | 2 or more children, youngest aged 6–15 | 17.3 | 31.8 | 30.0 | 22.6 | 21.9 |

*Source:* Generations and Gender Survey – I, own calculations.

*Notes:* * Only unemployed; ** Inactive and on parental leave.

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