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## Detailing household time use in an input-output database for climate footprint estimation

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45th INTERNATIONAL ASSOCIATION FOR TIME USE RESEARCH CONFERENCE

# BOOK OF ABSTRACTS

*Sustainable Society*

*and Time Use Research*

**27-30  
NOVEMBER 2023  
TOKYO, JAPAN**

International Association for Time Use Research | Statistics Bureau of Japan



IATUR



Statistics Bureau of Japan

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# LIST OF ABSTRACTS – PLENARY SESSION –

## Plenary session 1

### - Modern ways to collect time use data -

#### Centre for Time Use online time use diary tool

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**Oriel Sullivan, Jonathan Gershuny, Juana Lamote de Grignon Pérez**

We present variations in design and methodology of the online time use diary tool developed by the CTUR, the 'Click and Drag Diary Instrument' (CaDDI). The original diary tool, including all the HETUS diary fields plus enjoyment and device use, was first deployed in 2016 across 9 countries to enable the cross-national comparison of instantaneous enjoyment. The respondent panel of a large international market research organisation was used to collect quota-representative data. We subsequently used the same methodology across 5 waves in the UK during the COVID-19 pandemic, collecting information on population time use across 3 lockdowns, an intervening period with fewer restrictions, and following the declaration of 'Freedom Day' in July 2021. Various publications have appeared using this pandemic series data, which is available from the UK Data Archive. In collaboration with health researchers experienced with using social contact diaries, we next designed a version of the tool which enhances the 'who with' field of the diary to include information on closeness of contact, and collects additional information on location (indoor/outdoor) and subjective perceptions of crowdedness. This version is designed to be of future use to epidemiologists interested in combining the behavioural data available from time use diaries with the type of social contact information available from social contact diaries. The most recent version of the CaDDI expands the 'short diary' activities list of the original design to compatibility with the full HETUS activity list. While previous data has been collected using quota-representative market research panel respondents, this version has recently been run using a UK nationally-representative sample.

#### Simultaneous Behaviours and Time Use: An Application of the Experience Sampling Method in Time-Use Survey in Japan

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**Kenji Ishida**

One common way to measure how people spend their time is through the time diary method, which asks participants to recall what they did on specific days. However, this approach has limitations, as it can lead to over or under-reporting certain activities. The experience sampling method has been developed and used primarily in psychology to address this issue. This method tries to avoid biases by asking questions in real time. Despite its benefits, the experience sampling method presents some technical challenges, such as psychological or physical burden, which may result in a lower response rate. If non-responses happen randomly, the sample size may be too small, resulting in a large standard error. However, the real-time measurement may introduce bias if non-responses are not random. There is little research in Japan on applying the experience sampling method and its technical challenges.

The present study is the first one in Japan to investigate who responds to a time-use survey with the experience sampling method. Based on the Basic Resident Registration, we conducted a probability

sampling survey in mid-February 2023. In the first stage, we asked respondents social, economic, demographic, and time-use-relevant items as baseline questions. The response rate is 19.8% (N = 495), with women, those in their early 30s, or living in metropolitan areas more likely to respond. Of 495, 78.6% (n = 389) agreed to participate in the second stage (the experience sampling survey), and 82.5% (n = 321) completed the real-time survey at least once (each respondent is asked to answer three times a specific day assigned). We do not find clear evidence that the intention and actual participation in the experience sampling survey is associated with socioeconomic and demographic attributes. Meanwhile, simultaneous behaviours in secondary activities (e.g., paid and unpaid work) are associated with worse mental health, while a positive association regarding simultaneous tertiary activities (e.g., social media activities and hobbies). These results imply that the experience sampling survey is not problematic immediately concerning the retention bias despite room to improve the response rate at the first stage.

## Designing, creating, and conducting the International Association's Time Use Survey (IATUS) through MOTUS

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### ***Theun Pieter van Tienoven***

Time use surveys (TUS) collect data on daily life. Yet a TUS is a complex survey because it exists of multiple tasks that need to be completed by a respondent, such as the completion of a household questionnaire, individual questionnaires and time-diaries for all eligible household members. As such, TUSs face numerous challenges, such as the need to replace the expensive and laborious paper-and-pencil method by a digitalized method with smart ways to reduce respondent burden amid the absence of updated guidelines to harmonize digitalized TUS across NSIs. Many of these challenges relate to the principles of the European Statistics Code of Practice.

To tackle these challenges and to modernize the method with great attention to privacy and data security, multiple methods, modes, and applications have been developed. One of which is the data collection platform MOTUS, developed by the Research Group TOR of the Vrije Universiteit Brussel started in 2012. Since 2018, MOTUS is further developed within the spin-off company hbits, through projects done for and in collaboration with National Statistical Offices. This presentation aims to demonstrate live how MOTUS can be used to design, create, and conduct a tailor-made one-day TUS for the 45th IATUR conference.

## Plenary session 2

### - Time Use research in the field of civil and environmental engineering -

#### Time use research in the field of transportation planning

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##### **Mamoru Taniguchi, Sumiko Ishibashi**

In this presentation, we provide a detailed overview of the time-use surveys used in transportation planning studies and present results and policy implications from a chronological analysis using those surveys. Two main types of time-use survey are used in the field of transportation planning. The "Person Trip Survey" has a sample size of 1–2% of a metropolitan population and is used to replicate the actual traffic conditions in the metropolitan area. In these surveys, people are directly asked about their travel behavior on the survey date; participants report all the trips made on the survey day, with detailed information on origin, destination, purpose, timing, duration, and transportation mode. The "Activity Survey" has been more recently used during the COVID-19 pandemic. In this survey, participants are asked about their activities on the survey date; they report an activity log throughout the day, with information about the places they were at, the types of activity they engaged in, and the transportation modes they used. A key feature of these types of time-use surveys is that they provide information on personal attributes and trip details, such as trip purpose and mode of transportation, whereas smartphone location data do not; thus, time-use surveys are often more effective for use in transportation planning and policymaking. In addition, with the recent increase in telework, it has been proven more useful in terms of policymaking to survey activities throughout the day and not only trips. We conclude our presentation with the potential for future use of the time-use surveys in transportation planning.

#### Time use research in lifestyle analysis for decarbonization

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##### **Yuko Kanamori**

The question of "what activities we spent our limited time on - 24 hours a day, 7 days a week - " has impacts on our lives. In order to realize a decarbonized society, various changes are required in the way we live. This presentation will present three studies on how time-use data has been used and will be used in the future from the perspective of research for achieving a decarbonized society. This study is based on the household production theory of G.S.Becker, a well-known economist, in which households are considered to be engaged in production activities to produce commodities, using consumption expenditures and time as inputs. This study requires time information such as the number of hours spent on the activity. The second study examined energy supply and demand in the home. While households install PV systems to generate electricity, they also consider when to use electricity at home and when to charge and discharge electricity into storage batteries to determine the optimal supply and demand of electricity. This study will require information on when and which equipment is to be operated. The third study analyzes the impact of new technologies such as IT on energy consumption and CO<sub>2</sub> emissions by what activities people allocate their leisure time to. For example, when telework eliminates the need for commuting time, we analyzed which activities people would spend their leisure time on. In this presentation, In this article, I will focus mainly on my own research, but in recent years there have been several studies dealing with time in environmental research. Finally, I will summarize the expectations for time statistics in environmental research.

## Time use research in evaluation of residents' health risk caused by environmental contamination

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### **Yoko Shimada**

Environmental pollutants are released from a variety of sources, primarily from combustion of fuels in plants and from household, drainage pipes and vehicle exhaust pipes. Pollutants diffuse and contaminate the environment: atmosphere, soil, rivers, lakes and oceans. People are directly exposed by and indirectly intake pollutants through various pathways. Especially, outdoor and indoor air pollution, soil contamination and environmental radioactive contamination are related to people's individual daily life activities, which link to daily time use. Therefore, it is very important to know the time allocation of people's daily activities (time spent outdoors for working, traveling, leisure activities, time spent indoors for cooking, etc.) classified by gender, age, occupation, residence etc. in order to assess the health risks caused by the exposure to environmental pollutants. In other words, time use survey has potential to be used in the field of environmental risk analysis.

In this presentation, we provide the outline of an application on time use survey data to research on health risk assessment of environmental contamination and introduce a case study.

As a case study, we introduce the outline and utilization method of our time diary survey specific to the external exposure assessment for reconstruction of life and forestry in Fukushima. After the Fukushima Daiichi nuclear power plant accident, residents' lifestyle and dietary habits changed. The risk of radiation exposure for residents is expected to vary greatly depending on age and lifestyle. We designed and carried out a time diary survey in a village of Fukushima to grasp the changes in residents' health risk due to lifestyle changes before and after the Fukushima Daiichi nuclear power plant accident. This survey data makes it possible to evaluating the health risks of wide variety of residents.

# Plenary session 3

## - Time use research in East Asian countries -

### Gender and time use in East Asian and Western societies, 1980s - 2010s

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#### **Man-Yee Kan**

GenTime, a European Research Council funded project (2018-2026), aims to investigate trends in gender inequalities in time use in East Asian and Western societies. In this talk, I will present key research findings of the project. We harmonise large scale time diary data from China, Japan, South Korea and Taiwan from the 1980s to the 2010s and make them comparable with data of Western countries in Multinational Time Use Study. By analysing these harmonised data, we have found that the closing of gender gaps in paid work, domestic work, and total work time has stalled in the most recent decade in several countries. The magnitude of the gender gaps, cultural contexts, and welfare policies plays a key role in determining whether the gender revolution in the division of labour will stall or continue. Women undertake more total work than men across all societies: The gender gap ranges from 30 minutes to 2 hours a day. In further analyse, we examine whether there are changes in the associations of marriage and parenthood with the gendered patterns of time use. Results show that women's paid work and domestic work time are associated much more strongly with marriage and parenthood than men's. Although marriage has been associated less strongly with women's paid work time and domestic work time over the last 3 decades in some countries, parenthood has remained strongly and negatively associated with women's paid work time and positively associated with their domestic work time. Overall, the results suggest that the gender revolution in the division of labour has stalled in the most recent decade.

### Sleep, Study and Unpaid Work in Korea

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#### **Ki-soo Eun**

Korean Time Use Survey was launched in 1999, and has been conducted every five years since 1999. Many time use studies on daily Korean time use have been conducted on various areas such as sleep, students' study, paid work, unpaid work and leisure, for example. As a time use researcher, I also have conducted time use research using Korean Time Use Survey dataset, sometimes from a comparative perspective. In this session, some findings from the analysis on Korean Time Use Survey dataset are reported focusing on sleep, study and unpaid work in Korea.



# LIST OF ABSTRACTS –POSTER SESSION–

\*\* (Alphabetical, by first name of first author)

## Parents' Nonstandard Work Schedules and Child Lifestyles: An Analysis of the Japanese Longitudinal Survey of Newborns in the 21st Century 2001 Cohort

**Akiko S. Oishi**

Studies in the U.S. and Europe report that parents' nonstandard work schedules (NSWS) negatively affect their children's health. However, in Japan, where people work significantly longer hours than in other developed countries, few similar studies have been conducted except by Kachi et al. (2021). In particular, no such studies have used a nationally representative cohort of children considering the NSWS of both fathers and mothers.

Using the Japanese Longitudinal Survey of Newborns in the 21st Century commenced in 2001, we explore how parents' NSWS affect child lifestyles, such as dieting behavior, obesity, and sleeping and screen time. Data from 15,335 12-year-olds enrolled in the survey were analyzed. A child's dieting behavior was assessed by whether she/he usually eats breakfast. Obesity was defined by the Rohrer index. Sleeping and screen time was measured by hours spent on each activity in a school day. Parents' nonstandard work schedules included working early mornings, nights, and overnights. Associations between parents' work schedules in the past and present and children's lifestyles were examined by chi-square tests and logistic regressions, overall, and parents' educational levels.

Among the 12-year-old children whose parents were employed, 70% of fathers and 13% of mothers worked NSWS, respectively. Preliminary results showed that although parents' NSWS influence their children's lifestyles, the direction of influence differed between fathers and mothers. Specifically, fathers' NSWS lowered the proportion of children missing breakfast and overweight, whereas mothers' NSWS increased these proportions. In addition, the effect of fathers' NSWS is insignificant on children's sleep duration, while the effect of mothers' NSWS was significant.

Our study highlights differences in the impact of parents' NSWS on children's health and gender differences in parenting burden between married couples in Japan.

## Social determinants and measurement of adolescent moderate-to-vigorous physical activity: Comparing survey, time-diary and accelerometer data using structural equation modelling

**Elena Mylona, Oyinlola Oyebode, Richard Lampard, Raphael Dimitriou**

Physical activity constitutes a major aspect of maintaining a healthy lifestyle in adolescents; however, adolescents worldwide aged 11-17 appear to be rather inactive, with four-fifths failing to meet recommended physical activity levels. Being able to accurately measure physical activity levels among adolescents is vital, as it helps to assess its impact on various health outcomes, estimate population trends, and identify changes over time to evaluate the effectiveness of policy interventions. The purpose of this study is to apply structural equation modeling to examine the associations between three distinct measures of moderate-to-vigorous physical activity (MVPA) (survey, time diary, and accelerometer combined to create a latent variable), and factors known to

be associated; gender, ethnicity, parental socio-economic status, family structure, confidence, time spent on media, health, and parental health. We are using the Millennium Cohort Study (MCS), a UK-representative, longitudinal, multi-disciplinary study. At age 14, the MCS collected survey questionnaire, time diary, and accelerometer data, and the last two were collected on the same days, allowing for direct comparison. Preliminary findings show that all factors examined are associated with the MVPA latent variable, and there seems to be a low correlation between the accelerometer and time-diary MVPA measures, in both school and non-school days, indicating that it is difficult to get a true estimate of MVPA. Combining different measures of MVPA may help improve the identification of the factors associated with adolescent MVPA levels, and this can ultimately be used to plan more effectively physical activity interventions and promote MVPA in adolescents and children.

## User driven data collection design

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**Elisabeth Rønning, Nina Berg, Gezim Seferi**

Statistics Norway would like to share our experiences from the development of the digital design for the new Time Use Survey 2022-23. We will demonstrate the app we have developed for data collection, we will show you how we have combined the use of interviewers with a self-administrative web application and how we developed a system to monitor and adjust the field work during the 12 months of data collection. We will then present the response rate we received and a few preliminary learnings regarding data quality using this method.

This will be completely new findings when the IATUR conference will take place in November 2024, since the data collection will be finalized in October 2023. We will show you how we developed our Time Use web application, with heavy user involvement in many steps. We will demonstrate a new way of using interviewers in this survey: not only as interviewers, but to call and recruit the respondents, guide them on how to use the application, explain to the respondents the importance of participating and to call back respondents that agree to participate, but haven't started the survey. This brings me to the Case Management System we have developed that monitors the whole data collection. We will show you the most important features and how the system is used. Finally, we will concentrate on the response rate, both in total and for different groups and we will also deliberate on some quality issues we have detected and give some insights in what we have learned using this new method and what we have learned about collecting Time Use data in 2022/23.

Key words: new tools, user driven instrument development, response burden, respondent perspective, data quality, survey practice, interviewer role, case management system

## Activity Rates Approach : Methods and Findings

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**Masago Fujiwara**

In time use studies, activity rates data-table of percentages of persons engaged in activities in every time slots of a day-have been relatively neglected. I have ever been engaged in developing 'Activity rates approach' to extract as much as information from comparing a pair of tables. I have been developing such a series of analytical tools that are called 'letter graphs' that are originally written by Apl2 language.

I show several interesting fact-findings and theoretical implications as follows.

Comparing when people worked overtime and when they didn't, no difference was found in the average duration of time spent for returning home and eating meals after 5:00 p.m. However, looking at the letter graph drawn based on the activity rate data, it could be observed that returning home and eating were sacrificed in the early hours, it was revived in the late hours.

What kind of changes will occur in the time structure when unmarried working women change into part-time housewives, then to full-time housewives. It focuses on paid and unpaid work and their changing timing, and gives some theoretical findings .

When an elderly wife or husband becomes a care recipient, how will the caregiver's use of time be changed? To what extent does the husband participate in housework and child-rearing in households raising children?

This research aims to show the value and power of activity rate approach. It shows you many facts in various episodes of life through observing various unique letter graphs drawn by using a pair of tables of activity rates data.

## **The MOMENT of spacial justice. Mapping gendered perceived safety and the use of public spaces in Brussels, Belgium**

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***Petrus te Braak, Theun Pieter van Tienoven***

There is an indisputable link between the design and use of public space and gendered perceived safety. Moreover, Brussels and Belgium are not among the best in the class when it comes to perceived safety in public spaces. This is partly because minor offenses are often dismissed as everyday occurrences, leaving feelings of insecurity in public space unaddressed even though they are an imminent problem for citizens as they cause behavioral change. In addition, insights into this problem are often obtained through retrospective snapshots, while the perceived sense of security strongly depends on the situational context. This project aims at mapping gendered perceived safety of public spaces in Brussels in its context through a citizen science approach. As field experts, citizens will be involved in the research design such as the demarcation of public spaces to be studied. Citizens, as the privileged observers who subjectively appraise the context, will be involved in the data collection through an innovative application of the experience sampling method, which uses timefences and geofences (i.e., being at a certain place at a certain time) to trigger tasks for participants to complete. End-users, such as citizens and stakeholders will be encouraged to use results both as a "barometer" to monitor real-time perceived safety and as a source to support citizen initiatives.

## **Time Reveals Everything. A glimpse into the hourglass of time use research**

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***Theun Pieter van Tienoven, Joeri Minnen, Bram Spruyt***

How people spend their time says a lot about the organisation of their daily lives. It reveals the temporal organisation of the societies they live in: what happens when, how often, how long it lasts, in what order, and within which context. It reveals inequalities and challenges of sudden changes such as the COVID-19 pandemic. It reveals to be fertile ground for scientific-philosophical discussions about what time actually is. It reveals to be a meaningful statistical proxy for inequality, wealth, and happiness. It reveals to be an almost infinite source of scientific research in many diverse disciplines, but also a challenge to continue to supplement this source with data in times of digitisation, smart

statistics, and privacy and data security sensitivities. In short, time reveals everything.

*Time Reveals Everything* provides a state-of-the-art glimpse in the hourglass of time use research, in which leading scientists from the field of time use research demonstrate what it is, how it can be conducted, and how it can be used. By providing an overview of the key insights, current debates and challenges in performing time research, it is an invaluable source for time researchers. This publication is also relevant for anyone interested in (the implications of) the temporal organisation of societies as well as the challenges, opportunities and inequalities of everyday life. For scholars from a wide range of scientific disciplines, statisticians, students, policy makers, social workers, journalists, ... for everyone, time has something to reveal.

## **Exploring the Link Between Unemployment and Accelerated Transition to Motherhood: A Study on Unemployed Women in Germany**

### ***Zühal Arikan***

Time is a valuable resource, and individuals spend a significant portion of their lives engaged in employment activities. Consequently, the time spent on work occupies a substantial proportion of one's overall time. Similarly, motherhood and child-rearing demand a considerable amount of time. Social welfare states have implemented parental leave, which grants temporary exemption from employment. Unemployed individuals, on the other hand, are often assumed to have ample free time since they are not engaged in any work-related activities. This research investigates the behavior of unemployed women in Germany in relation to fertility over time and examines whether unemployed women transition to motherhood more quickly than their employed counterparts. Building upon the Social Identity Theory, the research question is grounded in the premise that unemployed women seek to break free from their "leisure" time meaningfully and dedicate themselves to childcare. Previous research has predominantly found a negative association between unemployment and fertility. However, this study challenges the conventional notion by investigating the possibility of unemployed women actively choosing to accelerate their transition to motherhood. By examining the motivations behind this decision and considering the role of social identity, this research offers a fresh perspective on the relationship between unemployment and fertility.

To conduct the analysis, data from the German Socio-Economic Panel spanning from 1984 to 2016 were utilized. A model was constructed using Directed Acyclic Graphs and subsequently examined through a Competing-Risk Analysis, with the competing event being re-entry into the labor market. The results indicate that unemployed women transition to fertility at a faster pace and with greater frequency compared to both full-time and part-time employed women.

This study contributes to the understanding of time-use dynamic and fertility decisions among unemployed women in Germany. The findings suggest that unemployed women may view motherhood as an opportunity to redefine their social identity and find purpose in their "leisure" time.

# LIST OF ABSTRACTS –PARALLEL SESSION–

\*\* (Alphabetical, by first name of first author)

## A Sign of Change in Japanese Men's Housework: Focusing on Changes in Men in Their 40s

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**Akihiro Hirata**

The time spent on housework by Japanese men has been notably shorter than in other countries, with a considerable gender gap remaining, but has gradually increased over the past 25 years. This research aims to explore factors behind the increased housework time among Japanese men by analyzing the results of a survey.

The Japan Broadcasting Corporation (NHK) has been conducting the nationwide "NHK Japanese Time Use Survey" every five years since 1960. Comparing the survey results since 1995, when the current method was adopted to make chronological comparisons possible, it is found that housework time per weekday for women showed little change with around 4 hours and 30 minutes while those for men has increased and exceeded one hour in the latest 2020 survey for the first time. By age groups, men in their 40s showed a notable change, although time spent on "shopping" stayed almost the same, "cooking, cleaning, and washing" and "childcare"—housework performed at home—have increased. Men in their 40s also showed changes in their work styles, such as the spread of staggered working time and work from home as well as a decrease in evening overtime, which contributed to the increase in their time spent at home.

From the above results, it can be assumed that the increased housework time for men in their 40s is partially attributed to the increase in their time spent at home due to changes in their work styles. The presentation will also provide details on the factors for the increased housework time for Japanese men that is showing a sign of change, with the average weekday housework time having exceeded one hour for the first time in the history of this survey series.

## Has Europe moved toward a leisure society? An analysis of gender and parental Leisure trends

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**Anna Martinez Mendiola**

Objective: The article explores trends in leisure time among men and women, parents, and non-parents from 1965 to 2014, with special emphasis on gender and parental leisure gaps. The article also assesses the role of the institutional and cultural context (namely family practices, family policies, and cultural gender norms) to explain between countries differences as well as within country evolution in the gender leisure gap among parents of young children.

Background: Major socio-economic and demographic changes have occurred in Europe during the last decades which have affected men's and women's use of time and modified established gender roles. In this regard, considerable debate has attempted to determine whether the falling of working hours has translated into an increment of leisure time as expected by the early Leisure Society thesis (Dumazedier, 1967), or if situations of time famine and overwork have arisen (Schor, 1992). Here, theories based on the un(completed) gender revolution (England, 2010), and the Second Shift of

mothers (Hochschild, 1989) may have much to add to the debate.

**Method:** The study uses data from the Multinational Time Use Study and comprises information from 600.697 diaries of 46 surveys belonging to 13 European countries observed over 55 years. Multilevel modeling techniques are applied.

**Results:** The findings show an increment in the total time childless men and women allocate to leisure nowadays. Contrarily, parents of young children have experienced a slight decrease in leisure time despite falls in working hours and declines in natality, resulting in a wide parental leisure gap that more intensively affects mothers. Here, the country's cultural and institutional context considerably impacts the gender leisure gap in parenthood, especially when a comparative perspective is applied.

**Conclusion:** Findings are of high relevance as they provide useful insights to those countries concerned with gender inequalities in the distribution of labour and that desire to release mothers from their Second Shift and leisure deficit.

## Time allocation and wellbeing in later life: The case of Italy

**Annalisa Donno, Maria Letizia Tanturri**

Theoretical background

As population ages, understanding how to improve the elderly's well-being increasingly becomes a priority and a societal challenge. Ageing processes are fundamentally linked to the concept of 'dealing with time'. The elderly's daily routines can be shaped by personal characteristics and attitudes, biological needs, social rhythms, but also by some limiting elements (poor health, loneliness), determining a gap between personal wishes and effective reality, thus influencing the elderly's well-being. In old age time use patterns change radically and how these changes are linked with satisfaction and wellbeing is still mostly unexplored.

Aim

To study old people daily life for understanding which factors can enable/challenge their wellbeing. Specifically, we want to analyse how old people allocate their time between different activities (paid and unpaid work, personal care, active and passive leisure), by describing patterns of elderly's time use, and their impacts on subjective well-being at older ages.

Data and methods

By using the most recent Italian Time Use Survey (2014-15) we get an insight in the association between time allocation and wellbeing in later life, in a country that is ageing rapidly. We go beyond the study of time use in terms of average duration and propose an innovative approach taking into account information on chronology (timing on each activity and how activities are ordered/scheduled during the day). We use Sequence Analysis techniques, allowing to find homogeneous time allocation schemes and to identify some "profiles of time use" in old ages. Moreover, we analyse how those profiles are linked with different levels of subjective wellbeing, thus providing a new perspective on old people needs, and identifying high-risk groups. Two measures of wellbeing will be used, one measuring self-rated life satisfaction as a whole, and a composite indicator synthetizing the level of satisfaction linked to each activity carried out during the sampled day.

Results

Four group corresponding to four different patterns of daily time use are identified. Such patterns correlate significantly with the level of self-rated satisfaction, even when we control for individual characteristics.

# A comparative study on the measurement of the size of informal economy through Time Use and Budget Surveys

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## **Armagan Aktuna Gunes**

In the literature, there are very few approaches using the individual level data on the measurement of the size of informal economy. These methods have several issues encountered in using micro level dataset. It could be expected that combining time use survey (TUS) with budget one (BS) would yields better predictions. Therefore, the estimation may suffer from loss of information during dataset imputations and/or from the imposed constraints by the theoretical models. First matching problem is that TUS surveys are often conducted only periodically and the variables available for co-imputation are not the same for both surveys. The second problem concerns the regression methodology used in matching assumes that the partial correlation values between common variables in both data sets are equal to zero. On the other hand, the results from the models used for the measurement of the size of informal economy is very sensitive to the selected variables for the instrumentation and the measurement. Besides, there is various possibilities about integrating the theoretical constraints into the model for the given selected econometric model of the measurement. In this proposal, these problems are tried to eliminated. First, 2014-2015 TUS and 2011 BS for Turkey are matched through unsupervised K-means clustering for both datasets. Second, the size informal activity for each sub-population is detected through the mixture of the household's participation scores obtained through machine learning anomaly-outlier detection algorithms such isolation forest, local outlier factor, supported vector machine and elliptic envelope. To validate our measurements of the size of informal economy, the results are compared with the measurement from the full expenditure complete demand system method obtained from theoretical model. The estimation results show that both approaches give close results such 43,21 and 47,61 for complete demand system and ML approach for full expenditures (money + time spent).

# How Japan Teacher's Union used the Time Use Research of Female teachers for advocating the Child-care Leave Law in 1975

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## **Chisato Atobe**

In this research, I aim attention at how the labor union used time use research to enact the law for labor rights. From 2012, the Japanese government has followed a policy to promote the participation of women in the labor market. However, Japan has been ranked 116th out of 146 countries in the World Economic Forum's 2022 Global Gender Gap Report. This is due to the fact that there are huge gender gaps regarding economic participation and political empowerment. Japan still has a long way to go with regard to encouraging women in the working sphere.

In this paper, I put the spotlight on female teachers in elementary schools. They were able to continue working after getting married and giving birth in an era when married women being housewives was a growing trend during the 1960s. The Japan teacher's Union (JTU) has been trying to reform working conditions for women since 1947 when it was instigated.

From 1963 to 1975, they tried to bring about child-care leave, in which a teacher could have leave after their child was born until their child became 1-year-old. Finally, the Child-care Law was established in 1975. To justify the child-care leave, they utilized time use research for union members in January, 1968. Why was this? It was to show the everyday problems of female workers for gender

equality. Female teachers were of the viewpoint previous union's research had problems based on gender stereotypes which was where only female workers needed protection (male workers did not need it). In fact, prior research had looked at only menstrual and maternity leave, not child-care leave.

Therefore, it can be concluded that Japanese female workers had a history with not only being victims of discrimination but also pursuing their rights to look into the time use of female workers by themselves and therefore enacted the law. This historical case made it obvious to us how important time use research is to encourage female workers.

## Women's Unpaid Work in India: Insights from the National Time Use Survey

**Ellina Samantroy Jena**

Women's participation in the labour market in India has been significantly low and has remained a major policy concern in the country. Their increasing concentration in unpaid work has remained as one of the persistent challenges impeding their continuance in paid employment. As recorded by the Employment and Unemployment Survey and Periodic Labour Force Surveys, women's labour force participation in India has decreased from 38.5 percent in 1999-00 to 28.7 percent in 2019-20 reflecting on a substantial decrease of 9.8 percentage points. While women's employment trends in India have been discouraging, women's time spent in unpaid and care work is significantly high as reported by the First National Time Use Survey in India released in the year 2020. The huge disparity between men and women's labour force participation rates does not imply that women work less; rather they perform a greater proportion of unpaid work. There is no denying the fact women tend to combine paid work with non-economic or unpaid activities due to the traditional perceptions about their role as dependent household members.

In this context, the present paper provides an overview of labour market situation in India with an understanding about women's unpaid work burden. The intrinsic relationship between paid and unpaid work is highlighted in the paper. The paper engages in a discussion on employment trends of women in the productive age group (15-59) and also tries to understand the linkage of women's paid employment with unpaid work. While understanding the time use patterns of women, a disaggregated analysis using unit level data of National Time Use Survey on time use and education, marital status vis a vis participation in paid employment are explored for a more nuanced understanding. At the end, policy perspectives on employment promotion and addressing the challenges of unpaid work will be analyzed at the end of the paper. The paper uses secondary data from erstwhile National Sample Survey Organization (NSSO), Periodic Labour Force Survey (PLFS) and the Time Use Surveys (TUS) with the 15-59 age group being considered for all kinds of analysis.

## The Social Structure of Work Time Patterns in the United Kingdom: A comparison of seven-day work schedules in the 2000-01 and 2014-15 United Kingdom Time Use Surveys

**Roxanne Connelly, Stella Chatzitheochari**

Each occupation, industry or organisation has its own rhythm of work. Working time patterns also reflect the position of workers in social space. This paper will explore the social stratification of



working time patterns in the United Kingdom. Social class divides in the time spent in paid work have been examined previously, but analyses of average time spent in paid work cannot distinguish complex patterns in work schedules across weeks. Developing our understanding of these detailed patterns of paid work is potentially important for understanding the nature of social class inequalities more broadly. The aim of this paper is to provide a detailed description of work week schedules for different social class groups in the United Kingdom.

Building on the work of Lesnard and Kan (2011), this paper will use the two stage optimal matching approach to analyse working time patterns in the continuous seven-day work schedules of the 2000-01 and 2014-15 United Kingdom Time Use Surveys. Our findings highlight clear divides in the social stratification of working time schedules. Between the surveys we observe both enduring social divides and nuanced changes in the scheduling of paid work in the United Kingdom.

## **The Impact of Fatherhood on Men's Paid Work and Child Care in Contemporary Korea: An Analysis of 2019 Korean Time-Use Survey**

***Eun-hye Kang, Ki-Soo Eun***

This study examines whether men with children spend more time in paid work in comparison to men without children of a similar age in Korea by analyzing the 2019 Korean Time-Use Survey. The study delves deeper into the extent to which variations fluctuate by the categorization of couples as either dual-income or single-income, as well as of the presence of preschool-aged children within their households.

According to prior literature, the transition to fatherhood prompts men to increase their paid work hours. The prevailing interpretation of this phenomenon posits that parenthood reinforces traditional gender roles within couples, or couples specialize in work based on their comparative advantages. Consequently, men tend to dedicate more time to paid work while women shoulder additional responsibilities in terms of child care and household labor. However, an advent of a new conception of fatherhood, which emphasizes an involved father in child care, has resulted in fathers spending more time with their children in contemporary society. Empirical evidence from various nations, including Korea, has substantiated this evolving trend. Nevertheless, Korea, until recently, remains as a country with one of the longest working hours in the world, and a high cost for educating children continues to be a considerable financial burden to many Korean parents. While previous studies have indicated a negative correlation between fathers' paid work hours and their child care time, it is conceivable that increased paternal engagement in child care in today's Korean society does not entail a straightforward trade-off with their paid work hours but may involve sacrifices in other domains, such as leisure or personal care time. Against this backdrop, the present study seeks to examine whether fatherhood in present-day Korea places a significant burden on fathers, potentially imposing a double workload that comprises both paid work and child care responsibilities. To accomplish this, the study compares the group of fathers with the group of non-fathers. Furthermore, it aims to elucidate how fathers navigate and allocate their time to fulfill these dual obligations by closely scrutinizing their overall patterns of time use.

## Feelings of time pressure despite leisure time? Exploring the effect of different time use and leisure time characteristics on subjective time pressure

**Francisca Mullens, Petrus te Braak**

This abstract presents an investigation into the complex relationship between leisure time and perceived time pressure. Despite empirical evidence that increased leisure time should logically reduce time pressure, contemporary societal trends paradoxically indicate the opposite. This study, using data collected in Flanders (Belgium) from 2013-2014, proposes that duration alone does not fully encapsulate the dynamics of leisure time and time pressure. Instead, we explore dimensions beyond duration, including fragmentation, timing, diversity, and contamination of leisure time. Our results corroborate the significance of duration, while also identifying an impactful role for other dimensions. Furthermore, we reveal gender-based disparities in these dynamics, suggesting that the way women allocate their leisure time significantly impacts their experience of time pressure.

## Time wealth between shift work and trust-based working time : a comparative real lab study before and after the Covid19 pandemic

**Gerrit von Jorck**

Covid19 was a real laboratory for new working time innovations. The extent to which different working time innovations influence the employees' time wealth has not been researched very much. We know that time use is influenced by social and technological innovations such as reduced working hours (Buhl et al., 2017), but our time use depends not only on the amount of free time available, but also on the subjectively perceived time pressure, the location of free time and its fragmentation (Mullens & Glorieux, 2023). This time frame is also referred to as time wealth (Geiger et al., 2021). Since every use of time has an ecological impact (Jalas 2002), time wealth can lead to time rebound effects: the time saved is reinvested in environmentally harmful activities. The central research questions of this work are therefore:

How have the working time innovations introduced by Covid19 affected employees' time wealth? And which temporal rebound effects resulted from this?

We compare employees' time wealth in seven case studies before and after Covid19 in five different work contexts: shift work, trust-based working hours, flextime, co-working and school. Based on 24 interviews and focus groups with a total of seventy employees, negative time experiences of employees with their current working time model before Covid19 were identified, which were then processed through the joint development of working time innovations. This was done through design thinking workshops with a total of seventy employees in 2019. Finally, after the introduction of working time innovations in the wake of the Covid19 pandemic, interviews were again conducted with the employees about their time wealth and use of time.

In this article, we first present time wealth profiles of the various working time contexts. This gives us a deeper understanding of the challenges and opportunities employees see for their time wealth in the respective work contexts. We will continue to discuss employee-centric work time innovations to promote time wealth. Finally, we show which working time innovations in the course of the Covid19 pandemic have promoted the time wealth of employees and which time rebound effects are associated with them.

# Temporal welfare positions : definition, operationalisation and measurement of a non-material understanding of welfare: a systematic literature review

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**Gerrit von Jorck, Franziska Dorn**

According to Zapf (1984), four welfare positions can be distinguished, depending on the relationship between objective (temporal) conditions and subjective (temporal) well-being: Well-being, deprivation, adaptation and dissonance. While far-reaching scientific standards have been developed for determining material welfare positions, the field of temporal welfare positions is fluid. On the one hand, there is a discourse on temporal wealth as a welfare position of well-being. Time wealth usually consists of several dimensions, such as free time, pace, plannability, synchronisation, time sovereignty, fragmentation or even the location of time (see, among others, Geiger et al. 2021, Mullens & Glorieux, 2023). On the other hand, there is a discourse around time poverty as a welfare position of deprivation. Time poverty usually refers to the amount of free time available (e.g. Goodin et al. 2005), but the value of free time also depends on conditions such as the location of time (e.g. Warren 2003, Chatzitheochari & Arber, 2012).

Currently, the discourses on time wealth and time poverty are largely conducted in parallel. There is also often no simultaneous consideration of subjective and objective conditions of welfare. In this article, we structure the interdisciplinary research landscape on temporal welfare positions. Our central research questions are: How can the four temporal welfare positions be defined? And how can they be operationalised and measured? This is done on the basis of a systematic literature review of German and English conceptual and empirical literature on time wealth and time poverty of a total of 398 journal articles and book contributions. We systematise the literature along different definitions of temporal welfare positions as well as along different operationalisations and measurement methods and classify them critically. On this basis, we make a proposal for the definition of the four welfare positions.

## Gender Differences in Housework among Solo Households across Gender Regimes

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**Hao-Chun Cheng, Liana C. Sayer**

This study aims to explore gender differences in the time spent on housework among solo households across different gender regimes. Previous studies have documented that women continue to be the main provider of housework in couple households across different societies. However, gender differences in housework vary depending on the prevailing gender regimes. In societies characterized by more gender egalitarian attitudes or family-friendly policies, such as Finland, men in couple households report higher levels of housework, thereby reducing the gender disparity. In contrast, in societies with less gender-egalitarian attitudes or a stronger emphasis on familism, such as Italy or South Korea, the gender difference in housework remains more pronounced among couple households because men do relatively less housework than men in other countries.

However, previous studies mainly focused on couple households. The extent of gender differences in housework among solo households across different gender regimes has not been investigated. We use a Gender as Structure perspective to determine levels and gender differences of women's and men's housework in seven countries with different gender logics and work/family supports. We anticipate that women should allocate more time to housework in countries like Italy or South Korea that have less egalitarian gender attitudes, stronger emphasis on familism, and weak work and family supports. However, it is also possible that gender differences will be small among solo households

in all seven countries because never married childless women and men who live alone may have more similar daily lives and resources (education, earnings), and perhaps nonexistent in countries like Finland that are high on gender egalitarian attitudes and policies.

Additionally, we anticipate that associations of education and age with housework may vary across gender regimes. For example, education may have a larger negative association with housework among solo women in societies with less gender-egalitarian attitudes because highly educated women may individually espouse gender egalitarian attitudes, have a stronger orientation with employment, and/or be able to education-related resources (earnings, information, networks) to reduce housework demands. Age may also vary across countries because older women from earlier cohorts experienced more gendered socialization, more gender discrimination in education and employment, and less egalitarian gender systems.

This study uses the Multinational Time Use Study archive housed at IPUMS Time Use <https://www.mtusdata.org/mtus/> (MTUS-X) that contains harmonized time diaries for countries with distinct gender regimes. We use data from the most recent comparable period for seven countries: Canada 2010; Finland 2009; France 2009; Italy 2008; Hungary 2009; South Korea 2009; and the United States 2010. We estimate a series of regression models to account for the interaction effects of gender and country and the effects of age groups and education within each gender. Our preliminary results show that solo women, like partnered women, report more housework than men, even when they live alone, in our seven countries. In addition, the results indicate that women with lower education levels and women who are older spend more time on housework compared to their female counterparts, particularly in Hungary, Italy, and South Korea. Furthermore, men who are older also spend more time on housework compared to their male counterparts, particularly in Hungary and Italy. These findings provide insights into how gender as a structure affects the time spent on housework, even within solo households, across different gender regimes.

## Dual-earners' synchronization of housework and childcare

***Hyejoong Kim, Meejung Chin***

The purpose of this study is to investigate the synchronized time of dual-earner couples in Korea and whether the time use is related to the husbands' and wives' daily emotional experiences by using dyadic data. This study focused on the time use of the domestic domain, specifically housework and childcare activities on weekdays and weekends. It also aimed to investigate whether there are gender differences in time use and the daily emotional experiences between husbands and wives.

For the analysis, this study used the 2019 Korean Time Use Survey conducted by Statistics Korea. A total of 250 couples aged between 20 and 59, with the oldest child under 10 years old, were selected for the sample. There were 250 husbands and 250 wives, and the number of participants was 500. In the survey, each participant submitted a two-day diary so a total of 1,000 diaries were used for the analysis.

For the analysis, it investigated the total amount of time spent on housework and childcare first. Then it examined how much time couples synchronized in housework and childcare, and whether there were differences in the perceived amount of time between synchronized time between husbands and wives. As a result, it identified that wives still did more housework and childcare even in dual-earner couples than their husbands. Husbands spent more time on paid work compared with their wives. The perceived synchronized housework and childcare time was different between husbands and wives, with wives reporting a slightly larger amount of synchronized time than their husbands.

Second, it investigated factors associated with couples' synchronization in housework and childcare time. The results demonstrated that the more individuals were engaged in housework or childcare, the more they synchronized housework or childcare time.

Last, it examined whether the synchronization of housework and childcare was related to the daily emotional experiences of husbands and wives and whether there are differences between the groups – 1) those who do not have synchronized time; 2) those who have synchronized time below-average; and 3) those who have synchronized time above-average. As a result, synchronized housework and childcare time was related to the daily emotional experiences, but the result appeared differently between husbands and wives. To be specific, the total amount of housework and childcare was negatively associated with wives' daily emotional experiences both on weekdays and weekends. However, synchronized housework and childcare time was positively associated with wives' emotional experiences on weekdays. Husband's daily emotional experiences were not significantly related to the total amount of time in housework or childcare. On the contrary, husbands' synchronized housework and childcare time with their wives on weekends was associated with their positive emotional experiences.

## **Work-Life Balance and Caring Masculinities: Insights from Male Caregivers in Korean Society**

***Hyuna Moon, Ki-Soo Eun***

Work-life balance has traditionally been predominantly focused on women's experiences, with less emphasis on the experiences of men. However, in the 21st century, it is increasingly recognized that achieving a harmonious work-life balance requires the realization of a 'universal caregiver model' that promotes shared care responsibilities between genders. This model emphasizes the importance of equitable distribution of caregiving responsibilities, highlighting the need to involve men more actively in caregiving roles. To foster this transformation, it is essential to encourage the development of 'caring masculinities' that challenge traditional gender roles and embrace nurturing and caregiving as integral parts of masculinity.

However, promoting caring masculinities and dismantling the gender-based division of labor is not without its challenges. A significant hurdle lies in reevaluating and redistributing the allocation of time between work and family responsibilities. Many men face societal expectations that prioritize their professional obligations over their caregiving roles, making it difficult to balance their work and family commitments.

This paper delves into the experiences of male caregivers in Korean society through in-depth interviews, specifically focusing on their responsibilities for elderly and childcare. By exploring their perspectives on time management and working time, the paper aims to understand how these men navigate or fail to navigate the intricate web of work-life balance in their caregiving lives. It seeks to address questions such as how male caregivers actively participate in the caregiver's role, what strategies they employ to achieve work-life balance, and what external factors hinder or limit their available caregiving time. By analyzing these issues, this research endeavors to provide insights into the challenges faced by male caregivers in realizing caring masculinities within the framework of work-life balance.

## Gender inequalities in the use of time in Vietnam: results from the 2022 Vietnam time use survey

### **Ignace Glorieux**

The 2022 Vietnam Time Use Survey, conducted from October 13, 2022, to January 4, 2023, surveyed the time use of 6,001 Vietnamese residents between the ages of 15 and 64. The data were weighted for regional distribution, urbanization, age and gender.

In this presentation, we first examine gender differences in global time use and then focus on the distribution of paid and unpaid work. We examine gender differences in the nature of unpaid work and differences in occupational sectors in which men and women perform paid work.

We further investigate gender differences in social participation and free time. Finally, we assess how the presence of (young) children and the level of education of the respondents influence the distribution of paid work of women and men in Vietnam.

## Production and Consumption in the Non-Market Sphere – Agent’s Opportunity Cost of Time Estimations

### **Jacek Jankiewicz, Przemysław Garsztko**

The article presents ways of estimating the value of non-market time as an opportunity cost at a microlevel. For this purpose, two different calculation procedures were used in the form of Heckman’s econometric model and Opportunity Cost of Time (OCT) estimation with a theoretical background in the form of Household Production Function Model (HPF). The OCT values were calculated for years 2012-2015, taking into account not only the time of non-market production, but also focusing on activities from the consumption category. In this way, the concept of full income from the theory of HPF was referred to. Calculations were made separately for groups of people distinguished on the basis of their socio-economic characteristics, such as gender, children presence, professional activity, household type (married vs single). Differences of non-market time valuations were growing in the selected groups during analyzed period. The valuations obtained with the employed methods for subsequent years lead to different conclusions. Heckman’s hourly rates are generally lower than OCT rates. What’s more, they change in opposite directions - when Heckman valuations fall, OCT values are increasing. Heckman’s valuations vary more for M and K than OCT estimates. The former method does not give unequivocal results depending on the presence of children in the family (women without children are characterized by higher estimates of opportunity cost of time than in the case of mothers. The opposite is true for men, agents with children are characterized by higher valuations. Taking into account all the valuations and differences between them, OCT seem to be a more reliable method of the opportunity cost of non-market time.

## A typology of women’s work schedules in the UK

### **Jennifer Whillans**

While employment rate and weekly number of hours worked by women is well document, typical schedules of women’s work – the timing of when women work – is under-explored. Extant applications of optimal matching (OM) with Time Use data have tended to derive a generic typology of work schedules, using aggregate data from men and women, and only afterwards examine

gender, thus patterns of work emerge as gendered according to the proportions or probabilities of men and women performing them (Whillans, under review). The analysis in this paper identifies a typology of women's work schedules – describing both the hours of the day and the days of the week worked - using OM applied to the workweek grids from women only, contained within the United Kingdom Time Use Survey 2014-2015 (UKTUS15). Two-stage OM (proposed by Lesnard and Kan 2011) is particularly appropriate for the analysis of women's work in UK as – being more likely to undertake part-time employment – women achieve reduced hours by either working fewer hours per day, fewer days per week, or a combination of the two. The resultant typology of work schedules is then analysed using descriptive statistics to identify the sociodemographic characteristics associated with different patterns of paid work performed by women. Discussion of results focuses on what it means to work 'part' time and 'unsociable hours', and the role of the 'standard working week' in organising women's worktime.

## A Comparative Analysis of Care Time Allocation in Korea and Canada

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**Jiweon Jun, Ito Peng**

With the global population ageing, understanding the dynamics of time allocation for care work became a crucial social concern. As a part of an ongoing global research project, 'Care Economies in Context', we conducted a comparative analysis of care time allocation in Korea and Canada, utilizing harmonised questionnaires to explore the factors influencing the time spent on caring for older adults by main caregivers and the distribution of care responsibilities among family members. Socioeconomic factors, including employment status, income, and access to formal care services were analysed to understand their impact on caregiving resources and time allocation decisions. Furthermore, the study investigated how family dynamics influence the sharing of care responsibilities among family members, offering valuable insights into the similarities and differences between the two countries. By examining family dynamics, we seek to uncover the underlying factors that influence caregiving time allocation and support system design in each country. By comparing Korea and Canada, two countries with distinct cultural backgrounds and with ageing demographics, we aim to shed light on the interplay of cultural, social, and policy contexts that shape caregiving practices in diverse social settings.

## Unveiling the Hidden: Enhancing Measurement of Care Activities through Caregiver-Focused Time Use Diaries

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**Jiweon Jun, Minseok Kang, Bora Yeon**

The measurement of care activities has been a critical question in the study of care. While time use data have offered valuable insights, challenges persist in determining which activities should be considered as care and how to measure ""invisible"" care, such as supervisory and on-call responsibilities for care recipients. This study aims to enhance our understanding of what constitutes care and improve the quantification of time spent on care work by analyzing a caregiver-focused time use diary specifically designed to capture various aspects of care activities performed by paid caregivers. Our sample comprises 600 time use diaries from caregivers in Korea, with 300 from childcare workers and 300 from eldercare workers. Specific coding schemes were developed to comprehensively identify care-related activities. To better capture indirect care, respondents were

encouraged to record secondary activities, supervisory activities, and the location of care recipients during specific time slots. This study explores the array of activities undertaken by caregivers during their paid hours, providing insights into the ongoing debate surrounding the inclusion of specific activities when estimating unpaid care activities using national time use surveys. Moreover, we estimate the duration of indirect (passive) care by considering both primary and secondary activities, as well as information on the location of care recipients. This research contributes to refining the measurement of care activities, addressing the “invisible” aspects of care, and exploring the characteristics of care work performed by paid caregivers in Korea.

## SNAP recipients' labor supply in the presence of children in households

**Jongsung Kim, Sanae Tashiro**

In the U.S., the Supplemental Nutrition Assistance Program (SNAP) provides cash assistance to low-income households to reduce food insecurity. Since welfare recipients are “time poor” because households differ in their money income and time resources, this paper considers both time and income as poverty dimensions to examine labor supply decisions among program recipients.

We examine time allocation decisions in the labor market among SNAP program recipients, considering both time and income. We compare labor supply behavior between SNAP recipients and non-SNAP recipients by separating them into four groups concerning SNAP reciprocity and the presence of children. Finally, we empirically test proposed questions with a Random Effects Tobit model using combined data from the American Time Use Survey (ATUS) and the Current Population Survey Food Security Supplement (CPS-FSS) for 2013-2018. The dependent variable in this study is a respondent adult's hours worked per day. We consider the actual hours spent working per day, which is a time-use variable.

We find that SNAP participation has had a negligible negative impact on time spent daily working among SNAP recipients. We also find no overall evidence of labor supply responses due to the presence of children in a household for all respondent adults. The empirical results further confirm that young adults, females, and Hispanics with children who live in SNAP-participating households are likely to reduce the usual minutes worked per day. On the other hand, full-time employment and higher education encourage labor supply among all respondent adults, especially those with children, regardless of SNAP participation status.

This study suggests that targeting and assisting young adults (age 18-35), females, and Hispanics, particularly those with children living in SNAP-participating households, are important for improving labor supply behavior. Analyses of time-use time-diary data among program recipients improve the existing literature by measuring the importance of time and income as a poverty dimension. In addition, this research provides useful implications for workers, firms, and policymakers in improving labor market outcomes among recipient adults in recent years in the United States.

## Home and away? Differences in time use between teleworkers and commuters

**Juana Lamote de Grignon Pérez, Oriel Sullivan, Margarita Vega Rapún**

Teleworking is likely to become a permanent feature of the employment landscape, so changes in behaviour associated with it are a matter of substantial policy interest. This paper explores differences in time use between teleworkers and office workers. The data used is a representative



online time-use diary survey from the UK that collected data during the pandemic and up to June of 2023. It contains approximately 10,000 diaries collected over 8 waves. The restrictions on businesses imposed by the government during the first lockdown, and maintained throughout, created a natural experiment, enabling comparison of the 'new teleworkers' to those who continued to work in the workplace, the 'continuing commuters'. Although the 'treatment' of telework is not randomly assigned in the workforce – because not all occupations or tasks were equally able to be done from home – it is exogenous to a large extent because it was mandated by the government. The former, together with the fact that the 'treatment' was so widespread, keeps self-selection concerns to a minimum. In fact, the two groups look identical according to the most common sociodemographics. The analysis of the first 6 waves of data reveals substantial behavioural differences between the two groups. While overall work hours are the same, new teleworkers are twice as likely as continuing commuters to make choices associated with healthy working lifestyles, such as taking breaks while working and engaging in sports on workdays, and are less likely to work on weekends. Teleworkers are 1/3 less likely to be sleep deprived. Teleworking is more enjoyable than working at the workplace. These findings refer to approximately the first year of the pandemic, a period when teleworking was first imposed and when it was very prevalent. The analysis of the last two waves of data should permit the evaluation of the permanence of these teleworking 'effects'.

## Using time use diaries to measure child labour

***Juana Lamote de Grignon Pérez, Tanay Kondiparthi, Margarita Vega Rapún, Palin Supradit Na Ayudthaya***

The Sustainable Development Goals address the issue of child labor as a critical concern and seek to eliminate all forms of child labor by 2025. While there has been a decline in child labor over the past two decades, progress stalled after 2016. However, current child labor estimates may be biased and their true trend uncertain since they are based on stylized questions, and the time use literature has shown many times that these often provide biased estimates of time use for many activities, including work. Although the literature focuses on the work of adults in wealthy countries, it is not unreasonable to expect that there may be problems too when measuring the work done by children in less developed countries (although the types of biases may be very different). This is probably why important actors such as the UN or the International Conference for Labour Statisticians, have endorsed the use of time use surveys (TUS) for the study of child labor. The South African TUS of 2010 includes a question very similar to that used by the ILO to measure involvement in economic activities – SNA work only. Preliminary analysis revealed that stylized questions underestimate children's work. When non-SNA activities – domestic work, care-giving, and volunteer work - is taken into account, the amount of work done by children grows significantly and, most interestingly, girls become the main contributors to total work done by children instead of boys. This paper hopes to expand this analysis to other 4 or 5 countries to include a geographically diverse sample of TUS. The eventual discrepancies between estimates from questionnaires and diaries will be described and analyzed. Comparison with Labour Force Surveys (LFS) will also be explored if possible. This paper is part of a collaboration between CTUR and the child labor research unit at the ILO, to evaluate the potential of time use surveys in providing valuable insights into child labor practices in different countries.

## Big changes in daily activities across the course of the UK pandemic; but which of them will stick?

**Juana Lamote de Grignon Pérez, Oriel Sullivan, Marga Vega Rapun, Jonathan Gershuny**

We examine the UK population's behaviour both before and during five key phases of the COVID-19 pandemic, using a representative online time-use diary survey. Our main focus is which of the significant changes in activities associated with the pandemic survived the government-defined end of most restrictions on 'freedom day' (19/7/2021). The data comprises five waves coinciding with key phases of the pandemic; including all three lockdowns, a period of relaxation of restrictions between lockdowns, a wave following the end of all restrictions, and a 2016 baseline wave. We find that changes in behaviour that characterised lockdown periods but did not persist following the end of restrictions were: watching more TV; spending more time doing other home-based leisure activities; doing less paid work, and reducing leisure time spent out of the home, including socializing. However, other policy-relevant changes in time-use during the pandemic appeared to 'stick', i.e. persisted even after the lifting of restrictions. These were: an increase in exercising; a shift to more active ways of travelling; the increased contribution of fathers to childcare; more shopping online, more time spent sleeping, and more time spent doing paid work from home (teleworking). We discuss the policy relevance of these changes, and assess the subjective enjoyment associated with 'sticky' activities as a possible explanation for their persistence.

## Time use and screen time in the covid years 2020 to 2021

**Juha Haaramo**

According to Statistics Finland's data, Finns spent more time in front of screens in 2021 than ever before. The total daily screen time was longest for those aged 15 to 24 and shortest for those aged 10 to 14. Changes in the communication technology and the growth of the service and content supply have clearly increased the time spent in front of screens in the long term.

The presentation looks at the time spent in front of various screen over the entire day and in free time. The presentation examines the screen time allocation and the popularity of different media and platforms among different sociodemographics. Screen time and its relation to other time use information and activities is also analysed. Daily screen time refers to all activity in connection with which a screen, such as a TV receiver, smartphone, computer, tablet, game console or e-book reader has been used.

The latest information is obtained with Statistics Finland's Time Use Survey that was carried out between September 2020 and September 2021. The previous data are based on Statistics Finland's Time Use Surveys from 1987–1988, 1999–2000 and 2009–2010. The target population consisted of the household population aged over 10 and the data collection covered the entire year.

Key words: time use, digitalisation, information technology, screen time, media consumption, social media, digital gaming, internet, TV, video, HETUS, covid

# Life Tracker: A Simulated Approach for Analyzing Gender inequality in Unpaid Working Hours

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**Kiyomi Shirakawa**

This study addresses the limitations of previous research on gender inequality in unpaid working hours by introducing a new approach called 'Life Tracker'.

While prior studies relied on time use data and time differences to compare activities between men and women, they often overlooked crucial factors such as simultaneous behavior and the presence of other family members. To overcome these limitations, we developed the Life Tracker system, which enables the creation of household member avatars, video generation based on collecting data, and simulation of daily behaviors of husbands and wives over time.

By simultaneously displaying two households over a 24-hour period in one-minute intervals, our system allows for an effective comparison of gender inequality and the identification of patterns in other households. Our findings indicate that the behaviors of housewives, who tend to allocate significant time to unpaid work, are influenced by other household members. Furthermore, we incorporated an emotional expression function, which is absent in official statistics time use data, to better understand individuals' sentiments towards unpaid work. This enhancement not only facilitates the analysis of inequality in action time, but also enables international comparison by adding the English notation function.

By leveraging the Life Tracker system, this study contributes to a more comprehensive understanding of gender inequality in unpaid working hours, shedding light on the influence of simultaneous behaviors and family dynamics. Furthermore, it provides a valuable tool for investigating emotions associated with unpaid work and enables broader cross-cultural comparisons.

A future task is to expand this life tracker, add a function that can instantly convert it into a video by acquiring survey data using avatars in the virtual space, and publish it on the website.

## Impacts of Marriage Equality on Time Use

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**Kristine West, Melody Kosbab, Mollie Pierson**

In 2015 the Obergefell v. Hodges ruling by the US Supreme Court determined that same-sex marriage was guaranteed under the US Constitution. This federal-level legalization of same-sex marriage heralds significant cultural shifts in the tolerance of Queer Americans and spurred many LGBTQ+ couples to transition from cohabitation to marriage. These changes likely impacted how couples allocated time in public and private spheres. Prior to 2015, same-sex marriage was only legal in some states (starting with Massachusetts in 2003). We examine the impact of marriage equality laws at state and federal levels on couples' time allocation to work and leisure using data from the 2003-2021 American Time Use Survey (ATUS). Using difference-in-differences methodology, we compare same-sex to opposite-sex couples to control for contemporaneous changes in time use unrelated to the marriage equality laws. Preliminary findings show leisure time increases for same-sex couples after Obergefell v. Hodges by approximately 14 minutes per day more than their opposite-sex counterparts. State-level analysis suggests larger gains in leisure time spent together by same-sex couples but the estimate is imprecise. These gains are likely a result of both the influence of the policy on behavior and the shifting demographic composition of married couples over time. Demographic factors that influence an individual's marital status as well as their time allocation include geography, age, gender, income, and children so we use these as controls in our

model as well as for subgroup analyses. We build on previous literature that shows that cohabiting couples have different time use patterns than married couples (Flood, Genadek, Garca Romn 2016) and add to a growing literature that uses time use data to evaluate the impacts of policy changes. Understanding how marriage equality interacts with time use provides a more nuanced understanding of how public policy influences households' well-being.

## Trends in Work Time in France, 1985–2010: a Decomposition Approach

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**Laurent Lesnard, Boulin Jean-Yves**

Since the beginning of the industrial revolution and the emergence of wage labour, the daily and weekly number of work hours has been the subject of tension between employers and workers. In France, as in most European countries, work time has been regulated in connection with a succession of linked issues: improvement of working conditions; demographic and public health objectives (in particular for military purposes); quest for free time and for family, social and educational life; sharing of work; productive flexibility through the extension of the duration of use of equipment and opening of services.

However, compared to most other European countries, and irrespective of the issue at stake, one of the peculiarities of France with regard to the regulation of the duration and organization of work time is the decisive role played by laws. This means that the role of politics is central in the way of regulating working time. It follows that what has been done by one government can be undone by another one whose political colour is different.

Our hypothesis is that the reduction in working time in a country like France where this issue is very marked ideologically and regulated by law struggles to materialize in the actual working hours of employees.

Using data from the Time Survey data conducted in 1985, 1998, and 2009 – a period during which the legal working time was reduced twice, in 1981 from 40 to 39 hours a week, then in 1997 and 2000 from 39 to 35 hours a week – we will show that these reductions in the legal duration of working time did not really materialize in terms of actual durations practiced by employees. This result is due to structural changes in the working population. But it is also due to legislative acts that emptied the various working time reduction laws of their substance.

## Disparities in Lone Time Patterns Among Older Adults in Urban and Rural China: A Sequence Analysis Approach

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**Liu, Yongye; Zhou, Muzhi**

China is currently facing challenges of population aging and a declining birth rate, along with the unique household registration system (hukou) that has created significant disparities in urban and rural development. This study aims to analyze older adults' daily time use patterns in urban and rural China, focusing on the variations in time spent alone and with others. Using data from the 2008 China Time Use Survey, we first employed sequence analysis to examine the time use patterns of 4,640 older adults aged 60 and above on a weekday and a weekend. Our results revealed significant differences in time use patterns between urban and rural older adults. Specifically, older adults in rural areas spent significantly more time alone than their urban counterparts. Further analysis showed that rural older adults also had significantly less time spent with family members aged 65 and above

when compared to urban older adults. In the context of urbanization and population mobility, rural older adults are more likely to become “empty nesters,” potentially exacerbating inequalities in social welfare for older adults between urban and rural areas. This study highlights the importance of addressing these disparities to promote social welfare equity among older adults in China. By understanding the time use patterns of older adults in urban and rural settings, policymakers and practitioners can develop targeted interventions to improve the well-being of this vulnerable population.

## **Gendered returns to education in Australia: the role of time and temporalities**

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***Lyn Craig, Rebecca Valenzuela, Signe Ravn, Brendan Churchill***

This paper explores why Australian women miss out in the transition from the educational system to the labour market. Using nationally representative longitudinal data (2001-2018) from the Household Income and Labour Dynamics in Australia (HILDA) survey, we compare how long after graduation it takes men and women with tertiary qualifications (n=2030) to achieve key labour market milestones: (1) getting a full-time job; (2) getting a permanent contract; (3) earning an average wage; (4) finding a job that matches their skill level. We find significant gender differences in reaching these milestones, confirming that time is a critical dimension for understanding gendered inequalities in the returns to education. We attribute findings to incompatible temporal logics across the institutions of education, family and employment. The more flexible ‘timescape’ of education allows women to succeed, but the inflexible timescape of employment (particularly when combined with family responsibilities) impedes them from turning educational achievement into labour market progress. We discuss policy implications for the career prospects, family care time and economic security of men and women in Australia.

## **Changes in Time and Gender Ideology of Men and Women in the Child-rearing Period**

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***Mami Fujiwara***

In Japan, as in other advanced economies, the labor force participation rate of women is increasing, especially in their child-rearing period. It is needed to avoid women’s double burden of “working at their job as well as at home”.

There have been growing concerns for fathers’ participation in housework and childcare since 1990’. Studies have been analyzing the determinants of fathers’ participation in housework and childcare. In Japan, it has been found that the long working hours mainly hinder fathers from taking part in them. But, these days, the husbands’ changing awareness of gendered division of labor toward men’s sharing of childcare and housework is going on, and it is argued that we should shed light again on their changing awareness as determinant.

Based on our analytical frame of reference, we tried to collect the data of gendered awareness of husbands and their working hours. We found that the husbands of double income family work more at home than those of non-double income, and the husbands of the shorter working hours and the more progressive awareness participate more in childcare and housework. But we could find, on the contrary to our hypothesis that the conservative husbands worked at home more than the progressive ones among the longest working hours group of husbands (more than 11 hours of a day) of non-double-income family. It was surprising because the result was contrary to our hypothesis.

For our research, we conducted “Survey of work and life among women in their child-rearing years in Shimane Prefecture” in March 2018. Shimane prefecture was selected as research field because it has the highest labor force participation of women in their child-rearing period in Japan. We collected the size of 3000 individual couples on a family-by-family basis.

## Gender inequality in household labor division: cross-national comparison

**Maria Nagernyak, Natalia Mikhailova, Natalia Voronina, Sergey Ter-Akopov**

The study's objectives include estimating the gender gap in unpaid labor in Russia compared with the globe and identifying the variables influencing it. It is based on OECD statistics for time use and data collected by Rosstat, the Russian Federal State Statistics Service, Selective supervision of use of daily fund of time by the population, which was conducted in 2019.

A comparison of Russians' time use with residents of other countries showed that Russians work more, and in addition, they are among the leaders in the share of unpaid labor in the structure of time budgets, but the time spent on leisure, on the contrary, takes much less time - according to this indicator, Russians occupy one of the last positions. There are significant gender differences in the structure of the use of the daily time budget all over the world, and the same trend is typical for Russia: men work more, women do unpaid work, men spend more time on leisure.

Men work longer while women take on greater domestic and childcare responsibilities in Russia as well as in the majority of other countries. Men have more leisure time, but there are some areas where men and women do not differ much. The age factor has different effects on men and women. For men, differences in the time use start to show up after age 55 (closer to retirement age), whereas for women, the birth of children plays a significant role because childcare takes up time between the ages of 20 and 40, which is time that would otherwise be spent working. Women who have children under 1.5 years of age almost do not work, they have the same amount of free time and communication as women with children of 1.5-3 years. Redistribution happens within these categories, and the average percentage of time spent on this activity is between 45% and 50% for both men and women with children. In general, time spent on employment, childcare, and housework is generally steady for both genders.

## Leisure Time for Married Couples in Japan, Based on the Results of the 2021 and 2016 Japanese Survey on Time Use and Leisure Activities

**Mariko Sakurai**

The Statistics Bureau of Japan (SBJ) conducts the Survey on Time Use and Leisure Activities every five years to obtain comprehensive data on the daily patterns of time allocation and leisure activities. Recently, we conducted the 10th survey in 2021 and released its results in 2022.

In this survey, two types of questionnaire forms are used, questionnaire A and B. Questionnaire A is used for large-scale surveys targeting approximately 180,000 people. It adopts a pre-coded light diary to grasp people's time allocation, and it surveys the kind and frequency of people's leisure activities during the past year for the following five items: "learning, self-education, and training," "volunteer activities," "sports," "hobbies and amusements," and "travel and excursions."

The results of this survey are indispensable for various administrative policies related to the prosperous social life of people, such as the promotion of work-life balance and the formation of a

gender-equal society.

Using the results of questionnaire A for the 2021 and 2016 survey, this paper presents how much leisure time married couples spent in a day and what kind of leisure activities they engaged in during the past year.

In Japan, working couples raising a child(ren) are pressed for time to balance housework/child care and work. In particular, couples with an infant(s) have little leisure time. However, as their child(ren) ages, couples' leisure time gradually increases, and their leisure time spending also changes. This paper explores the characteristics of the leisure time for married couples with a child(ren) by focusing on how the leisure time and leisure activities change with the age of their child(ren).

## Childcare and Housework-Related Time Spent by Husbands and Wives Regarding Number of Children

### **Mari Nakamura**

The Statistics Bureau of Japan (SBJ) conducted the 2021 Survey on Time Use and Leisure Activities of Japan (STULA) in October 2021 and released the results in August and December 2022. In this paper, I would like to present the housework-related time spent by husbands and wives in terms of the number of children, using the results of the 2021 survey.

STULA aims to obtain comprehensive data on the daily patterns of time allocation and leisure activities. The survey has been conducted every five years since 1976, and the 2021 STULA is the tenth.

In this survey, about 91,000 households were selected, and about 190,000 household members aged 10 and over reported their activities in 15 minute intervals during two consecutive days that were designated by SBJ, and they responded to survey items, such as "caring activities," "acceptance of child care services," and "wish to work."

The results of STULA provide valuable data on "living time," which is not available in other official statistics, and are used as basic data for various administrative measures, such as the promotion of work-life balance. In particular, results related to so-called "unpaid work," such as housework and childcare, are used in policies related to gender equality to address the gender gap and the declining birthrate, which is a very serious social issue in Japan.

According to the 2022 edition of the White Paper on Measures for Society with a Decreasing Birthrate, "the longer a husband spends on housework and childcare on his days off, the higher the percentage is of more children being born after the second child." For this reason, improvements in the long working hours for men and the use of childcare leave are being promoted.

Therefore, based on the results of the 2021 STULA, we will examine the time spent by husbands and wives on household chores (housework, nursing care, childcare, and shopping) in terms of the number of children, and we will search for factors to resolve the imbalance between husbands and wives in terms of the burden of child-rearing.

## How much is it cost: care of one, two or more children? Sharing time in sustainable family and society : example of Poland

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**Marta Marszalek**

This analysis discuss and identifies that the strongest correlation with housework time allocation is observed more for single parent (mother or father) than for couples. In paid work time we registered that customization of the resources labor force is more dynamic than equal sharing home duties between couple. Even though, the higher employment rate for women is noticed (comparing to year 2013), we observe that women performed all home (invisible production) and professional duties (visible, market production) about 44 minutes longer than men (TUS Poland 2013). The further results indicate that in Polish households, more than other European Union countries, women play the crucial and unobserved role in the national economy. The major findings of this study confirm that men spend more hours in paid job, while women realize a significant amount of time on unpaid domestic activities, which limits their economic freedom. The power dynamic of the economic and social changes requires the relevant transitions in households, where traditional gender role attitude should be modified into more adjusted to real living conditions.

## Couples' Recent Time Use Trends in Terms of Housework and Working Hours in Japan : Towards Comparative Analyses Between Before and After the Recent Pandemic

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**Masao Takahashi**

Gender inequalities in time use in terms of the housework and working hours of couples in Japan have continued for many years. When we divide the gender roles division of married couples into working and housework, the former division, working, has changed to a large degree due to increased social advancement in women, however, the latter division, housework, seems to be still firmly maintained at least until recently.

In these circumstances, the COVID-19 pandemic that occurred in 2020 has greatly changed our daily life such as our working style and how and where we use our time. Outings were very much restricted and teleworking has become more widespread. People stay in their homes longer than before and as a result, it inevitably affects the time use pattern of them. This tendency might be continued somewhat after the pandemic.

This study aims to clarify the recent time use trends of couples in Japan. We first analyzed couples' housework and working hours trends before the pandemic as a benchmark study, using the statistical microdata of the Survey on Time Use and Leisure Activities (STULA) conducted by the Statistics Bureau of Japan in 1996, 2006, and 2016. The analysis revealed recent trends in couples' housework and working hours, e.g., there is a slight tendency for the husband's housework time to increase when the wife's working hours are long, or the youngest child is an infant.

The latest STULA was conducted in 2021, and its microdata has been released to researchers recently. We plan to proceed with our analysis using the 2021 STULA microdata soon, which will clarify the situation in the time use of couples amid the pandemic.



# Anxious Times or New Meanings? Analyzing Nuances of Fathers' and Mothers' Emotional Experiences in Daily Activities in the COVID vs. Pre-COVID Eras

**Melissa Milkie, Sarah Flood, Liana Sayer, Kelsey Drotning**

The COVID-19 pandemic abruptly altered daily life and rearranged how and with whom people spent their time. In this study, we examine competing perspectives on parents' lives: the anxious times hypothesis which suggests that activities fathers and mothers engaged in following the pandemic had a less positive valence than in the past due to many new stressors - versus the new meanings perspective which asserts that Americans' reflections on what mattered, and reorientations of daily experiences made life more meaningful and happier. We use the American Time Use Survey (2010, 2012, 2013, 2021) to compare emotion in five types of activities – paid work, housework, leisure, eating meals, and childcare – from the 2010s versus 2021. We provide a rich description of similarities and differences in the amount of time in these categories, who parents spent time with during these activities, and how positively they experienced them. Preliminary results show that parents felt more stress, fatigue and pain during daily activities in COVID-19 times. At the same time, felt meaning and happiness in activities was relatively high for parents. A previous gender difference changed: mothers' advantaged emotional states – of more reported meaning and happiness in daily activities from the 2010s converged with fathers because fathers' days were more positive and mothers slightly more negative during COVID-19 than in the earlier era. Overall the results support the anxious times perspective for mothers, who had more negative emotions especially in market work, and both anxious times and new meanings perspectives – a more complex emotional profile - for fathers. We examine to what extent changes were related to with whom parents spent time with during activities.

## Into the Deepest of the Night: A Longitudinal Analysis of Young Adults in Taiwan

**Ming-Chang Tsai**

Night time has been used as a frontier by young people. In contrast to the older group, young people's time frame of a day is less strictly defined and allows more flexibility when it comes to when to sleep. They are more likely to stay put into the latest of the night and see this behavior as conventional or normative. This paper analyzes the patterns of time use of young adults by way of observing their time of going to bed. Using the panel survey data from the Taiwan Youth Project, I am able to observe how late they still stayed awake when in college years and later when working in the labor market, comparing the differences between weekdays and weekends. A preliminary result shows that in the sophomore year in college, nearly 39% of them (the largest group) reported they slept between 0:00 and 0:59am during the weekdays. In the weekends, this figure dropped to 25.7%, and those who stayed awake between 1:00-1:59am and 2:00-2:59am become two equivalently large groups (25.3% and 24.4%, respectively). These patterns had continued as was observed when in the senior year of college. However, young people seem to retreat from the deepest of the night when they entered labor market. At age 30, those who went to bed between the midnight and 0:59am are the largest group (35.3% during weekdays and 31.2% during weekends). This study also explores their demographic characteristics (gender, educational backgrounds) and their employment (occupational status, industrial sectors, firm size, working shifts) to determine what factors associate closely with when the young people still stayed awake.

## Does the Reduction of Working Hours Promote or Constrain Residents' Consumption A Natural Experiment of Working Hours Adjustment in China

**Na Liu, Jing Li**

Household consumption is a vital focus on expanding domestic demand. Enhancing residents' consumption effectively has become the concentration of policies in contemporary China. Becker (1965) claims that "consumers combine time and market goods via the 'production functions' to produce the basic commodities, and they choose the best combination of these commodities in the conventional way by maximizing a utility function." Some scholars have explored the relationship between working hours and residents' consumption, while the impact of adjusting working hours on residents' consumption is still controversial.

Using China Health and Nutrition Survey (CHNS) dataset, the essay estimates the impact of working hours on residents' consumption by taking the implement of Chinese employees' work time regulation in 1994 as a natural experiment. Difference-in-difference (DID) is applied. It finds that shortening working hours significantly increases household consumption, and it is approvable in a series of robustness tests such as Paired t-test and Placebo Test. Furthermore, the increasing household consumption caused by shortening working hours is mainly driven by increasing shopping time, and those have less daily shopping time are affected more. Finally, it shows that shrinking working hours has a greater impact on the consumption of junior technicians, high-income groups, and unmarried groups. There might be several contributions on literature. First, it is clarified that shortening working hours significantly promote household consumption. Some literature has examined the impact of changing work time on consumption, however there is no agreed conclusion on whether varying working hours promote or suppress residents' consumption. Our tests provide exact evidence. Second, to the best of our knowledge, this is the first effort on this issue by taking the implement of employees' work time adjustment in 1994 China as a natural experiment. It provides new evidence in China for Becker's announcement. Third, those results inspire policy implements aimed to promote domestic demand and consumption around the world, particularly in China.

## Gender inequalities in time-use between cohabiting and married individuals: Evidence from the South African Time-Use Survey

**Odile Mackett**

Cohabiting households have, in recent decades, become a more prominent feature in both the Global North and South. The decline in marriage rates have in some instances been attributed to an increase in women's economic power and decision making, allowing them to deviate from the traditional norms and practices which would have confined them to limited options in relation to household formation and the ways in which they navigate the relational aspects which would result in such formation. In the South African context (where unemployment is widespread), research has also found that members of cohabiting couples are more likely to be employed than those who are married, demonstrating that cohabiting individuals tend to have greater economic autonomy; free from the dependence on extended family structures which require compliance with a set of traditional values and norms in relation to household formation and gender roles. Given the circumstances under which these households exist, it is expected that cohabiting women, in particular, would be less likely to subscribe to the traditional gender roles which may characterise the conditions under

which married women use their time. This study investigated how the average amount of time spent on System of National Accounts (SNA) activity and non-SNA activity differed between married and cohabiting men and women using the 2010 South African Time-Use Survey. The study confirms the widely found results that married women spend more on non-SNA activity compared to married men and that the opposite is true for time spent on SNA activity. The data also interestingly show that despite their greater economic independence and deviation from traditional household formation, the same patterns were also present amongst cohabiting women and men. Furthermore, cohabiting women spent an even greater amount of time on non-SNA work compared to married women. The study shows that although changing patterns in household formation may signal greater economic independence and autonomy, this may not necessarily be the case in relation to the way in which people navigate their gender identities and accompanying roles in cohabiting households.

## **Teachers' time poverty uncovered through time-diaries: The relevance of time allocation rather than the duration of working hours to teachers' well-being**

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***Petrus te Braak, Theun Pieter Van Tienoven***

Measuring the working time of teachers has become standard practice in teacher questionnaires for studying workload and time poverty. However, this measurement is often reduced to the durations of working hours. This is limiting as it does not take into account other dimensions of time, such as the timing, fragmentation and contamination of working hours. Considering these dimensions is critical because the teaching profession is characterised by cyclical, flexible, and irregular working hours, with work also largely taking place outside the workplace. Failing to measure these dimensions of working time leaves the field with an incomplete image of time poverty and what impact it has on well-being. To gain a better understanding of teachers' time poverty, we use data of a unique, large-scale time-use study in which 7,500 teachers in Flanders (Belgium) kept a time-diary for seven consecutive days resulting in more than 1,250,000 hours of registered activities. We examine how the duration, timing, fragmentation, and contamination of teachers' working hours affect teachers' well-being and work-family conflict. The findings demonstrate that durations of working hours are of minor importance for time poverty among teachers. How teachers spend their working time rather than how much time they spend on the job matters more when it comes to the relationship of working time on teacher well-being.

## **Social Exclusion, Gender Inequality, and Time Use: Mixed-Method Evidence from Nepal**

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***Phanwin Yokying, Mukta Lama Tamang***

Both social exclusion and gender inequality influence decisions on how individuals can allocate their labor and account for disparities in time use in paid labor market work, unpaid household responsibilities, leisure, and self-care activities. Their time-use patterns, in turn, affect time pressure, time poverty, and, ultimately, their livelihoods and well-being. Our study is also the first study to employ time-use data to showcase and deepen awareness on the reality of two critical issues—social exclusion and gender inequality—that have been hampering the progress of Nepal's development and growth. Our time-use data reveals gender disparities remain prevalent across all key daily activities among high- and low-caste populations. Compared to those in the included castes and

ethnic groups, women and men from the bottom of the social hierarchy contribute more time in agriculture and construction, while those at the top of the social hierarchy allocate more time towards working for government agencies, NGOs, and corporations. Marginalized women also contribute more time towards labor-intensive domestic work, such as cleaning and household maintenance, whereas women from the included social groups spend their time on less labor-intensive tasks, such as pet care and shopping. Interestingly, men from the included social groups do spend more time on domestic tasks than men from excluded social groups. In terms of non-work activities, both women and men from the included social groups are able to allocate more time towards community service and volunteering activities, leisure/sports, and eating and drinking than those from the excluded social groups. Additionally, women from the top 20% most included groups can spend more time on additional learning activities, such as reading, than women from the bottom 20% most excluded groups. To sum up, gender- and caste-based discrimination and stigmatization together with strong caste identities result in work segregation in both paid and unpaid domains; individuals from the lower castes, especially women, spend longer hours in labor-intensive and low-paying work mostly in the informal sector, while those in the higher caste work in higher-paying occupations in the formal sector.

## Gender, Time Poverty and Access to Social Protection: A Time Use Analysis of Women Workers in India

**Priyanka Chatterjee, Ellina Samantroy Jena**

Allocation of time among paid work, unpaid work and leisure has been central to the discourse on time poverty. The distribution of time between men and women in the household and the economy is significant to understand various dimensions of inequality and access to economic rights. Moreover, the welfare of a household does not depend solely on the income or consumption, but also depends highly on the freedom of the individual to allocate time. The persistent pressure of unpaid work on women affects their participation in the labour market and they are constrained to opt for part-time, precarious, informal work, or remain self-employed having limited access to social security. The present paper is contextualised around the major concern of women not only suffering from time poverty, but also having limited access to social security benefits due to their engagement in informal and low paying jobs. The paper tries to explore how women's unequal allocation of time in the paid employment and unpaid care work leads to lack of time for leisure activities in India and adversely affects the well-being of women hindering the achievement of development goals which aimed at promoting gender equality. It discusses women's employment in India vis a vis access to social security provisions. The paper is based on secondary data analysis derived from the unit level Periodic Labour Force Survey (PLFS) data of five years during 2017-18 to 2021-22. Further, the unit level data analysis of the first All India Time Use Survey 2019 is done in this paper to analyse the participation rate and time allocation in a day in paid, unpaid and leisure activities to understand time poverty. The paper focusses on the working population in the 15 years and above age group as the main aim is to reflect on the double burden of women – in paid and unpaid work and their problem of time poverty. At the end, the paper discusses how the social protection policies and the new labour codes in India can help in the reduction of time poverty among working women.

## Economic activity of household members and the size of the shadow economy. The case of Poland and Turkey

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**Przemysław Garsztka, Jacek Jankiewicz**

The paper analyses the sources of monetary income and the structure of household expenditure. Calculations were carried out using merged databases on Household Budget Survey (HBS) and information on time allocation from the Time Use Survey (TUS). In this way, the economically active persons included in the databases were divided into the self-employed and the employed in the hired work. Value estimates were prepared in two ways - in the first case, only monetary data were taken into account, and in the next step, the Becker full income concept was referred to using time valuation of domestic work.

Using the modified QAIDS model, the size of the informal economy was estimated for selected groups of households and for the whole economy of Turkey and for Poland. Households were divided by the presence of children, education of the head of household, type of family (married vs. single) and type of employment contract. Based on the calculations, it was noted that on average the size of the shadow economy is larger in Turkey than in Poland. The percentage of wages to GDP was taken into account in this case. It was also noted that the differences between the self-employed and those in the hired work in terms of the size of the shadow economy are larger in Turkey than in Poland.

## How Does Hidden Contribution in Unpaid Work Reshape Our Understanding of China's Economy?

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**Shen Ke, Wang Feng, Cai Yong**

Over the past four decades, China's spectacular economic growth, demographic transformations and gender equalization have intertwined with each other, and significantly impacted individual economic behavior and government transfers. Under the economic life course framework and with a particular attention paid into gender perspective, this paper aims to employ the National Time Transfer Accounts (NTTA) method to estimate the value of unpaid work in Chinese economy. Such unpaid work varies by age and gender, with most contributions coming from women and older adults.

In our past work, we have employed the National Transfer Accounts (NTA) approach to track changes in the Chinese economy and its distributional aspects. In this study, we incorporate time using data collected in China to evaluate how hidden contributions in unpaid work contribute to a re-understanding of the Chinese economy: its size, gendered distribution, and trajectories of future change. With the National Transfer Accounts (NTTA) framework, we can further evaluate how incorporating unpaid work reshapes estimates of China's future lifecycle surplus.

We first estimate the age distribution of time devoted to various kinds of unpaid work (childcare, elderly care, domestic work and etc.) for men and women at each age and each province of China based on the national time use survey data. We then collect the market price for each type of unpaid care work by province from job recruiting and hiring websites. With these estimates, we can re-evaluate the age pattern of labor income and consumption by gender with the value in unpaid work included, which can refresh our understanding on the economic contribution of women and older adults that are traditionally under-estimated. Finally, we can project the future economic surplus (difference between labor income and consumption) under various scenarios of population aging and gender equalization, and compare these results with conventional predictions without taking into account of the contribution in unpaid work. This research helps to deepen the understanding of

gender disparity and generational inequality, and offer implications for tapping economic potential in one of the world's largest economies.

## Analysis of Actual Time Use in the lives of Working Caregivers

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### ***Shinichi Nagao***

The purpose of this study is to clarify the actual time use of workers who take on the role of caregivers while working, based on data from the 2021 Time Use Survey. In today's Japan, notable among other countries as a rapidly aging society with a declining birthrate, is facing many issues related to the care of the elderly. The current average life expectancy of the Japanese is approximately 81 years for men and 88 years for women; those in the next generation, in their 50s, are likely to be experiencing a significant burden of care. In particular, many elderly people prefer to live at home, and it is not an uncommon belief that women should be responsible for caring for elderly family members in the home, as in the traditional family way of life.

The Time Use Survey has been conducted every five years since 1976, for the purpose of obtaining basic data to clarify the actual state of time use in Japan, such as time distribution in everyday life and the status of main activities during leisure time. The 10th and latest survey was conducted in 2021.

The data used in this analysis is from the 2021 Time Use Survey. The participation rate from this survey was used. Each day was divided into 96 time segments consisting of 15-minute increments. By confirming the caregivers during each time segment, the hours of care and the time periods during which care was provided were ascertained by individual attribute, with attention to the percentages among caregivers. The scope of targets was defined as employed men and women working full time, with the age of eligibility between 45 and 65.

In brief, the results revealed that a higher percentage of caregivers are in the 45 and older age group than in younger age groups, and with regard to the time of day when care is provided, a higher percentage of both men and women provide care at morning, noon, and evening meal times. In addition, women spend more time providing care than men, and at the same time are more likely to perform a higher percentage of housework than men. These results are considered valid in light of other data and general social conditions.

In Japan, there are several types of elder care services: nursing home care, in which elderly people reside in nursing facilities and receive services there; home care, in which elderly people receive services from visiting caregivers while residing in their own homes; and adult day care, in which elderly people commute from their homes to facilities that provide care services during the day.

In order to understand the time spent in different caregiving services, the Time Use Survey includes a survey item on whether the caregiver is providing care at home or outside the home. This analysis also revealed that there are differences in time use between these two groups. Those who provide care inside their homes spend more time providing care than those who do so outside their homes. This is particularly true for women, indicating that care is provided late into the night. This situation suggests that while the provision of nursing care services is able to meet the demand during the daytime, nighttime services are inadequate, revealing that some people are experiencing a heavy burden of care.

In terms of Japanese time use, it is well known that women spend more time on housework and childcare than men, in comparison to other countries as well, an issue often open to discussion as a gender gap. This study clarified that the same applies to nursing care as well. Research utilizing the

Time Use Survey data enables a quantitative understanding of the demand for nursing care services in given time periods; its findings will serve as a basic resource for the provision of nursing care services in Japan. It is our hope that this research will contribute to solving the problem of nursing care in Japan.

## **Gender differences in time use among couples in rural Bangladesh: Does women's decision-making autonomy play a role?**

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**Sneha Lamba**

Women in South Asia have among the lowest labor force participation rates and most disproportionate burden of unpaid work in the world. Parenthood has been shown to exacerbate gender differences in time use among couples. But little is known about gender differences in time use among couples with young children in this region, and whether women's decision-making autonomy can reduce these differences. A cross-sectional household survey was carried out within the infrastructure of a free daycare intervention in Bangladesh. Mothers (N=1348) and fathers (N=975) with young children completed time use diaries for their own time use. Data from matched couples (N=890) was used to estimate household fixed effects regressions to examine gender differences in time use (time spent on paid work, domestic work, childcare, and leisure) between couples, and examine whether these differences vary across levels of the mother's bargaining power. The results show a sharp gender division of labor between matched couples. Mothers spend 2.8 hours more on unpaid domestic work, 2.2 hours more on childcare, and 3.4 hours less on paid work compared to fathers. However, gender differences in leisure between couples dissipate in adjusted estimates (in contrast to literature from the global North which shows wider leisure gaps between couples with young children as compared to those without young children). Further, gender differences in time use between couples do not vary across levels of the mother's decision-making autonomy. These results suggest that there are strong gender norms in place in my study setting which define the gendered nature of division of household work and childcare, and that the woman's bargaining power (as captured by her decision-making autonomy) does not lead to a renegotiation in gendered division of labor.

## **Effect of access to daycare on parental time use: Evidence from a free community daycare intervention in rural Bangladesh**

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**Sneha Lamba**

Time use surveys are rare in the context of South Asian countries. This is especially true for time use surveys embedded within interventions. Although early childhood interventions such as free daycare services have the potential to decrease gender differences between parents in how they spend time, their effect on parental time use outcomes are understudied. This paper asks how a free community daycare intervention for children below the age of five years affects parental time use in rural Bangladesh. A cross-sectional household survey was carried out between May and August 2022 in the context of the Crèches for Child Safety and Health (CreCHeS) daycare intervention— which is part of the Saving of Lives from Drowning initiative in Bangladesh. Survey respondents included mothers and fathers residing in the community with children below the age of five years (eligibility criteria for attending the daycare). The household survey included time use diaries for both parents,

a mother's questionnaire, and a household questionnaire. Primary data from the survey was used to examine the relationship between children's daycare attendance and time spent by parents on paid work, unpaid domestic work, childcare, and leisure. An instrumental variables approach was used to account for self-selection into daycare participation. The results show that a one day increase in a child's daycare attendance increases time spent by their mothers on paid work, unpaid domestic work, and leisure (by 23.4, 10.8, and 19.8 minutes in one day respectively). And decreases time spent by mothers on childcare (by 31.8 minutes in one day). On the contrary, children's daycare attendance has no effect on father's time use. These findings imply that child participation in the free daycare intervention has the potential to reduce gender disparities between parents in time spent on paid work, childcare, and leisure.

## **Detailing household time use in an input-output database for climate footprint estimation**

***Sofia Topcu Madsen, Bo Pedersen Weidema, Jonathan Gershuny***

The Intergovernmental Panel on Climate Change emphasized the significance of household time use in determining households' climate footprint in their recent Sixth Assessment Report. To estimate the climate footprint associated with the entire life cycle of market activities, environmentally extended input-output databases provide a comprehensive record of product flows between the activities. However, representing household activities in such databases is equally important from a sustainability perspective, reflecting that household behaviour drives the climate footprint. Although a few studies have estimated the climate footprint associated with time spent in various activities, there is, to our knowledge, currently no consistent effort to integrate household time and money expenditures into environmentally extended input-output databases. Our project focuses on developing a multi-country database that distinguishes socio-economic groups and depicts the input of time as well as market and household-produced products to household activities, alongside the market economy. By distinguishing household production from consumption activities, we aim to achieve a comprehensive representation of the production that occurs in society. Initially, our work has concentrated on Western European countries, but we plan to extend it to cover other countries, including countries in the Global South. By providing climate footprint estimates for household activities, our database considers both the monetary and temporal constraints faced by households. From a climate change perspective, results can inform policymakers about whether targeting the structure of household activity patterns or the consumption during an activity is most important and provide an informed basis for whether a household-produced product is better than a similar market product. Although our current project focuses on the climate footprint, the database can be expanded to include the impact on other Sustainable Development Goals such as good health and well-being or decent work.

## **Multitasking of leisure in Japan: The tendency of dual income couples using 2016 Survey on Time Use and Leisure Activities**

***Taiki Hirai***

Objective: This research aims to explore the tendency of multitasking of Leisure Time in Japan. It is quite important for people to keep leisure time to certain extent every day. If there is free time



shortage, it would be “Time Poor” or “Time Poverty”. Leisure time has long been a topic of special interest, and research as a predictor of keeping leisure time usually focuses on gender, working time, education level and occupation. However, it has received little empirical evaluation from the perspective of multitasking of leisure time. If they keep leisure time as main activity, it would do other activity as secondly activity. In case of that, leisure time in main activity may not have an effect on well-being. From above, we examine how long multitasking of leisure time they have in a day and factors of multitasking, using the sample of Japanese husbands and wives of dual income couples.

Method: Data from 2016 Survey on Time Use and Leisure Activities are used in this research. The Survey on Time Use and Leisure Activities aims to obtain comprehensive data on daily patterns of time allocation and on leisure activities. The survey has been conducted every five years since 1976(<https://www.stat.go.jp/english/data/shakai/2016/gaiyo.html>). Descriptive statistics is applied to find the time of multitasking activity in leisure time of main activity. And OLS or tobit model in regression analysis is used for find the factors of multitasking activity in leisure time. The pattern of multitasking is secondly activity is housework, caring or nursing, child care, work with leisure as main activity.

Conclusion: The empirical results are as follows. First, Japanese wives do more multitasking in leisure time than husbands even though the time of leisure in main activity is shorter. Second, the multitasking is determined by age, education level, working hours, occupation, age of children. Third, these factors of multitasking in leisure are more obscure in wives who are younger and have children under 5. These results implicate that Japanese wives are at risk of not well-being even though they enjoy leisure.

## Who works in non-standard work schedule and how do they change in Japan over the last 20 years?

### **Takuya Hasebe**

The focus of this study is non-standard work schedules (NSWS) in which employees work other than usual schedule of daytime on weekdays. Our analysis of NSWS has two dimensions; the one is whether to work late night and early morning (10:00pm to 6:00am) and the other is whether to work on weekend (Saturday and Sunday). This study explores how NSWS has changed over the last two decades in Japan, using the quinquennial Survey on Time Use and Leisure Activities from 1996 to 2016. We empirically examine who works in NSWS and whether and how characteristics of NSWS workers have changed during the study period of 20 years. For this purpose, we use least absolute shrinkage and selection operator (Lasso) approach to uncover key determinants of NSWS in each survey year. Our preliminary results show that the sets of determinants of NSWS, which include educational attainments and family structures among others, remain nearly the same over time. However, the quantitative impacts of such determinants have changed. The predicted probability of working late night and early morning that male employees in 2016 act as if those in 1996 is approximately 2 percentage point lower than the actual probability in 2016. On the other hand, such predicted probability of weekend working is around 5 percentage point higher than the actual probability in 2016. These findings indicate that a male of the same characteristics would be more likely to work late night and early morning but less likely to work on weekend in 2016 than in 1996. We find the similar pattern for female employees. We will extend our analysis further to consider a high dimensional set of household and individual characteristics to leverage the strength of Lasso approach.

## Demonstrating construct validity and reliability of an eight-item experienced time pressure scale in nine large studies

**Theun Pieter van Tienoven, Petrus te Braak, Joeri Minnen, Francisca Mullens, Ignace Glorieux**

Modern Western societies are believed to be characterized by a chronic lack of time. However, in that same society people have never worked so little and there has never been so much free time. The lack of time is therefore mainly a subjective experience. Despite all attempts to measure this objectively – mainly in time use research – a subjective time pressure scale seems more appropriate. Although such scales exist, they have hardly been validated for their construct validity and reliability. This contribution evaluates an commonly used eight-item experienced time pressure scale by situating its items in the social problem from which time pressure arises and by checking its consistency in nine databases from 1999 to 2021 consisting of different research populations. It argues that a measure of experienced time pressure should be constituent of three key elements of daily life in contemporary society: the lack of time, aspirations of time, and temporal norms. It shows that the proposed eight-time scale forms a single latent variable that measures experienced time pressure coherently across all databases and that it shows consistency in variation according to sociodemographic characteristics.

## Social class inequalities in Increasing Childcare Time

**Tomo Nishimura**

In Japan, as in other developed countries, parental childcare time is increasing (despite its higher opportunity cost). This is because parental childcare, unlike other household chores, is an investment that enhances children's academic performance and, hence, their future income. Parents are more committed to child care in countries with the higher internal rate of the returns to education (Doepke and Zilibotti 2019).

This study used the Japanese Time Use Survey (1996 and 2016) to conduct a descriptive analysis of how the total parenting time has changed over the past 20 years. The results showed that childcare time increased by about 30% on weekdays and nearly 60% on weekends. We also found that there is a social class inequalities in the growth rate of childcare time on weekends (University-educated parents have higher rates of increased childcare time than non-university-educated parents).

This social class disparity cannot immediately be considered as a difference in behavior or attitudes by class. This is because several sociodemographic structural changes have occurred over the past two decades that can affect childcare time. For example, there has been an increase in the percentage of parents with university degrees, a decrease in the percentage of three-generation families, and a change in the employment rate on weekends. Therefore, we decompose the changes in weekend childcare time into two parts, one due to the structural changes described above and the other (changes in behavior) applying Shift-share decomposition and Blinder Oaxaca decomposition to examine whether the stratification gap in weekend child care has widened.

## Long-Term Changes in Work-Life Balance in Japan

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### **Tomoe Naito**

According to the Gender Gap Index of 2022, Japan ranks 116th regarding gender inequality. One of the reasons for this is that women's workforce participation, which has never been high, has fallen further (World Economic Forum, 2023). One of the reasons why it is difficult for women to enter the labor market in Japan is not only because of long working hours but also because of the need to work according to the company's schedule. Traditional gender roles maintain these employment practices: men working primarily in the labor market and women doing domestic work (Yashiro 1997). However, according to the Cabinet Office (2015), by 1990, the number of dual-earner households had already exceeded that of one-earner households, which means that women worked outside while taking on domestic labor tasks. Therefore, this study first provides an overview of women's work-life balance evolution from the past to the present, focusing on domestic work. It will then analyze how husbands affect women's work-life balance over the long term and what factors other than husbands have a long-term impact.

The data is from the Japan Panel Survey on Consumer Affairs (JPSC), conducted from 1993 to 2020. Although this is a national survey of Japanese women, it includes information on spouses' working hours, housework hours, and leisure time. It explains how men think they contribute to unpaid work, such as housework and childcare.

Preliminary analysis shows that in 1993 women were divided into two groups: those who spent more time doing housework and those who spent less. Still, when this trend was checked at five-year intervals, there was a decrease in the amount of time spent doing housework among those who spent more time doing housework. On the other hand, even in 2020, the year of the COVID-19 Disaster, the distribution of men's hours for housework has remained almost unchanged since 1993. If there is a decrease in women's hours for housework, other factors might contribute more than husbands.

## A blessing and a curse? Housework and women's relative academic attainment in Colombia

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### **Trinidad Moreno**

The academic study of the gap in the time allocated to care and housework between men and women has a long history within social sciences. To explain it, two main theories have arisen, ones that explain it as the result of individual resource bargains and others that put gender roles as a main factor in the process. However, the methods to test the effect of gender have had their limitations. One of them is focusing mainly on relative economic resources as a cause of potential imbalances that could lead to the reinforcement of gender norms allocating more (or less) time to housework. The present study uses the 2017 Colombian Time Use Survey to test whether education is a resource that, when distributed in an "unnatural" way, can be related to non-rational time allocations in cooking and cleaning tasks. The findings show that relatively more educated women do more cooking and cleaning tasks than women with less years of education than their husbands, which goes against the predictions of both the rational and gendered approaches. This calls for rethinking new ways of including gendered dynamics in empirical exercises, and to research the underlying phenomena that can lead to more educated women needing to do more housework than those who are less or as educated as their husbands.

## A Study on the Extent of the Socialization of Housework and Couples' Housework Time

**Wenjia Hao**

The purpose of this study is to investigate how the extent of the socialization of housework affects the amount of time couples allocate to housework considering the rapid development of AI, ICT and digital economy. The study was conducted in the capital region of China, where technology and housework-related industries have gained rapid development since the 21st century. The extent of the socialization of housework is judged based on how the couples conduct their daily errands (if appliances or food delivery services were used or not), the amount of time grandparents spent assisting with childcare, and the presence of a caregiver. Eight couples were interviewed for an empirical study through time use diary survey. Since couples of different ages are likely to have different items of housework depending on the life events they have experienced, so this study controlled their personal attributes, such as age, employment status, presence of children, and presence of the elderly person's welfare needs. Thus, the eight couples were divided into four groups: (1) the age of 20s: working households with no children, (2) the age of 30s: working households with one child under 6 years old, (3) the age of 40s: housewife households with one child over 6 years old, (4) the age of 50s: working households without childcare but with welfare related household chores.

The results of the study showed that: 1. As the extent of the socialization of housework increased, the amount of households' dedicated time to housework can be reduced. However, this does not necessarily mean that domestical gender equality can be achieved. Regardless of the extent of the socialization of housework, equal sharing of housework by the husband is linked to domestical gender equality and the satisfaction of the wife with housework. 2. Cooking service in public workplace canteens is able to reduce the household's housework time and burden more. 3. For housewives with a small child, a higher extent of the socialization of housework in daily errands is helpful in securing time for childcare. 4. A higher extent of the socialization of housework in caregiving chores is effective in reducing caregiving chore time for the wife.

## The Global Human Day: Human Activities and the Earth System

**William Fajzel, Eric Galbraith, Christopher Barrington-Leigh, Jacques Charmes, Elena Frie, Ian Hatton, Priscilla Le Mézo, Ron Milo, Kelton Minor, Xinbei Wan, Veronica Xia, Shirley Xu**

Understanding how the world's  $\approx 8$  billion people spend their time is crucial to achieving 21st-century sustainability goals. Yet, despite the importance of human activities in determining our progress towards sustainability, there is no comprehensive overview of how the finite resource of time is allocated at the global scale. Here, we estimate how all humans spend their time using a generalized, physical outcome-based categorization that facilitates the integration of data from diverse datasets. Our compilation shows that most waking hours are spent on activities intended to achieve direct outcomes for human minds and bodies (9.4 h/d), while 3.4 h/d are spent modifying our inhabited environments and the world beyond. The remaining 2.1 h/d are devoted to organizing social processes and transportation. We distinguish activities that vary strongly with GDP per capita, including the time allocated to food provision and infrastructure, vs. those that do not vary consistently, such as meals and transportation time. Globally, the time spent directly extracting

materials and energy from the Earth system is small, on the order of 5 min per average human day, while the time directly dealing with waste is on the order of 1 min per day, suggesting a large potential scope to modify the allocation of time to these activities.

We can reveal patterns and characteristics of the global human system in the face of climate change, rapid technological innovation, and demographic transition by pairing these results with material end uses and financial flows, and mapping human activities globally. Our results provide a baseline quantification of the temporal composition of global human life in the early 21st century and amidst the COVID-19 pandemic. We aim for these findings to be expanded and applied to multiple fields of research.

## Limited time for patient–doctor interaction at the bedside: shared perceptions between patients and doctors

***Young Kyung Do, Sun Young Lee, Un-Na Kim, Jae-Joon Yim, Hyeontaek Hwang, Yukyung Shin, Youngsuk Kwon***

Physician's time is vital for the quality of medical care, particularly for the interpersonal aspect of quality. As patient centeredness is increasingly highlighted as the central component of health care quality in recent decades, patient experience surveys are conducted in many countries so that patients can report their experience of interactions with physicians and other hospital staff. Given the time constraint faced by physicians in their clinical duties, however, physicians are likely to justify the status quo and, therefore, to perceive the current limited time for patient-physician interactions more favorably than patients do. We aimed to test this hypothesis: For the same amount of time used in hospital doctors' ward round to interact with their inpatients at the bedside, physicians are less likely to report that the time is insufficient than patients are. Clinical vignettes were used to examine differences in perceptions of the round time between patients and physicians. The data of this study came from two separate surveys on 177 patients and on 291 physicians at a tertiary hospital in Seoul, South Korea. Four hypothetical vignettes were presented with varying time duration and regularity of round: 1 minute every day, 3 minutes every day, 5 minutes every 2 days, and 1 minute every 2 days. The survey results did not support our hypothesis; rather, physicians perceived the limited round time as being insufficient largely to the same extent as patients did. For example, physicians' negative response rate was 60.1% for the vignette of 1 minute every day, while patients' negative response rate was 61.9%, with the difference less than 2% points. Furthermore, for the vignette of 1 minute every 2 days, physicians reported even more negatively than patients did. These results suggest that despite the time constraint among hospital physicians, they also recognize the need for more time to be used for patient-physician interactions. Our results are relieving for recent policy efforts to improve patient experience in South Korea, as physicians at least agree that the limited time for patient-physician interactions must be addressed, possibly through health care reforms aimed at investing in hospital physician workforce.

## Grocery shopping and access trips in the Canadian time use surveys

***Yousefzadeh Barri Elnaz, Lachapelle Ugo, Widener Michael***

Background and aims:

Access to food is an increasingly studied field. Yet grocery shopping trips are often lumped with

other shopping trips in travel surveys making it difficult to study these specific discretionary trips. This project explores the use of two waves of the Canadian General Social Survey's (GSS) time use module (2010, 2015) to better understand grocery shopping trip participants, timing, shopping duration and insertion into trip chains of various length, by various travel modes. We also assess the potential loss of information stemming from the grouping of all shopping activities together in the most recent version (2015) of the GGS survey.

#### Methods:

We extracted individuals with grocery shopping trips and shopping at other stores and malls from the GSS 2010 (n=2251 separate grocery shopping and n 4712 all joined) and 2015 (n=4027 all joined). We also identify two previous and two following activities in diaries to conduct sequence analyses of shopping trips. We expect the previous and following activity locations to be transport modes used to access the grocery store, and the earlier and latter activities to be other destination locations such as home, workplace or daycare.

We use this data to produce comparative tables, bivariate tests and Sankey diagrams. We also explore characteristics of grocery shopping and of individuals conducting trips with respect to duration, timing, weekday vs. weekends, age, sex, income, living alone and employment status. We focus on residents of Metropolitan areas and compare 2010 and 2015 data.

#### Results:

We find that groceries are more frequently made by women (60%), higher income groups (28%) and people living with partners (70%). Trips more frequently take place during weekdays and tend to occur late afternoon (3-6PM: 30%), have average durations of less than 50 minutes and be shorter during weekdays.

Predominant sequences vary by groups but generally are more frequently Home store home (34%) and Work store home (8.7%) trips by car. Home-based active transport grocery trips are the fourth most popular chains (5.9%). Regardless of the travel mode used and the origin and destination of a grocery trip, one-way travel times hover remarkably near 12-15 minutes with slightly longer travel time when coming back from work. Between 53% and 66% of a grocery shopping trip is spent in the store.

Other shopping occurs earlier in the afternoon, less frequently on weekends and last on average 75 minutes, and longer on weekends. One-way travel times are longer and fewer trips are made by active modes.

#### Conclusion:

Time use surveys enable detailed description of grocery shopping trips that are not available elsewhere. Nearly half of a grocery trip's time is spent on the road and relative proximity seems key. Results suggest that grocery shopping trips are distinct from all other shopping trips based on various features, namely who does them, when they occur how long they last and how far people travel to access them.

## How and why parental nonstandard work schedules affect children's outcomes

### **Yuko Nozaki**

Parents working irregular work schedules can make it harder for families to establish routines for childrearing and consequently, cause disruptions of parenting time for children in early childhood. These disruptions are associated with a number of negative effects on their children's outcomes. Some evidence suggests that when mothers have nonstandard working schedules (NSWS), their

children have poorer cognitive / healthy development and have more behavioral problems. Using the Japanese Longitudinal Survey of Newborns in the 21st Century, this chapter aims to examine how parental NSWS affects the children's physical, psychological, and sociological development for school-aged children. Results show that the most damaging factor was found to be parents working irregular shift hours which caused their children to experience different settings, different caregivers, and different times for meals and sleep from day to day. Estimation results also indicate how crucial the mother's time management is for the home. While breadwinner fathers may not be able to change their working hours or schedules, mothers can create more stable and consistent routines for their children to help mitigate the negative effects of their work on their children's development.





