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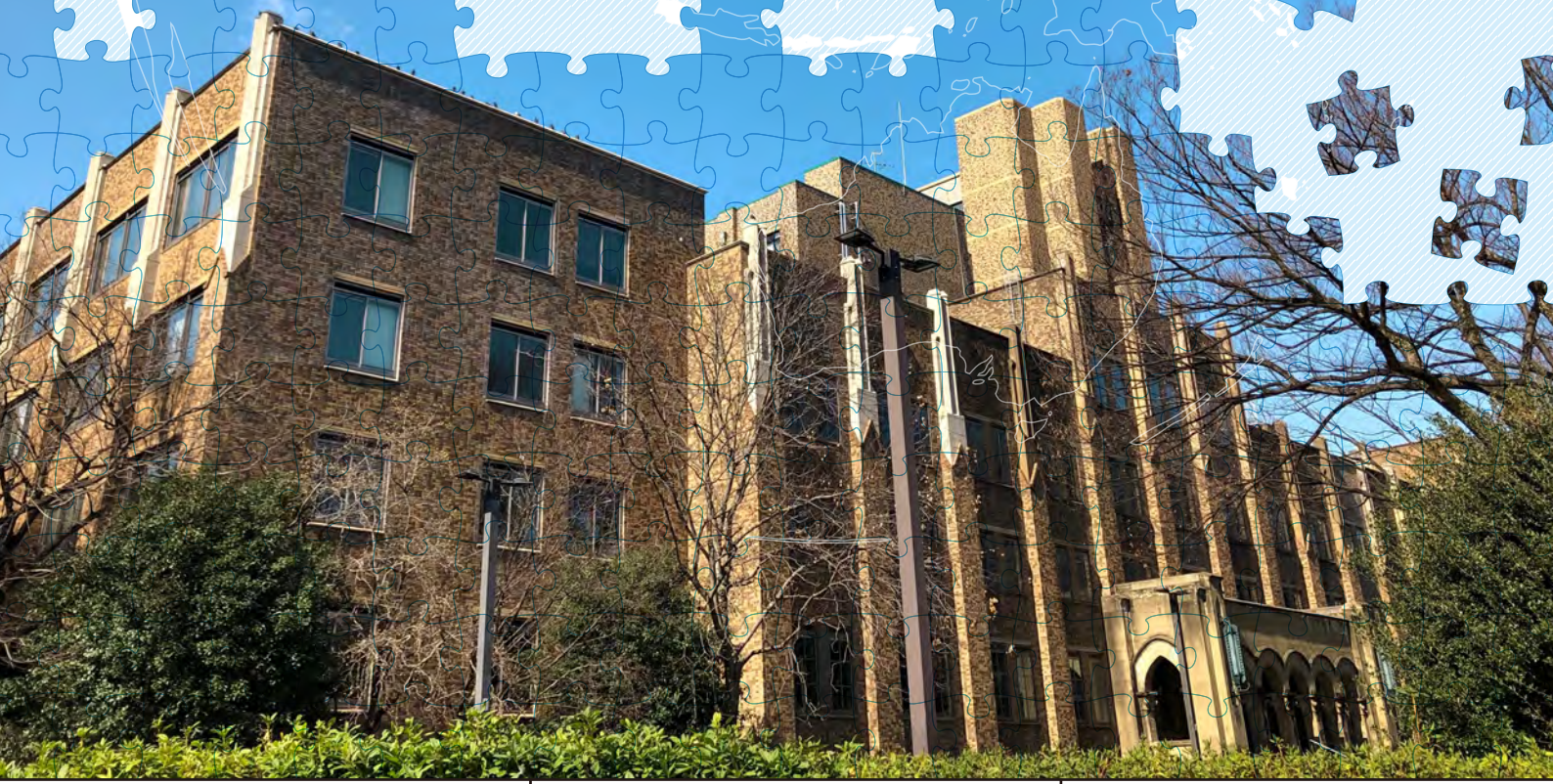
## Multitasking and Time Pressure: Application of the Experience Sampling Method in Time-Use Survey with a Probability Sample in Japan



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# Multitasking and Time Pressure: Application of the Experience Sampling Method in Time-Use Survey with a Probability Sample in Japan

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## Abstract

This study examines the association between multitasking and time pressure using time-use data collected by the experience sampling method (ESM) in Japan. Time pressure is the degree of temporal (time-related) stress that motivates people to complete necessary tasks in their daily lives, and multitasking refers to how one simultaneously engages in several tasks and activities. By utilising a probability-based sample with ESM, this study examines the multitasking effect using fixed effects models and addresses issues of retrospective errors and unobserved time-constant individual heterogeneity. The use of fixed effects regression models revealed that although multitasking, which is defined as the number of simultaneous activities taking place in one hour, does not influence subjective time pressure in its entirety, it heightens time pressure after controlling for the activity types in each time slot. This study considered differences in gender and survey dates, as well. Although we did not find any gender heterogeneity, the multitasking effect was apparently salient for women. Furthermore, multitasking increases time pressure, particularly on weekends. One explanation is that respondents must concentrate their time on a single task (paid work) on weekdays. Accordingly, the loading of each activity should affect one's subjective time pressure. However, on weekends, people are exposed to more multitasking situations since they have more discretionary time and have to think more about how to spend their time compared to weekdays. Finally, based on its results, this study proposes an agenda for future research.

Keywords: Multitasking, Time Pressure, Time Use, Experience Sampling Method

## 1. Introduction

The present study focuses on time pressure, which is seemingly a concern for many people living in contemporary societies. Bookstores offer many books on how individuals can spend

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their time productively and efficiently. This reflects people's concern about not finding time to perform necessary activities and their desire to have more free time. In summary, most individuals are busy with their daily lives.

However, not everyone feels pressed for time. In other words, time use is unequal in contemporary societies. Existing research reveals that multiple roles heighten tensions regarding time use, and the number of roles played by individuals depends on their social and economic standings.

Multitasking, which is another aspect considered by the present study, is key to interpreting the effects of multiple roles on time pressure. The more the responsibilities of individuals, the more the activities they must do in a short period. Meanwhile, the development of electronic and digital technologies enables us to actively engage in various activities. Accordingly, multitasking has both positive and negative effects on time pressure.

The present study examines the rigorous association between multitasking and time pressure using time-use data collected by the experience sampling method (ESM). It is a research utilising a probability-based survey dataset, probably for the first time in Japan. The study includes a literature review, survey, and data description, as well as clarifying panel regression analysis results. Finally, the study findings are discussed.

## 2. Time-Use Research Literature Review

### 2.1 Time Pressure

Time pressure is the degree of temporal (time-related) stress that motivates people to complete necessary tasks in their daily lives. A high time pressure makes them feel that they have insufficient time to do their tasks and, hence, they should hurry (Denovan and Dangnall, 2019). A United Kingdom–based study, which applies a mixed method to analyse quantitative and interview data, indicates that people refer to several aspects while thinking about the feeling of being pressed for time (Southerton and Tomlinson, 2005: 229). Specifically, whereas being 'hurried' refers to a density of activities to be completed within a certain unit of time, being 'pressed' for time refers to a general shortage of free time. Furthermore, Sullivan (2008) reveals that hurriedness is a status distinction symbol that relies on the framework of cultural omnivorousness (Peterson and Kern, 1996).

However, hurriedness and being pressed for time (time shortage) are mutual. While developing the Chronic Time Pressure (CTP) scale, Denovan and Dangnall (2019) found that, although hurriedness and time shortage were indeed distinctive, the total CTP score was unidimensional. Time pressure and other aforementioned terms have been analysed and discussed in similar contexts where people feel rushed and require more time (Roxburgh, 2004; Sullivan and Gershuny, 2018). Despite recognising the significance of

distinguishing them, we use the time pressure concept in a broad sense related to time shortage and hurriedness for the purpose of the present study.

As mentioned earlier, time pressure is sometimes a positive aspect of the recognition of time use, particularly for affluent people (Sullivan, 2008). The use of time pressure as a status distinction can be traced back to the study on the hurried leisure class by Linder (1970). Nonetheless, most individuals consider time pressure a stressor. For instance, using a United States–based dataset, Roxburgh (2004) demonstrates that time pressure enhances distress, and people with low income are highly likely to suffer from their exposure to time pressure. Furthermore, Giurge et al. (2021) summarise empirical studies investigating the relationship between time poverty and mental and physical health worldwide. According to the authors, poverty, at times, reduces well-being, physical health, and even productivity.

Although time pressure is prevalent and is something that people generally want to avoid, it is unequally distributed across social and economic situations. The balance of work and life is a central area where time pressure occurs (Voydanoff, 2005). For example, according to the aforementioned Roxburgh's (2004) study, 10 hours or more of housework reduces mental health, and its effect decreases following the consideration of time pressure. Therefore, time pressure may mediate the impact of housework burden on distress. In addition, gender inequality is prevalent in the experience of time pressure. In general, women are more likely to feel rushed (Kleiner, 2014; Milkie et al., 2009) and experience a more significant mediating effect of time pressure than men (Roxburgh, 2004). Ruppanner et al.'s (2019) study, utilising extensive longitudinal data from Australia, indicates that childbirth increases time pressure, and the estimated effect of this increase is stronger for women than men.

Apart from being an important consideration in family and work–life balance studies, time pressure is key to understanding contemporary social change. This is linked to the concept of the pace, or speed, of life, which has been intensively examined since the beginning of the 21st century (Bergener and Santarius, 2021; Cornwell et al., 2019; Rosa, 2003; Rosa and Trejo-Mathys, 2013; Wajcman, 2008). An epoch-making theoretical study linking time to modernity or modernisation initiated by Rosa (2003: 12) discusses the social acceleration thesis, that is, societal acceleration is driven by the cycle of technological acceleration and the acceleration of social change and pace of life. Suppose mobile devices connecting the Internet and working life as a simple (and a little bit extreme) example. When mobile device usage becomes prevalent, large numbers of people start using the Internet for work (technological acceleration); furthermore, the diversity in the time and place of work facilitates the emergence of various ways of working (social change

acceleration). A possible consequence of mobile device diffusion and working style diversification is that people will have to communicate with their workmates. When such a situation becomes socially common, many people will eventually have to be ready to work 24/7 (the acceleration of the pace of life). Accordingly, the requirement for further efficiency leads to the next acceleration cycle.

Time pressure is an aspect of the acceleration of the pace of life. While testing the acceleration thesis is difficult because it requires repetitive cross-sectional data at different time points, Sullivan and Gershuny (2018) find no evidence that time pressure increases with 2000 and 2015 datasets. Time pressure is associated with gender and occupational status. Additionally, another study, adopting a comparative perspective using European data, clarifies that the diffusion of technology and degree of economic growth weaken the perception that work and life are balanced (Schöneck, 2018). Although the latter study does not directly measure time pressure, for which work–life balance is a proxy, it is significant since it associates societal settings with time-use evaluation. Furthermore, earlier studies imply that time-use researchers find the acceleration of the pace of life an interesting topic and time pressure is one of the most conventional measurements that represents the pace of life.

### 2.2 Multitasking

Since multitasking theoretically enhances time pressure in individuals' daily lives, the present study focused on its effect on the extent to which Japanese people feel rushed. In time use and work–life balance studies, multitasking refers to a set of simultaneous behaviours, whereby one engages in several tasks and activities at the same time (Offer and Schneider, 2011; Spink et al., 2008). The combination of activities indicates whether it is literally and strictly possible to do several things at once (e.g. commuting to office while listening to music on a mobile device). Furthermore, the term 'simultaneousness' can indicate a situation in which we are involved in several things within a (usually short-term) time unit or another in which we quickly switch activities.

Based on the social acceleration framework proposed by Rosa and Trejo-Mathys (2013), technological development enables us to manage several tasks and activities. For instance, the use of home electronics for housework in the olden days and Internet of Things (IoT) in the modern day streamlines the performance of necessary activities in daily life. However, the time slack generated by streamlining tasks does not always result in leisure time; new ones may come into the vacant time. In this scenario, one must, ironically, do more things by streamlining tasks and eventually becoming rushed.

Although the association between multitasking and (subjective) time pressure

remains underdeveloped, earlier studies clarify that unpaid work disturbs leisure time (Craig and Brown, 2017) and that multitasking reduces subjective well-being (Offer and Schneider, 2011). Regarding the backgrounds of multitasking, having multiple roles and demands stemming from them strengthens the multitasking situation (Schieman and Young, 2015). Additionally, gender inequality is prevalent in individuals' exposure to multitasking. Married women are more likely to multitask than married men (Offer and Schneider, 2011; Sullivan and Gershuny, 2013).

A recent study specifically investigated the relationship between multitasking and time pressure (Lu, 2024). It clarifies that while all women with work-time fragmentation feel rushed irrespective of whether they do or do not have children, men with fragmentation feel rushed only when they have children. According to Lu (2024), fathers must manage role switching in their family lives.

### 2.3 Research Issues and Hypothesis

Although earlier research implies a link between multitasking and time pressure, they do not address some research issues. First, relatively few studies focus on the link between multitasking and time pressure (Lu, 2024). Multitasking and time pressure are parts of the pace of life concept (Bergener and Santarius, 2021), and it may be too self-evident to examine the relationship. However, multitasking should not necessarily be restricted to activities with social and economic responsibilities. For instance, light leisure activities, such as listening to music, can be done while performing housework; they might offset their (possibly) negative and positive effects on time pressure. To address this issue, we must investigate the relationship between multitasking and time pressure while controlling for the types of simultaneous activities.

Second, most of the earlier studies relied on data collected using the time diary method or questions on specific aspects of subjective time pressure and multitasking. Measuring one's time use using the diary method has long been considered to have a retrospective bias in recalling the types and lengths of activities in each time interval on a specific day (Gershuny, 2004; Sonnenberg et al., 2012), as well as having an attrition error. ESM is an alternative to the time diary method since it addresses the retrospective error. ESM is used to measure momentum activities and experiences with as little retrospection as possible (Csikszentmihalyi and Larson, 1987). By using ESM, respondents can easily recall even irregular activities (Sonnenberg et al., 2012). In addition, since the data obtained using ESM have a longitudinal structure, fixed effects models can use these data to control for time-constant attributes, such as personality.

Third, although earlier Japanese studies have examined relevant topics in this study

area (Nagase and Brinton, 2017; Nemoto, 2013), they have failed to explicitly focus on time use. While they examine the gender-based division of labour, these studies do not focus on time use in its entirety.

Taken together, at least, scrutinising the relationship between multitasking and time pressure in Japan is yet not sufficient. This study examines the case of Japan using a nationwide random sample. Furthermore, it contributes to the aforementioned technical issues pertaining to a rigorous association between multitasking and time pressure. Finally, it examines the following hypothesis based on relevant literature:

> Hypothesis: The more simultaneous activities individuals engage in, the stronger they feel rushed.

## 3. Data and Methods

### 3.1 Design of the Online Survey on Time Use

#### 3.1.1 Baseline Survey

Based on earlier literature, the present study utilised the Online Survey on Time Use (OSTU), which was originally conducted from January to February 2023. To our knowledge, this was the first time use survey to be conducted in Japan based on nationwide probability sampling and ESM.

The OSTU's target population was individuals of 25–44 years of age living in Japan towards the end of December 2022. The planned sample size was 2,500. Since Japanese people of this age range usually experience various life events such as marriage, childbirth, and career formation and associated social and economic responsibilities, we assumed this group to be more familiar with multitasking issues than younger or older people.

In terms of sampling, the two-stage random sampling procedure drew the respondents. As the primary sampling unit, 109 survey areas of street-level sizes were selected proportionally in line with each municipality's population size following the target population's stratification by city size and region[2]. The secondary sampling unit comprised each individual in the 109 survey sites. Based on the Basic Resident Register administered by municipal governments, 2,500 respondents were randomly selected.

The survey was initiated in early January 2023, and an invitation letter was sent to each respondent by postal mail. The survey mode was online, and respondents logged into

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[2] Four city size categories (21 metropolitan cities; cities with a population of 100,000 or more; other cities; and towns or villages) and 10 regions (Hokkaido, Tohoku, Kanto, Keihin, Hokuriku, Tosan, Tokai, Kinki, Chugoku, Shikoku, and Kyushu) in Japan were identified.

the online questionnaire through the survey site's URL or QR code. Hence, the occurrence of coverage error was a possibility for some respondents who could not participate in the survey because of their inaccessibility to the Internet. Nevertheless, this study assumed error occurrence to be minor[3]. The response rate of the Baseline Survey, which collected information on the respondents' socioeconomic background and examined whether they consented to participate in the subsequent Real-Time Survey, was 19.8%. Section 4.3 discusses the Baseline Survey's nonresponse issue.

3.1.2 Real-Time Survey

Among the 495 Baseline Survey respondents, 389 consented to participate in the Real-Time Survey, which applied ESM and had a consent rate of 78.6%. In the Real-Time Survey, the respondents were asked to report their activities and feelings of time pressure in the last hour when receiving an email notification[4].

Figure 1 illustrates the Real-Time Survey design, which consists of the following three dates: Tuesday (a weekday, 22 February 2024), Saturday (25 February 2024), and Sunday (26 February 2024). Each participant was randomly assigned a date and notified in advance of the survey date alone. The timing of sending the notifications to the participants was not strictly random. They received the message three times in 4 hours after the first message inviting them to complete the online questionnaire. For instance, the respondents in Group A in Figure 1 were supposed to receive the first notification at 10 am and answer their situation in the last hour, that is, 9 am to 10 am. The notifications were sent systematically, and participants were randomly assigned to four groups based on the time of receiving the first notification on the survey day. This ensured that the number of cases at each time slot on each day remained equal as much as possible, whereas the random assignment was made sufficiently to some extent.

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[3] However, the coverage error's impact may not be serious because the Internet connection's possession rate is high among Japanese people in their 30s and 40s. According to the Communications Usage Trend Survey conducted by the Ministry of Internal Affairs and Communications, those aged 20–29 and 30–39 years were around 95% in 2022. See the Ministry's website for more information: https://www.soumu.go.jp/johotsusintokei/statistics/statistics05b1.html (accessed 6 March 2024).

[4] The Real-Time Survey collected information on respondents' mental health, places where they were, and persons with whom they were; however, these details are outside the present study's scope.

Notifications in the early morning and late night were not sent to avoid the participants' burden. In addition, in any situation in which the respondents could not answer the questions despite being willing to do so, responses to the Real-Time Survey were accepted until the day after each survey date. The survey's final response rate, that is, the percentage of participants who answered one or more of three times, was 82.5% (=321/389). Another definition of the response rate was the proportion of number of responses to the total number of notifications; according to this definition, the response rate was 77.2% (=901 responses/1167 notifications).

The respondents who participated only in the Baseline Survey received a voucher worth 500 JPY (Quo Card) after the Real-Time Survey, whereas those who completed both the Baseline and Real-Time Surveys received a voucher worth 1,000 JPY. In the subsequent panel regression analysis, we used a sample comprising 895 observations from 321 individuals without any missing values.

### 3.2 Key Outcome and Independent Variables and Covariates

This study considered respondents' feelings of time pressure as the outcome variable. Such feelings were measured by the following question: To what extent did you feel rushed in the last hour? Acceptable answers to this question were 'Always', 'Sometimes', and 'Not at all', and the respondents were supposed to choose one alternative. The response percentages for 'Always', 'Sometimes', and 'Not at all' were 8.3%, 29.4%, and 62.3%, respectively. Due to the significantly low percentage of Always, we took Always and 'Sometimes' together into 'Rushed' coded one and zero otherwise.

Although the time pressure item was based on an earlier study (Sullivan and Gershuny, 2018), it was considered too simple to be used as an outcome. Hence, we used the chronic time pressure inventory (CTPI) proposed by Denovan and Dangnall (2019) to address this aspect. The CTPI battery comprises 18 items related to feelings of time pressure, and these items were included in the Baseline Survey. Each question was translated into Japanese by the authors, and the simple sum of the 18 items appeared unidimensional; factor analysis generated a scree plot and a Cronbach's alpha coefficient of 0.877. Since it included a large number of items, the Real-Time Survey did not include the battery. Subsequently, we examined the correlation between the dichotomised time pressure item and the CTPI scale. Pearson's correlation coefficient was 0.299 at the observation level (n = 887). Furthermore, for the individual level (n = 315), which was based on the person-mean of Rushed, the correlation coefficient was 0.306. Although there was only a single, simple question, the dichotomised time pressure variable was moderately correlated with a detailed time pressure scale. Accordingly, the present outcome variable is not only

convenient but also valid to some extent.

Multitasking, which is the key independent variable in this study, was defined as the number of activities engaged in by individuals in a 1-hour time slot. The Real-Time Survey required respondents to select as many activities as possible that they had been engaged in in the last hour: (1) Sleeping, (2) personal care, (3) eating, (4) commuting, (5) working, (6) study (at school), (7) housework, (8) caring for others (other than work), (9) childrearing, (10) grocery shopping, (11) moving (other than commuting), (12) TV and radio programs, (13) watching video streaming, (14) social media use, (15) relaxing, (16) self-study, (17) engaging in hobbies, (18) sports, (19) volunteering activities, (20) socialising, and (21) seeing a doctor.

For all unlisted activities, respondents described specific activities in a free-answer format after the multiple-choice question. After completing the survey, the authors classified the free answers into pre-coded alternatives. Accordingly, the multitasking variable was the number of aforementioned items applied to each respondent. However, the meaning of each item probably differed among respondents. For example, for an activity that helped ease one's time pressure, there probably was another one that made them feel rushed. In this case, summing the activities cancelled their effects on time pressure. We addressed this issue by controlling for the types of activities that they were doing in analysing the multitasking effect. The aforementioned items are classified for simplicity, as follows: The personal care–related activity variable is 1 if (1), (2), or (3) is applicable and 0 otherwise; work- or study-related activity variable is 1 if (4), (5), or (6) is applicable and 0 otherwise; housework-related variable is 1 if (7), (8), (9), or (10) is applicable and 0 otherwise; passive leisure activity variable is 1 if (12), (13), (14), or (15) is applicable and 0 otherwise; and active leisure activity is 1 if (16), (17), (18), (19), or (20) is applicable and 0 otherwise. By controlling for activity type, we can interpret the number of simultaneous activities as the degree of multitasking.

Since the present study used fixed effect modelling to control for the unobserved time-invariant heterogeneity in the Real-Time Survey dataset, which could confound both the outcome and key independent variables, it did not use the ones measured in the Baseline Survey. However, the respondents' social and economic backgrounds helped clarify the sample's characteristics. In particular, the Baseline Survey's low response rate made it preferable to investigate non-responses and their potential bias. Therefore, this study utilised the following variables to analyse the responses to Baseline and Real-Time Surveys and consent to participate in the Real-Time Survey.

The analysis of Baseline Survey responses controlled for the following variables:

gender, age, respondents' residential city size and region, percentages of professional or managerial workers, workers in the tertiary (service) industry, and population at the residential municipality level. Details on participants' gender and age were obtained from the Basic Resident Registry at the time of sampling. The names of the surveyed municipalities were available; hence, the municipalities were classified into 21 metropolitan areas; cities with 200,000 people or more; other cities; or towns or villages. Meanwhile, the population size varied within the same city size category, and the specific population size in the 2020 Population Census was adjusted accordingly. Furthermore, the percentages of professional or managerial workers and tertiary industry workers indicated the average socioeconomic situation of the municipality where the respondents lived. Since it was impossible to use their social and economic backgrounds if they did not respond to the Baseline Survey, using municipal information is the second-best approach.

To analyse the respondents' consent and subsequent responses to the Real-Time Survey, their gender, age, and residential city size and region were controlled for. In addition, their education, employment status, housing, marital status, and youngest child were independent variables in the Baseline Survey. The education variable comprised high school or lower, post-secondary (technical, vocational, and 2-year colleges), and undergraduate or graduate degrees as options. Moreover, employment status had four categories: regular employment, non-regular employment, executive or self-employed, and unemployed. Similarly, three categories (owned house, rented house, and others) were defined for the housing variable. Marital status included the options married, unmarried, divorced, and bereaved. Finally, the youngest child variable included the following categories: no child, child younger than 6 years old, and 6-year-old or older child. Table 1 presents the summary statistics of the variables. The mean and proportion of each variable were weighted by the adjustment weight to control for the non-response. All the following descriptive and statistical analyses utilised the weight to control for non-response errors as much as possible.

### 3.3 Data Analysis Method

Before examining the hypothesis that multitasking makes people feel pressed for time using statistical models, the responses to the Baseline and Real-Time Surveys and descriptive results of the time pressure and multitasking situation were clarified. The responses and consent were analysed using binary logistic regression models. The predicted probability of response to the Baseline Survey can be used as a propensity score; hence, in this study, a weight was constructed to adjust non-response errors using the inverse probability weighting method.

The descriptive analysis of time pressure and multitasking followed the analysis of non-responses and consent. Specifically, the study investigated descriptive statistics by time slots and survey dates.

Furthermore, the study used fixed effect modelling to carefully examine multitasking's impact on time pressure. Since there were a maximum of three observations per respondent on the survey day in the Real-Time Survey, the dataset had a longitudinal structure. This made it possible to run fixed effects regression models, which controlled for unobserved time-constant individual heterogeneity. Almost every time, there are omitted variables that should be considered when analysing observation data. Therefore, applying fixed effects models is a powerful method to obtain accurate estimates. This study used the following regression equation:

$$y_{it} = \beta_0 + \beta_1 multitasking + \boldsymbol{XB} + u_i + e_{ij}$$

Here, $y_{it}$ denotes the time pressure at each time slot, the outcome variable; $\beta_0$ is the intercept; $\beta_1$ is the regression coefficient of interest, that is, the effect of the multitasking variable defined by the number of simultaneous activities; and the vector product $\boldsymbol{XB}$ refers to time-variant control variables. This analysis accounts for the five types of activities mentioned earlier and the dummy variables of the time slots. Additionally, $u_i$ is the unobserved time-invariant heterogeneity that is correlated with other independent variables. Therefore, $\beta_1$ represents the multitasking effect independently of any individual traits. Finally, $e_{ij}$ is the idiosyncratic error term.

In the present study, we used the linear probability model, which is a linear regression model with a binary outcome. Since the outcome variable is dichotomous, a logistic fixed effect (conditional logit) model is conventionally used to analyse the binary outcomes in longitudinal data. However, we could not use the conditional logit model because the estimation was not converged. This can be considered a limitation of this study. However, LPM provides the next best result for analyses of small samples, such as OSTU data, because the logistic regression model usually requires a large dataset to obtain accurate results (Agresti, 2007; Long, 1997).

## 4. Results

### 4.1 Response and Consent Rates of Baseline and Real-Time Surveys

One concern regarding the Baseline Survey was its low response rate, which indicated that a non-response error would bias statistical analyses. To address this issue, we constructed a weight for non-responses and adjusted the results. The adjustment weight was based on the

logistic regression model of Baseline Survey responses, as depicted in Table 2.

The results of the logistic regression on Baseline Survey responses indicated that gender, age, and city size were significantly associated with survey participation. Female subjects are likely to answer the survey 1.7 times more (=exp(0.537)) than their male counterparts. Furthermore, subjects aged 30–34 years exhibited a higher propensity to participate in the Baseline Survey than those aged 25–29 years, with an odds ratio of 1.35. Meanwhile, the logit coefficients of older groups, aged 35–39 and 40–44 years, were not statistically significant. Accordingly, no linear association was observed between age and response rate. Regarding residential aspects, only city size classification was associated with the participants' propensity for survey participation. Moreover, the propensity for participation appeared to be the highest for those living in metropolitan cities. However, for statistical significance, only the participants in cities with 200,000 people or more were less likely to participate than those in metropolitan cities (0.665 times lower).

C-statistic, which is used to check the propensity score's quality, was 0.6004. Conventionally, the value should be more than 0.6 and less than 0.9 to clearly identify the two specific groups (e.g. treatment and control). Despite being only slightly higher than 0.6, the present c-statistic is acceptable. In addition, the potential non-response bias from the variables in the logit model was controlled in the subsequent analyses by the adjustment weight based on the estimation result of regression.

Table 3 depicts the results of the logistic regression models for consent and subsequent responses to the Real-Time Survey. In addition to some of the variables used in Table 2, we included respondents' social and economic situations as independent variables. The consent model revealed that female respondents were more likely to consent to participate in the Real-Time Survey than their male counterparts, and there were differences among residential regions. Regarding marital status, divorced or bereaved respondents were less likely to participate than those who were married. However, the coefficient was not significant at the 5% level; it was only marginally significant. Other independent variables did not have significant coefficients. In the Real-Time Survey response model, although the respondents whose employment statuses were executives or self-employed exhibited a marginally significant coefficient, no independent variable was statistically significant at the 5% level.

Furthermore, neither the consent model ($p = 0.057$) nor response model ($p = 0.227$) were statistically significant at the 5% level. Taken together, even though a few variables might generate an error or a bias stemming from whether to consent to the subsequence survey or not, the entire influence on the following analyses would be considered minor.

4.2 Descriptive Results of Time Pressure and Multitasking Variables

Figure 2 illustrates the descriptive statistics of time pressure and multitasking variables by time slot and survey date. Figure 2(a), 2(b), and 2(c) represents the results for the weekday (Tuesday), Saturday, and Sunday, respectively.

In Figure 2, bar charts indicate the percentages of those who felt rushed in the last hour after being notified. Regarding activities related to personal care, work or study, housework, passive leisure, and active leisure, each chart indicates the proportion of each type of activity applied to the respondents. The dashed line and triangular markers present the mean number of activities performed by the respondents.

In Figure 2(a), the proportion of respondents feeling rushed was relatively high between 9 am and 11 am, 4 pm and 6 pm, and 8 pm and 9 pm. In Japan, commute, work, and housework are generally concentrated during these periods. Regarding the number of simultaneous activities as an indicator of multitasking, the mean is approximately 1.5 activities across time slots. The mean was higher in the morning, at noon, and after the evening than in the other time slots. These results imply that time pressure may occur at the moment of activity switching, such as leaving home after getting ready in the morning and going home after finishing work in the evening. In addition, multitasking becomes apparent when activities are switched.

In Figure 2(b), although it depends on time slots, the proportion of those who feel rushed is generally lower than that on the weekdays. Moreover, the mean number of simultaneous activities was higher. One explanation is that housework and leisure activities are more likely to occur, while fewer respondents engaged in work on Saturdays.

Finally, Figure 2(c) presents a pattern of time pressure and simultaneous activities that is similar to the pattern in Figure 2(b). Meanwhile, the time pressure at noon and the proportion of work-related activities were lower across the day compared with Saturday. At noon and in early afternoon, the proportions of passive and active leisure activities were relatively high; at these times, the mean number of simultaneous activities was high. However, time pressure was high at night, when the respondents likely did several things simultaneously. These results imply that leisure activities may ease time pressure, and engaging in several activities at once does not always increase time pressure because the multitasking effect depends on the types of activities.

The descriptive results in Figure 2 indicate that time pressure is associated with both the degree of multitasking and the types of activities in which people engage. Multitasking can indeed make people feel rushed. However, the specific factors that strengthen time pressure depend on the types of activities. From the perspective of

statistical analysis, the type of activity done by people should be controlled to determine multitasking's effect on time pressure as accurately as possible. Accordingly, it is rational to include the types of activities in panel regression models.

We conducted separate analyses by survey date, as follows: weekday (Tuesday), Saturday, and Sunday. Since each graph illustrates time pressure and multitasking patterns that are different to some extent, the relationship among them may be different, as well.

4.3 Panel Data Analysis

Tables 4 and 5 present the results of LPMs considering fixed effects. Model 1 in Table 4 includes only time slot dummy variables. As shown in Figure 1, the four survey groups received three notifications at different times. Accordingly, each sub-dataset had a reference category for the time slot dummy variable and, after combining the sub-datasets, the estimated number of time slot dummy variables was eight (=12–4). Overall, Model 1 was not statistically significant ($p = 0.521$).

Model 2 added a focal independent variable, the number of simultaneous activities representing a multitasking situation, to Model 1. The regression coefficient was –0.02; in other words, one additional activity decreased the probability of feeling rushed by per cent points. However, the value was not statistically significant.

Model 3 did not include a variable to indicate the number of simultaneous activities. Instead, it included the types of activities performed by respondents during the last hour after receiving a notification. The personal care–related dummy variable has a negatively significant coefficient, –0.102; the coefficient indicated that those who do this type of activity decrease the probability of feeling rushed by 10.2% points. In addition, passive leisure activities decreased the probability by 14.4% points, and the coefficient was statistically significant. The work- or study-related dummy variable had a significantly positive coefficient of 0.185; in other words, doing this activity type increased the outcome variable's probability by 18.5% points. These results are consistent with the descriptive results depicted by Figure 2.

In Model 4, the number of simultaneous activities was added to Model 3. This key independent variable has a positive coefficient that is statistically significant at the 5% level. Specifically, one additional simultaneous activity increased the probability of feeling rushed by 6.9% points. Regarding the types of activities, the regression coefficients were similar to those in Model 3, whereas the work- or study-related and active leisure dummy variables were marginally significant in Model 4.

Models 4m and 4f are the models separated by gender, which is the same as Model 4. In neither Model 4m nor Model 4f, the coefficient of the number of simultaneous

activities is statistically significant. Nevertheless, the magnitudes of the coefficient are 0.059 and 0.062 (marginally significant) for the male and female subsamples, respectively. These coefficient values are similar to the value of Model 4. Furthermore, the interaction effect of the number of simultaneous activities and gender was evaluated as –0.003 and considered statistically insignificant (standard error = 0.062, $p = 0.959$). These results indicate that the multitasking effect is considered to be equal by gender.

Table 5 presents the results of additional analyses by survey date to clarify whether the multitasking effect varied across survey dates. The independent variables for each model were the same as those for Model 4 in Table 4. The number of simultaneous activities has a negative coefficient; however, it is only marginally significant. Meanwhile, in the samples collected on both Saturday and Sunday, the multitasking effects were significant at the 5% level. The magnitudes were similar too. Accordingly, multitasking situations increase feelings of time pressure on weekends.

## 5. Discussion and Conclusions

This study investigated the relationship between multitasking and time pressure in Japan using a random sample time use dataset and the ESM. Although multitasking, which is defined as the number of simultaneous activities in one hour, does not influence subjective time pressure in its entirety, it heightens time pressure after controlling for the activity types in each time slot. Our descriptive results indicate that multitasking is likely to occur in the morning, evening, and night when role switching frequently occurs. Accordingly, our results are in line with those of an earlier study conducted in the United Kingdom (Lu, 2024).

This study considered the differences in gender and survey dates. Although we did not find gender heterogeneity, the multitasking effect was apparently salient for women in Model 4f in Table 4. This is in accordance with the findings of earlier studies. Regarding survey dates, multitasking enhanced time pressure particularly on weekends. One explanation is that respondents generally spend their time on a single task, that is, paid work, on weekdays. Accordingly, the loading of each activity should affect subjective time pressure. However, on weekends, people are exposed to more multitasking situations due to the availability of a longer discretionary time (Goodin et al., 2005), and they have to think more about how to use their time.

Furthermore, the present study addresses some methodological issues related to time-use research. We used ESM to contain recall bias in measuring simultaneous activities and subjective time pressure. Moreover, because the dataset had a longitudinal structure, we demonstrated multitasking's effect on time pressure by controlling for other time-constant individual traits using fixed effects models. This study's contribution to the literature is that

it determines the relationship between multitasking and time pressure in Japan after considering potential errors and confounders.

Future research should address some issues. First, it should consider a larger Japanese population than the present study. Since we considered young and middle-aged people to be more exposed to multitasking and time pressure than older individuals, this study exclusively focused on individuals aged 25–44 years. However, our presumption remains empirical. Second, other types of time pressure measurements can be used, although we relied on a simple measurement method since we were afraid of keeping response rates across the Real-Time Survey. Third, further effort should be expended to increase the response rate of the Baseline Survey, which recruits participants for the experimental sampling survey, although younger survey subjects are less likely to respond to surveys, in general.

Nonetheless, the present study highlights the possibility of conducting a probability-based experience sampling survey in Japan and indicates that multitasking may strengthen time pressure. Compared to this study's sample, larger samples will help us examine topics relevant to time use more rigorously.

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Figure 1: Random Assignment for the Experience Sampling Survey (Real-time Survey)

| | | | Time Slot | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Group | | n | 09-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 |
| Weekday | a: | 26 | 1st | | | | 2nd | | | | 3rd | | | |
| The 22nd of February | b: | 34 | | 1st | | | | 2nd | | | | 3rd | | |
| | c: | 37 | | | 1st | | | | 2nd | | | | 3rd | |
| | d: | 30 | | | | 1st | | | | 2nd | | | | 3rd |
| Saturday | a: | 39 | 1st | | | | 2nd | | | | 3rd | | | |
| The 25th of February | b: | 30 | | 1st | | | | 2nd | | | | 3rd | | |
| | c: | 31 | | | 1st | | | | 2nd | | | | 3rd | |
| | d: | 32 | | | | 1st | | | | 2nd | | | | 3rd |
| Sunday | a: | 29 | 1st | | | | 2nd | | | | 3rd | | | |
| The 26th of February | b: | 36 | | 1st | | | | 2nd | | | | 3rd | | |
| | c: | 35 | | | 1st | | | | 2nd | | | | 3rd | |
| | d: | 30 | | | | 1st | | | | 2nd | | | | 3rd |

Table 1: Summary Statistics on Variables Relevant in the Present Study

| Individual-level variables | | | | Observation-level variables | | | |
|---|---|---|---|---|---|---|---|
| | n | Mean/Prop | S.D. | | n | Mean/Prop | S.D. |
| Gender | | | | Time Pressure (Outcome) | | | |
| Male | 495 | 0.523 | 0.500 | Always | 895 | 0.083 | 0.276 |
| Female | 495 | 0.477 | 0.500 | Sometime | 895 | 0.294 | 0.456 |
| Age | | | | Not at all | 895 | 0.623 | 0.485 |
| 25-29 | 495 | 0.229 | 0.420 | n of activities engaged in one hour | 900 | 1.930 | 1.185 |
| 30-34 | 495 | 0.217 | 0.412 | Personal-care-related activities | | | |
| 35-39 | 495 | 0.259 | 0.438 | 0 activity in one hour | 900 | 0.611 | 0.488 |
| 40-44 | 495 | 0.296 | 0.457 | 1 activity in one hour | 900 | 0.344 | 0.475 |
| City Size | | | | 2 activities in one hour | 900 | 0.042 | 0.201 |
| Metropolitan | 495 | 0.317 | 0.466 | 3 activities in one hour | 900 | 0.003 | 0.052 |
| Cities with 200k or more | 495 | 0.247 | 0.431 | Work or study-related activities | | | |
| Other cities | 495 | 0.364 | 0.482 | 0 activity in one hour | 900 | 0.741 | 0.438 |
| Town/Village | 495 | 0.073 | 0.260 | 1 activity in one hour | 900 | 0.254 | 0.435 |
| Region | | | | 2 activities in one hour | 900 | 0.006 | 0.074 |
| Hokkaido | 495 | 0.039 | 0.195 | Housework-related activities | | | |
| Tohoku | 495 | 0.065 | 0.247 | 0 activity in one hour | 900 | 0.614 | 0.487 |
| Kanto | 495 | 0.364 | 0.481 | 1 activity in one hour | 900 | 0.280 | 0.449 |
| Hokuriku | 495 | 0.041 | 0.199 | 2 activities in one hour | 900 | 0.099 | 0.299 |
| Tosan | 495 | 0.036 | 0.186 | 3 activities in one hour | 900 | 0.007 | 0.083 |
| Tokai | 495 | 0.108 | 0.310 | Passive leisure activities | | | |
| Kinki | 495 | 0.154 | 0.361 | 0 activity in one hour | 900 | 0.719 | 0.450 |
| Chugoku | 495 | 0.055 | 0.228 | 1 activity in one hour | 900 | 0.185 | 0.389 |
| Shikoku | 495 | 0.026 | 0.159 | 2 activities in one hour | 900 | 0.070 | 0.255 |
| Kyushu/Okinawa | 495 | 0.112 | 0.316 | 3 activities in one hour | 900 | 0.023 | 0.152 |
| Education | | | | 4 activities in one hour | 900 | 0.003 | 0.054 |
| High school or lower | 491 | 0.269 | 0.444 | Active leisure activities | | | |
| Post-secondary | 491 | 0.244 | 0.430 | 0 activity in one hour | 900 | 0.833 | 0.373 |
| Undergraduate/Graduate | 491 | 0.487 | 0.500 | 1 activity in one hour | 900 | 0.161 | 0.367 |
| Employment Status | | | | 2 activities in one hour | 900 | 0.006 | 0.080 |
| Regular employment | 483 | 0.649 | 0.478 | Time at assigned | | | |
| Non-regular employment | 483 | 0.196 | 0.397 | 09:00-10:00 | 900 | 0.078 | 0.268 |
| Executive/Self-employed | 483 | 0.050 | 0.218 | 10:00-11:00 | 900 | 0.082 | 0.274 |
| Unemployment | 483 | 0.104 | 0.306 | 11:00-12:00 | 900 | 0.088 | 0.284 |
| Housing | | | | 12:00-13:00 | 900 | 0.081 | 0.272 |
| Owned house | 490 | 0.578 | 0.494 | 13:00-14:00 | 900 | 0.075 | 0.264 |
| Rent | 490 | 0.346 | 0.476 | 14:00-15:00 | 900 | 0.085 | 0.279 |
| Others | 490 | 0.075 | 0.264 | 15:00-16:00 | 900 | 0.087 | 0.283 |
| Marital Status | | | | 16:00-17:00 | 900 | 0.082 | 0.274 |
| Married | 486 | 0.630 | 0.483 | 17:00-18:00 | 900 | 0.084 | 0.277 |
| Never married | 486 | 0.343 | 0.475 | 18:00-19:00 | 900 | 0.088 | 0.284 |
| Divorce/Bereaved | 486 | 0.026 | 0.161 | 19:00-20:00 | 900 | 0.089 | 0.285 |
| Youngest Child | | | | 20:00-21:00 | 900 | 0.081 | 0.273 |
| No child | 485 | 0.454 | 0.498 | | | | |
| Younger than 6 years old | 485 | 0.324 | 0.469 | | | | |
| 6 years old or older | 485 | 0.222 | 0.416 | | | | |
| Assigned Group | | | | | | | |
| Weekday group | 321 | 0.327 | 0.470 | | | | |
| Saturday group | 321 | 0.334 | 0.472 | | | | |
| Sunday group | 321 | 0.340 | 0.474 | | | | |

Weighted by the adjustment weight for nonresponse.

Table 2: Logistic Regression on the Response to the Baseline Survey

| | Coef. | | S.E. |
|---|---|---|---|
| Gender (ref: Male) | | | |
| Female | 0.537 | *** | 0.103 |
| Age (ref: 25-29) | | | |
| 30-34 | 0.303 | * | 0.152 |
| 35-39 | 0.161 | | 0.150 |
| 40-44 | 0.122 | | 0.147 |
| City Size (ref: Metropolitan) | | | |
| Cities with 200k or more | -0.408 | * | 0.159 |
| Other Cities | -0.260 | | 0.168 |
| Town/Village | -0.221 | | 0.267 |
| Region (ref: Hokkaido) | | | |
| Tohoku | 0.246 | | 0.326 |
| Kanto | 0.099 | | 0.286 |
| Hokuriku | -0.746 | | 0.461 |
| Tosan | 0.252 | | 0.400 |
| Tokai | 0.107 | | 0.334 |
| Kinki | 0.017 | | 0.304 |
| Chugoku | 0.198 | | 0.345 |
| Shikoku | 0.214 | | 0.415 |
| Kyushu/Okinawa | -0.080 | | 0.308 |
| % of Professional or Managerial Workers of the Respondent's Municipality | -2.684 | | 2.033 |
| % of Tertiary Industry Workers in the Respondent's Municipality | 0.691 | | 1.134 |
| Population Size in the Respondent's Municipality (10k) | 0.004 | | 0.004 |
| Intercept | -1.713 | * | 0.814 |

n = 2500

c-statistics = 0.6004

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$ (two-tailed test)

Table 3: Logistic Regression Models on Consent and Response to the Real-time Survey

| | Consent | | | Response more than once | | |
|---|---|---|---|---|---|---|
| | Coef. | | S.E. | Coef. | | S.E. |
| Gender (ref: Male) | | | | | | |
| Female | 0.965 | *** | 0.252 | 0.540 | | 0.354 |
| Age (ref: 25-29) | | | | | | |
| 30-34 | -0.234 | | 0.397 | 0.438 | | 0.468 |
| 35-39 | -0.316 | | 0.419 | 0.760 | | 0.533 |
| 40-44 | 0.361 | | 0.476 | 0.059 | | 0.531 |
| City Size (ref: Metropolitan) | | | | | | |
| Cities with 200k or more | 0.430 | | 0.341 | 0.388 | | 0.433 |
| Other cities | 0.404 | | 0.326 | -0.177 | | 0.359 |
| Town/Village | 0.701 | | 0.550 | 0.192 | | 0.769 |
| Region (ref: Hokkaido) | | | | | | |
| Tohoku | -2.376 | * | 1.100 | 1.519 | | 1.027 |
| Kanto | -1.895 | | 1.040 | 0.255 | | 0.686 |
| Hokuriku | -1.826 | | 1.311 | 0.080 | | 1.080 |
| Tosan | -2.068 | | 1.175 | 0.290 | | 1.024 |
| Tokai | -2.563 | * | 1.062 | 0.842 | | 0.900 |
| Kinki | -1.858 | | 1.069 | 0.871 | | 0.768 |
| Chugoku | -1.311 | | 1.183 | -0.680 | | 0.793 |
| Shikoku | -2.372 | | 1.224 | -0.424 | | 1.009 |
| Kyushu/Okinawa | -1.605 | | 1.089 | 0.641 | | 0.783 |
| Education (ref: High school or lower) | | | | | | |
| Post-secondary | 0.065 | | 0.362 | -0.168 | | 0.417 |
| Undergraduate/Graduate | 0.093 | | 0.320 | 0.453 | | 0.413 |
| Employment Status (ref: Regular employment) | | | | | | |
| Non-regular employment | -0.052 | | 0.340 | -0.306 | | 0.431 |
| Executive/Self-employed | -0.443 | | 0.531 | -1.016 | + | 0.579 |
| Unemployment | -0.574 | | 0.430 | -0.071 | | 0.559 |
| Housing (ref: Owned house) | | | | | | |
| Rent | 0.330 | | 0.291 | -0.191 | | 0.334 |
| Others | -0.235 | | 0.492 | 0.139 | | 0.726 |
| Marital Status (ref: Married) | | | | | | |
| Never married | -0.125 | | 0.496 | 0.633 | | 0.531 |
| Divorce/Bereaved | -1.225 | + | 0.661 | -0.003 | | 0.863 |
| Youngest Child (ref: No child) | | | | | | |
| Younger than 6 years old | -0.111 | | 0.486 | -0.476 | | 0.463 |
| 6 years old or older | 0.347 | | 0.548 | -0.282 | | 0.527 |
| Intercept | 2.582 | * | 1.147 | 0.647 | | 0.940 |
| n | 473 | | | 376 | | |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$ (two-tailed test)

Weighted by the adjustment weight for nonresponse.

Figure 2: Time Pressure and Activities by One-hour Time Slot

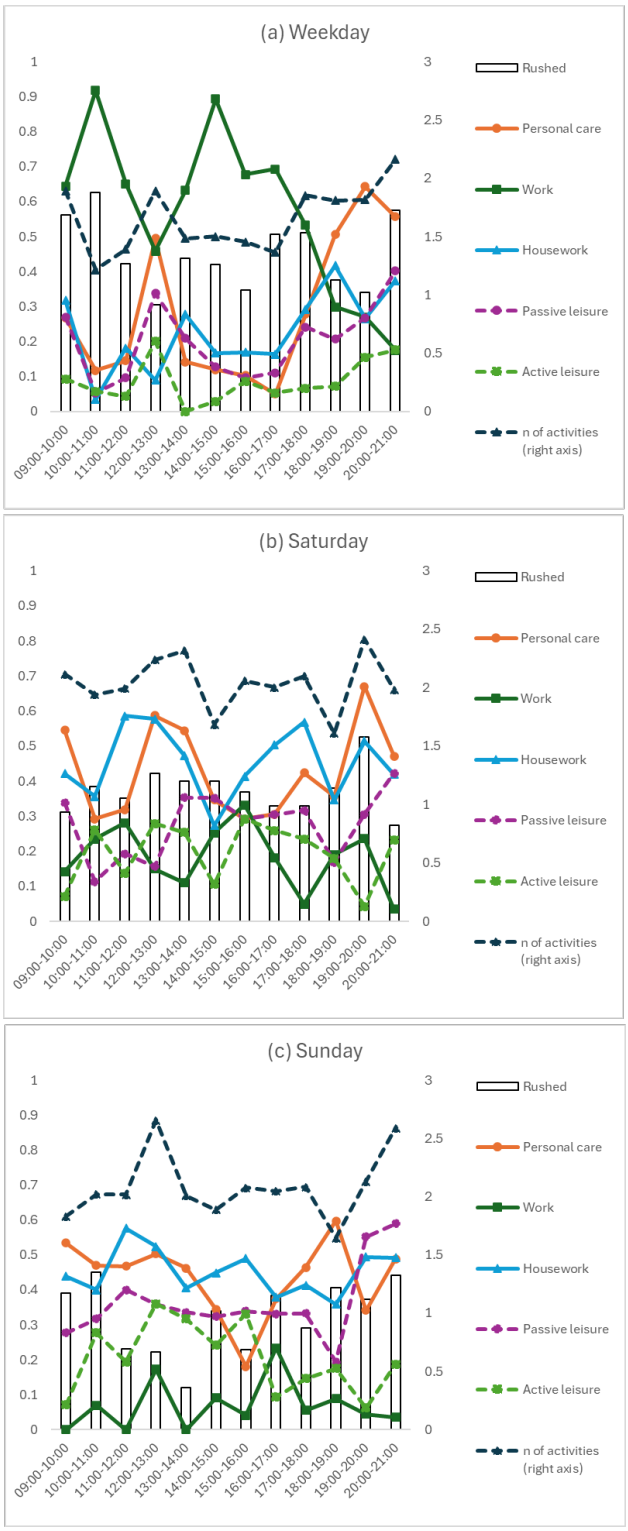

Table 4: Linear Probability Fixed Effect Models on Time Pressure

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 4m | | Model 4f | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| n of activities | | | -0.020 | 0.018 | | | 0.069 * | 0.029 | 0.059 | 0.057 | 0.062 + | 0.033 |
| Personal care dummy | | | | | -0.102 ** | 0.037 | -0.166 *** | 0.046 | -0.216 * | 0.085 | -0.110 * | 0.054 |
| Work or study dummy | | | | | 0.185 ** | 0.067 | 0.131 + | 0.071 | 0.129 | 0.113 | 0.132 | 0.093 |
| Housework dummy | | | | | 0.072 | 0.044 | -0.007 | 0.055 | 0.107 | 0.101 | -0.052 | 0.067 |
| Passive leisure usage dummy | | | | | -0.144 ** | 0.041 | -0.226 *** | 0.054 | -0.112 | 0.098 | -0.312 *** | 0.066 |
| Active leisure dummy | | | | | -0.033 | 0.049 | -0.098 + | 0.056 | 0.085 | 0.095 | -0.249 ** | 0.072 |
| Time | | | | | | | | | | | | |
| 10:00-11:00 | 0.086 | 0.065 | 0.087 | 0.065 | 0.038 | 0.065 | 0.028 | 0.065 | 0.076 | 0.096 | 0.007 | 0.089 |
| 11:00-12:00 | -0.031 | 0.063 | -0.037 | 0.064 | -0.109 + | 0.063 | -0.105 + | 0.063 | -0.022 | 0.100 | -0.145 + | 0.081 |
| 12:00-13:00 | -0.059 | 0.067 | -0.055 | 0.067 | -0.113 + | 0.067 | -0.121 + | 0.067 | -0.136 | 0.106 | -0.150 + | 0.087 |
| 13:00-14:00 | -0.070 | 0.067 | -0.069 | 0.067 | -0.066 | 0.066 | -0.064 | 0.066 | -0.139 | 0.112 | -0.026 | 0.080 |
| 14:00-15:00 | 0.002 | 0.065 | 0.003 | 0.065 | -0.048 | 0.064 | -0.052 | 0.064 | -0.074 | 0.095 | -0.023 | 0.087 |
| 15:00-16:00 | -0.097 | 0.064 | -0.103 | 0.064 | -0.182 ** | 0.064 | -0.184 ** | 0.064 | -0.148 | 0.104 | -0.171 * | 0.082 |
| 16:00-17:00 | 0.014 | 0.067 | 0.008 | 0.067 | -0.095 | 0.068 | -0.100 | 0.067 | -0.116 | 0.104 | -0.125 | 0.090 |
| 17:00-18:00 | -0.054 | 0.067 | -0.052 | 0.067 | -0.048 | 0.066 | -0.050 | 0.065 | -0.170 | 0.113 | -0.005 | 0.080 |
| Intercept | 0.395 *** | 0.023 | 0.434 *** | 0.042 | 0.440 *** | 0.045 | 0.413 *** | 0.046 | 0.303 *** | 0.072 | 0.526 *** | 0.061 |
| rho | 0.479 | | 0.480 | | 0.463 | | 0.459 | | 0.518 | | 0.439 | |
| corr(u_i, ***Xb***) | -0.009 | | -0.024 | | 0.045 | | 0.083 | | 0.021 | | -0.027 | |
| n of observations | 895 | | 895 | | 895 | | 895 | | 306 | | 589 | |
| n of individuals | 321 | | 321 | | 321 | | 321 | | 112 | | 209 | |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$ (two-tailed test)

Weighted by the adjustment weight for nonresponse.

Table 5: Linear Probability Fixed Effect Models on Time Pressure by Survey Date

| | Weekday | | | Saturday | | | Sunday | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coef. | | S.E. | Coef. | | S.E. | Coef. | | S.E. |
| n of activities | -0.139 | + | 0.074 | 0.109 | * | 0.046 | 0.107 | * | 0.043 |
| Personal care dummy | 0.163 | | 0.120 | -0.317 | *** | 0.071 | -0.157 | * | 0.070 |
| Work or study dummy | 0.349 | ** | 0.124 | 0.111 | | 0.142 | 0.114 | | 0.174 |
| Housework dummy | 0.277 | * | 0.136 | -0.084 | | 0.092 | -0.035 | | 0.081 |
| Passive leisure dummy | 0.145 | | 0.138 | -0.274 | ** | 0.086 | -0.298 | *** | 0.080 |
| Active leisure dummy | 0.043 | | 0.146 | -0.132 | | 0.089 | -0.084 | | 0.084 |
| Time | | | | | | | | | |
| 10:00-11:00 | 0.121 | | 0.126 | -0.085 | | 0.122 | 0.037 | | 0.097 |
| 11:00-12:00 | 0.085 | | 0.118 | -0.244 | * | 0.116 | -0.108 | | 0.102 |
| 12:00-13:00 | -0.285 | * | 0.139 | 0.069 | | 0.106 | -0.233 | * | 0.113 |
| 13:00-14:00 | -0.106 | | 0.139 | 0.106 | | 0.098 | -0.265 | * | 0.113 |
| 14:00-15:00 | -0.040 | | 0.125 | 0.005 | | 0.122 | -0.068 | | 0.095 |
| 15:00-16:00 | -0.022 | | 0.120 | -0.239 | * | 0.119 | -0.224 | * | 0.101 |
| 16:00-17:00 | -0.178 | | 0.151 | -0.038 | | 0.101 | -0.082 | | 0.116 |
| 17:00-18:00 | -0.024 | | 0.139 | 0.005 | | 0.098 | -0.153 | | 0.112 |
| Intercept | 0.359 | ** | 0.104 | 0.434 | *** | 0.075 | 0.394 | *** | 0.071 |
| rho | 0.502 | | | 0.453 | | | 0.448 | | |
| corr(u_i, $\boldsymbol{Xb}$) | -0.163 | | | -0.034 | | | 0.158 | | |
| n of observations | 275 | | | 308 | | | 312 | | |
| n of individuals | 103 | | | 108 | | | 110 | | |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$

Weighted by the adjustment weight for nonresponse.