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The Reciprocal Relationship between Unemployment
and Social Isolation:
A Longitudinal Approach Using the Japanese Life
Course Panel Survey

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Abstract

Even though Japan has lower unemployment rates than other industrial societies, it has particularly increased for young and middle-aged people over the two last decades. Similarly, social isolation is a problem in Japan and is thought to be a potential cause of unemployment. The present study uses waves 1 (2007), 3 (2009) and 5 (2011) from the Japanese Life Course Panel Survey, a nationally representative data for Japanese people aged 20 to 40. We perform a cross-lagged panel model with and without random intercepts and control a set of socio-economic covariates. Results show that the seeming reciprocal relationship between unemployment and social isolation is spurious after controlling for covariates at an earlier life stage and random intercepts implying between-individual inherent traits. We conclude that it is challenging to overcome the initial social and economic disadvantages in contemporary Japanese society.

1. Background

Japan is a country where unemployment rate is relatively low compared with other industrial countries, e.g. among OECD members. According to the Labour Force Survey produced by the Japanese government (which is the source of most OECD employment-related statistics in Japan), only 2.4% of the labour force was unemployed in 2019. This figure was much lower than the OECD average, which is about 6% for the same year.

In the Japanese context, however, the seemingly low unemployment rate should be regarded with caution, for at least two reasons. Firstly, Japanese unemployment rates have risen substantially during the long-term recession that started in the early 1990s, when Japan faced the late 1980s bursting of the bubble economy. The unemployment rate was around 5% in the 2000s and at least about three times higher than during the period of rapid economic growth, in the 1960s. Secondly, for young and middle-aged Japanese workers today, unemployment is likely to occur in their career trajectories. Younger workers are more likely to be unemployed than older ones. According to the labour force survey, for example, unemployment rates reached about 9% for the 20-24 and 7% for 25-29 aged workers in the 2000s. It is slightly higher for those in their 30s but near the average.

Social isolation is also a problem that receives much attention in Japan. The 2018 Comprehensive Survey of Living Conditions by the Ministry of Health, Labour, and Welfare (MHLW) showed that 4.4% of the 20-44 did not have any contact to ask help about things that worry them. Meanwhile, such a percentage was 4.9% for those who were 45 years old or more. Concerning the social supports of any kind, however, there are differences between young and older individuals. The same 2018 MHLW survey reported the distribution of what bothered respondents the most. Young and middle-aged respondents aged from 20 to 44 at the time of the survey mentioned their work as the top concern, with 33% of them. It was 16% for the older people, but health related issues for themselves and their families were the things that bothered them the most. These figures suggest that social support that young and middle-aged people need is primarily about work and that they may not obtain such support due to social isolation.

These figures, flowing from government surveys on unemployment and social isolation, suggest that the two aspects should be somehow interrelated. However, how unemployment affects isolation (and vice versa) and why such a relationship occurs is not entirely obvious. This study primarily aims to examine the existence of the vicious cycle.

2. Previous Studies

The Impact of Unemployment and Social Isolation

Written in 1933, "Marrienthal: The sociography of an unemployed community" (Lazarsfeld, Jahoda, and Zeisel, 1982) was one of the first pieces of work describing the social consequences of unemployment among which loneliness, isolation, hopelessness, and passivity were the most salient features. Almost one century later, the study of the small community of Marrienthal is still accurate, demonstrating the universality of job loss (Lobo, 2018) and its effects on social integration.

Unemployment goes beyond the loss of an income, and non-pecuniary effects of unemployment are "much larger than the effect that stems from the associated loss of income" (Winkelmann and Winkelmann, 1998). Social isolation remains a major social issue, and a considerable number of researchers have carried out studies to assess to what extent unemployment is associated with social isolation. For instance, analysing the relationship between unemployment and social participation in 26 countries and attempting to identify the role of national policies and attitudes as possible mediators, Dieckhoff and Gash (2015) demonstrate that the unemployed are likely to be less socially engaged compared with employed respondents. The authors particularly underline the role played by poverty risks associated with unemployment in explaining social isolation: in countries where unemployment is associated with higher poverty risks, unemployed people have a lower social participation rate. The importance of such structural factors is also demonstrated by Hammer (Hammer, 2000) in a study investigating the processes that lead to the integration or social exclusion of unemployed youth comparing Denmark, Finland, Iceland, and Norway. The author finds that Danish youth unemployment had a better economy, felt less isolated, and reported fewer mental health issues than unemployment youth in the other selected countries.

Nevertheless, social isolation can also be a process, not only the outcome of a process (Silver, 2012). To better understand such a process, a longitudinal approach is required. Using a longitudinal panel study to demonstrate the association between unemployment and social support, Atkinson, Liem, and Liem (1986) have found that unemployment is associated with a decline in spousal support, quality of the marital relation and a decrease in the frequency of contact with network members for blue-collar workers. The study demonstrates that unemployment affects marital and family support mainly through the husband's psychological well-being. Meanwhile, social isolation created by involuntary job loss is moderated by other factors, among which the area of residence might play a role. For instance, a higher level of social support is evidenced by

rural unemployment compared with urban unemployment (Gore, 1978). Looking at marriage and parenthood, Klamijn (2012) shows using data from the Swiss Household Panel that marriage does not affect weak ties but affects the nature of stronger ties, parenthood is associated with more local relationships and divorce, and widowhood is positively associated with contact and support. The study finds that unemployment is associated with a reduced number of neighbours in the network with an increase in the number of friends.

The Reciprocal Relationship between Unemployment and Social Isolation

On the other side, much attention has been given to the role played by social isolation and, more specifically, to the lack of social network, in explaining unemployment. Inspired by Granovetter's weak-tie hypothesis (Granovetter, 1973), Montgomery (1992) has demonstrated that the weak-tie implies an association between network composition and a job seeker's minimum acceptable wage. Although, the weak tie is rarely associated with higher expected wages. His findings show that, on the one hand, one should focus on the structure of the job seekers' network and, on the other hand, that social networks could have more potent effects on non-pecuniary aspects of work.

Using the 2001 International Social Survey Programme on social relations and support systems, Franzen and Hangartner (2006) show that the use of social networks in finding a job does not increase the monetary pay-off. Though, looking at a sample of 8,000 Swiss university graduates, they demonstrate that informal job-search channels are beneficial for important non-monetary job characteristics such as jobs that are better linked to educational degrees and better career perspectives. However, studies looking at the reciprocal relationship between social isolation and unemployment are few. The nature of the network also plays a role. Looking at unemployed people in Great Britain, Sousounis and Lanot (Sousounis and Lanot, 2018) found that the probability of finding work increases as the number of employed (versus unemployed) increases.

Comparing European countries using longitudinal and cross-sectional data from the European Community Household Panel, Gallie, Paugam and Jacobs have shown that social exclusion "implies that there is a downward spiral in which labour market marginality leads to poverty and social isolation, which in turn reinforces the risk of long-term unemployment" (Gallie, Paugam, and Jacobs, 2003). In the study, the authors first look at the impact unemployment could have on poverty risk and social isolation and then look at whether poverty and social isolation could affect the length of time before leaving unemployment. Results show that there is a vicious circle of exclusion in which unemployment reinforces poverty and, in return, poverty heightens long-term

unemployment risks. However, the article does not find significant effects of unemployment on social isolation or vice versa; according to the authors, social isolation is much related to household structure and local sociability that vary across countries. The article concludes that poverty remains the main challenge associated with unemployment. Some other studies establish a link between social isolation and unemployment. For instance, using qualitative surveys, Lindsay (2010) shows that long-term unemployed people in two areas of high unemployment in Glasgow struggle to access social networks for a job search; long-term unemployment is associated with a general erosion of social relations and communities.

Social Isolation and Unemployment in Japan

Japanese scholars have also been interested in looking at the association between these two aspects. Such an interest has its origins in employment problems, especially among young people, which have gain in intensity after the 1990s bubble burst which led Japan to a prolonged recession, and reduced employment opportunities for the youngest generations. In the 2000s, the problem of youth employment remained unsolved, and the proportion of young unemployed people – known as NEET (Not in Education, Employment, or Training) – has reached a size that is not negligible.

In exploring the background of the young unemployed, some discussions have emerged that shed light on social relationships. A pioneering work by Genda and Maganuma (2004) pointed out that the young NEET were not confident with communicating with others. Lack of social skills and adjustment to the work environment could explain difficulties in finding a job. Given that isolated people are likely to lose opportunities for social skill formation, social isolation may cause unemployment, and vice versa.

As long as the Japanese system for youth workers entering the labour market worked well, social isolation and lack of social skills were not necessarily problematic. Before the long-term recession, young people were able to start their first job as regular employees soon after their school graduation (Ishida, 2005). Under such a configuration, the impact of social networks - that connect people to various others (Granovetter, 1995) - was small, particularly because the central issue was career development within the corporate organization. The changes that occurred in the 1990s, including less straightforward pathways to employment for those entering the labour market just after graduation have increased the importance to be part of social network and to develop social skills. In other words, social relationships have become more crucial for young people's careers, particularly given the changing nature of the transition to employment

(Brinton, 2010).

Social networks can be one of the social skill-building sources for careers, but also contribute more directly to the acquisition of job opportunities. In particular, strong ties enable job seekers to obtain more information beneficial for job hunting in the Japanese labour market (Watanabe, 1991). Also, family and kin networks - a typical kind of strong ties - increase one's chance to get a regular job in case of involuntary job turnover (Ishida, 2009).

Though social networks possibly play a role in finding job offers, unemployed Japanese people, who would actually benefit the most from network resources, are in a poor situation about them. A recent analysis demonstrates that the joblessness is highly associated with loss in social support (Nagayoshi, 2017). This validates what was found in another study explicitly focusing on the youth unemployed: young unemployed tend to have few social contacts (Hori, 2005).

3. Empirical Issues and Hypotheses of the Study

The findings of previous studies in Japan and western societies suggest that unemployment may increase the risk of social isolation and vice versa. While this scholastic argument implies that there would be a reciprocal relationship between unemployment and social isolation, such interdependency complicates the specification of each path. Because the effect on one side possibly affects the other, misleading results may occur if both effects are not identified simultaneously. None of the prior research has yet tried to examine the reciprocal relationship between these two dimensions. It is one of the original contributions of the present study.

Another original point of view of this study is to focus on the potential states of unemployment and social isolation. In terms of robustly estimating these effects, the correlation of the latent traits of unemployment and isolation seems to be just a source of the simultaneous bias. However, which aspects are more critical in explaining the observed reciprocal association is itself a question that is worth considering. If the correlation of the latent variables of interest is more determining than the effect of each one, the policy implication for intervening the vicious cycle will be different from the one in the case that the interdependent effects are decisive. The more considerable impact of the potential traits than the bi-directional effects implies a necessity of some policy supports for the disadvantaged people at an earlier stage in the life course. Accordingly, it is necessary to distinguish between- and within-individual differences and/or changes. Based on these research concerns, the present study aims to examine the following two

hypotheses.

The first hypothesis is that there could be a ‘vicious cycle of unemployment and social isolation’ in which unemployment reinforces social isolation, and social isolation reduces job opportunities. To test for such a hypothesis, we use a cross-lagged model that looks at the reciprocal relation between unemployment and social isolation.

The second hypothesis refers to social and life course background factors that could affect both unemployment and social isolation. If it is possible to hold this hypothesis, the seeming vicious cycle comes from the individual difference in the propensities of both unemployment and social isolation. Presuming the second hypothesis, the cross-lagged effect in each endogenous variable would decrease after considering the individual variations.

4. Data and Method

Data

Data come from the Japanese Life Course Panel Surveys (JLPS). JLPS conducted its first wave (Wave 1) in 2007 and has yearly follow-up surveys of the primary sample with a questionnaire design that allows us to trace changes in social statuses and attitudes toward a wide range of topics. The respondents stemmed from a stratified two-stage random sampling design, and the sample was representative of the target population in Japan at first wave (Miwa, 2008). JLPS has two different samples, a youth and a middle-aged sample (JLPS-Y and JLPS-M). The former consists of respondents aged 20 to 34 years old in 2007. The respondents in the middle-aged sample were aged 35 to 40 years old. These two samples have the same questionnaire, and it is entirely possible to analyse the two datasets together.

The response rates in JLPS-Y and JLPS-M at Wave 1 are 34.5% and 40.4%, respectively. Those at Wave 2 (2008) and in the subsequent waves are around 80%. Given the fact that the information about the degree of isolation from social support is available in survey waves of odd numbers, we utilize the first, third, and fifth waves in this study. We analyse the male and female samples separately and restrict the baseline sample only to those who responded in all waves from Wave 1 to Wave 5. We also exclude students. The numbers of cases for the male and female samples are respectively 957 and 1,269.

Variables

Endogenous Variables

In this study, we primarily focus on the following two endogenous variables:

unemployment and the degree of isolation from social support networks. They are endogenous in the sense that their states at the last time of the survey wave have effects on the later ones each other.

The unemployment variable is defined as the employment status at each wave. In this study, unemployment is defined as joblessness, i.e., regardless of the intention of working or any job search behaviour. Students are omitted from the analytical sample and, given the age-groups selected at the baseline (i.e., 20-40 years old), it does not contain any retired respondents. By doing so, we use an extended definition of unemployment that does not only integrates respondents perceiving unemployment benefits only. We use the employment status as a binary variable distinguishing those who are unemployed from those working at the time of the survey (reference category).

The other dependent variable is the degree of isolation from social support networks. JLPS contains a social support module in waves 1, 3, and 5. It asks the respondents to whom they would ask a favour about these four topics; (1) work or study, (2) job recommendation, (3) relationship issues with friends and spouse or partner, and (4) borrowing a significant amount of money. For each item, respondents can choose 'no one' in the case nobody could help with those issues. We regard the answer modality 'no one' in each item as the highest degree of isolation from social support networks. Therefore, the variable of the social isolation ranges from 0 (the lowest degree) to 4 (the highest degree).

There two ways to use this variable. One could use it as a continuous variable containing five answer modalities. It can also be possible to use the variable as a binary variable distinguishing those who benefit from some kind of social support (0-3) from those who are socially isolated in all aspects (4). We test both options in the present study and confirmed similar results. This article only shows results for the continuous variable. One limitation of the isolation variable is that those who do not need to ask anyone to help could choose the answer modality 'no one' because they do not need any support for these matters. As Kalmijn (2012) points out, social contacts and supports not only come from social statuses but are also related to the need to contact someone or to get specific supports. Therefore, a higher value within the social isolation scale could also indicate that the respondent can easily afford anything by him- or herself. However, as his analysis implies as well (Kalmijn 2012), it is an empirical matter what the seeming isolation means for each person. We will interpret associations of the social isolation degree and background variables from standpoints of both opportunity and necessity in the following analyses.

Covariates

Concerning the second hypothesis in this article, we aim to demonstrate how the initial life course states affect the individual-level variations on the degrees of risks of unemployment and social isolation. Here, we explicitly focus on age, social background, respondents' initial status attainment, household situations, and the past life course experiences.

Because the age of the respondents ranges from 20 to 40 at the baseline (Wave 1), it is necessary to control the effect of different life stages. To do so, we include age at Wave 1 as a covariate explaining random variances of unemployment and social isolation among individuals.

Social background is another major exogenous variable. In this paper, we use the father's occupational status as a marker of social origin. At Wave 1, the JLPS asked respondents their father's employment status, occupation, and the size of the firm they worked when the respondents were 15 years old. The father's status variable is composed of seven modalities; (1) professional, (2) managerial, (3) non-manual in the large-sized firm, (4) self-employed, (5) other occupational statuses, (6) unemployed or no father at that time, and (7) Do not know or Not answered (DK).

We also investigate the association between the early status attainment and latent risks of the endogenous variables. We particularly pay attention to two kinds of variables: the educational status and the first job. The educational status at Wave 1 includes three folds: secondary (junior and senior high schools), post-secondary (technical college and two-year college), and tertiary (undergraduate and graduate degrees) education. Respondents' first job almost has the same structure as the father's status, but managerial and professional positions are combined because few respondents held a managerial position at the first job.

The study also spots the household situation. It controls the total household income, the marital status, whether the respondent has a child or children at Wave 1. The household income has six categories; (1) 150 million JPY or less, (2) 150-350 million JPY, (3) 350-600 million JPY, (4) 600-850 million JPY, (5) 850 million JPY or more, (6) Do not know or Not answered (DK).

The marital status should be understood both as a social position and as a source of social networks. In Japan, under the male-breadwinner model, having a spouse will make men work, but female quit a job (Zhou, 2015). The marital status also relates to social support, because one can expand family and kin networks through the spouse (Kalmijn, 2012). For a similar reason, having a child will increase social support ties with one's needs or opportunity for connecting with other parents' networks (Kalmijn, 2012).

The last type of covariates is the respondents' past life course experiences. In this paper, we use three variables, that are: experience(s) of crime victimization, experience(s) with any severe disease, and home atmosphere at 15 years old. While its effect is ambiguous, exposure to crime is associated with socioemotional difficulties (Saegert and Winkel, 2014). This item is dichotomous and coded '1' if one has been subject of crime victimization and '0' if not. Also, mental or physical health condition relates to the propensity of employment (Pacheco, Page, and Webber, 2014), and this study utilizes the past severe disease experience as an indicator of the health condition of an earlier life course; this variable is a binary variable as well as the exposure to crime. Finally, we use the home atmosphere at 15 years old as a circumstance of socialization because parenting has an impact on children's socio-emotional development (Shaffer, Suveg, Thomassin, and Bradbury, 2012). This item has a four-point ordinal scale, from one to four, in which a higher value indicates a warmer home environment at 15 years old.

Cross-lagged Panel Model

The present study uses a cross-lagged panel model to assess the interdependency between unemployment and social isolation. With lagged endogenous variables, it is possible to distinguish both the effect of unemployment on social isolation and the inverse relationship from the entire association between them. Its methodological feature is appealing for social scientists who are interested in the dynamic process of social phenomena. Especially in the life course research and development studies, scholars have often applied this model to various topics (for instance, see Lindwall, Larsman, and Hagger (2011), and Yao and Zhong (2014) for some recent application of the cross-lagged panel method).

In line with the advancement of research, however, there are some methodological concerns about the standard cross-lagged panel model (Hamaker, Kuiper, and Grasman, 2015). One issue is on the individual differences in endogenous variables. In the standard approach, we assume the mean structure of endogenous variables of constant. However, there can be differences among individuals. Unless distinguishing the between-individual variances and the within-individual ones, we have a high risk of obtaining inappropriate estimates (Mund and Nestlers 2019).

When ignoring the individual variation, it is impossible to investigate how it emerges. Referring to the social background hypothesis in the present study, the between-individual differences in unemployment and social isolation may come from previous life course situations. To test this thesis, we must consider the latent structure of endogenous variables, which consists of their variances and covariance (Hamaker, Kuiper, and

Grasman, 2015).

The cross-lagged panel model with random intercepts of endogenous variables is an alternative for the standard approach. By considering the random variances of unemployment and social isolation, and their covariance, we can estimate the cross-lagged and autoregressive effects more accurately and examine the associations between the time-invariant factors and random variances.

Another issue to be discussed is the covariance structure of residuals among endogenous variables. The standard cross-lagged panel model controls the simultaneous relationship between the residuals of dependent variables. Meanwhile, there are possibly serial correlations between variables observed at different time points. In general viewpoints from regression analysis, using a lagged dependent variable can cause a bias stemming from a serial correlation of residuals (Schuurman et al., 2016). Due to this concern, there is an argument that the standard cross-lagged model would not be appropriate for investigating the dynamic relationship (Schuurman et al., 2016).

One option is to control the residual covariances of endogenous variables within the cross-lagged panel model in order to consider these technical issues. In this paper, we estimate four types of residual covariance at the same time; (1) unemployment at t and social isolation at $t+2$, (2) social isolation at t and social isolation at $t+2$, (3) unemployment at t and $t+2$, (4) social isolation at t and $t+2$. It is possible to control these covariates with the structural equation model (SEM).

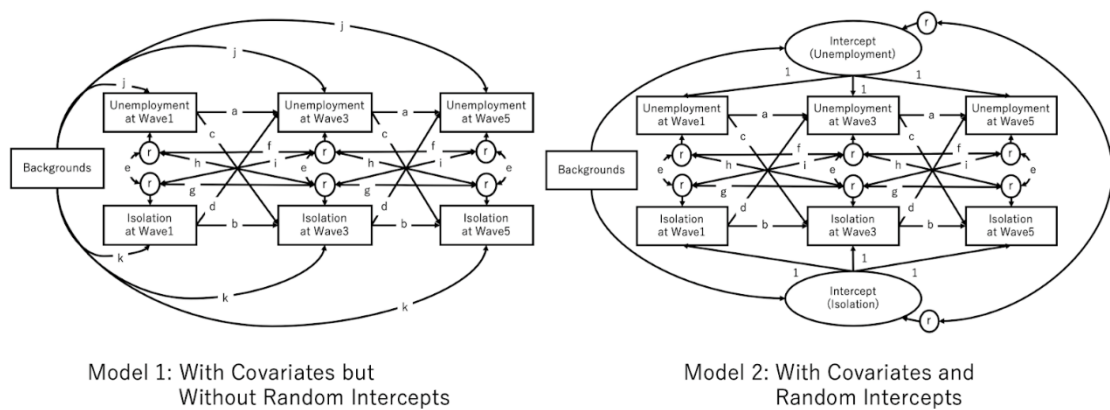


Figure 1. Study design (Cross-Lagged Panel Models)

In this paper, we carry out the two types of the cross-lagged model, as shown in Figure 1. Firstly, we perform the model without random intercepts of unemployment and social isolation (Model 1), which means the standard (classical) cross-lagged modeling. In Model 1, we make the cross-lagged and autoregressive effects equal across survey

waves. The characters “a,” “b,” “c,” and “d” in Figure 1 refer to the equality constraints. We control the simultaneous and serial correlations of residuals in Model 1 and set the equality constraints among them across waves (“e,” “f,” “g,” “h,” and “i” in Figure 1). Model 1 also considers the effects of the background covariates on the endogenous variables at each wave. The letters, “j” and “k” means that the effects of covariates are equal through waves. “r” in the path diagrams refers to the residual term.

In Model 2, we add random intercepts of unemployment and social isolation to the Model 1¹. After investigating the model only with random intercepts, we include time-invariant variables as background factors to explain the between-individual variations of unemployment and social isolation. We perform these models by gender. Also, we use robust standard errors for each parameter in the following analyses².

Adjusting for Attrition Effect

In addition to the empirical model, a sample bias caused by the attrition process is a serious problem when analyzing longitudinal data like JLPS. Attrition occurs in almost all cases of longitudinal studies. We do not have to care about the attrition when it occurs randomly. However, those who exit the panel often arise in some specific characteristics and situations. Furthermore, we use a balanced sample, but it is difficult to assume that whether one can respond to all waves or not is random in this study. Without balancing the propensity of remaining in or dropping out the panel among respondents, we may fail to obtain accurate estimates in case that the propensity of one’s retention confounds relationships among relevant variables.

There is no perfect measure to correct the attrition bias, but we need to consider it as much as possible. In this paper, we run a logistic regression model on one’s retention. The dependent variable took 1 when one responded in all five waves from Wave 1 to Wave 5, and 0 otherwise. In the logistic regression model, we use 79 independent variables and omit students at Wave 1 from the sample. With the inverse probability

¹ Endogenous variables can change with time, and it is possible to estimate random slopes of the time effect in the structural equation modeling (Mund and Nestler 2019). In this paper, it was impossible to estimate models including random slope variances due to non-convergence. However, authors did not regard this problem as a serious one because they did not see any systematic change in endogenous variables over the selected sequence, as Table 4 and Figure 2 imply.

² Because the unemployment variable is dichotomous, it is difficult to assume that its error follows the normality and homoscedasticity. Using the nonlinear SEM (generalized SEM) is another approach, but estimation is more complex and unstable in the present study. We cannot deal with the simultaneous and serial correlation among residuals, either. Authors recognize the methodological limitation in this paper but rely on using the robust standard error as the second best solution (Savalei 2014).

weighting approach, weights for adjusting the propensity of retention are constructed for the male and female samples based on the result of the logit model.

5. Results

Descriptive Statistics

Adjusting Propensity for Retention in the Panel

Table 1 shows the result of the logistic regression models on the retention performed by gender. 50% of male respondents and 30% of female ones have dropped out of the sample for the five years since Wave 1.

Table 1. Attrition and Retention of the Respondents in the JLPS dataset

	Male	Female
N	2113	2244
n of attrition	1004	765
n of retention	1109	1479
% of correctly classified	68.39%	71.93%
c-statistics	0.75	0.76

Results of the logit model indicate tolerable performances. The logistic regression model classified 68.39% of the male respondents and 71.93% of the female ones. Also, we calculated the c-statistics (concordance statistics) for both results. C-statistics is one of the indicators which evaluate the model fits of logistic regression models (Hanley and McNeil 1982; Westreich et al. 2011). It ranges from 0.5 to the maximum one of 1. The c-statistics of the male and female samples are respectively 0.75 and 0.76. These results indicate the intermediary levels about predicting the propensity of retention or attrition.

Table 2 provides descriptive statistics for the time-invariant variables of interest of the unweighted and weighted samples. Unweighted samples are considerably deviant from the ones which also include the cases of attrition. However, the data with inverse probability weight for retention shows no statistically significant difference. In line with this result, we perform the following cross-lagged models with the weighted data.

Table 2. Descriptive Statistics of Relevant Variables

	Unweighted sample				Weighted sample			
	Male		Female		Male		Female	
	Mean/Proportion	S.D.	Mean/Proportion	S.D.	Mean/Proportion	S.D.	Mean/Proportion	S.D.
Unemployment at t	0.048	0.214	0.292	0.455	0.054	0.227	0.266	0.442
Degree of isolation from support at t	0.737	1.006	0.556	0.742	0.755	1.029	0.554	0.766
Age at Wave1	33.137	4.942	32.883	5.336	32.396	5.266	32.425	5.497
Father's status at 15 years old (Ref: Other occupations)								
Professional	0.107	0.309	0.091	0.287	0.092	0.289	0.085	0.279
Managerial	0.07	0.255	0.087	0.283	0.091	0.288	0.087	0.282
Non-manual in large-sized firm	0.079	0.271	0.076	0.265	0.068	0.252	0.072	0.259
Self-employed	0.258	0.438	0.246	0.431	0.245	0.431	0.242	0.428
Unemployed/No father	0.041	0.198	0.038	0.191	0.043	0.204	0.039	0.194
DK	0.01	0.102	0.017	0.131	0.012	0.107	0.017	0.131
Educational status at Wave1 (Ref: Post secondary)								
Secondary	0.313	0.464	0.288	0.453	0.328	0.47	0.309	0.462
Undergraduate or more	0.452	0.498	0.249	0.433	0.443	0.497	0.234	0.424
First job (Ref: Other occupations)								
Professional/Managerial	0.213	0.41	0.214	0.411	0.197	0.398	0.212	0.409
Non-manual in large-sized firm	0.082	0.274	0.183	0.387	0.07	0.255	0.165	0.372
Self-employed	0.027	0.163	0.009	0.097	0.031	0.173	0.008	0.091
DK	0.077	0.267	0.073	0.261	0.073	0.261	0.077	0.267
Household income (Ref: 150-350 million JPY)								
150 million JPY or less	0.016	0.124	0.02	0.139	0.017	0.13	0.02	0.142
350-600 million JPY	0.285	0.452	0.287	0.452	0.28	0.449	0.254	0.435
600-850 million JPY	0.19	0.393	0.139	0.346	0.17	0.376	0.141	0.348
850 million JPY or more	0.162	0.369	0.158	0.365	0.144	0.352	0.159	0.365
DK	0.23	0.421	0.281	0.449	0.269	0.444	0.301	0.459
Marital status at Wave1 (Ref: Married)								
Unmarried	0.442	0.497	0.389	0.488	0.491	0.5	0.422	0.494
Divorce/Widowed	0.021	0.143	0.039	0.195	0.03	0.171	0.039	0.193
Having children at Wave1	0.441	0.497	0.51	0.5	0.404	0.491	0.476	0.5
Crime Victimization Experience	0.053	0.225	0.042	0.2	0.059	0.236	0.043	0.203
Experience having got a heavy disease	0.241	0.428	0.199	0.4	0.232	0.422	0.199	0.4
Home atmosphere at 15 years old	3.09	0.805	3.108	0.831	3.074	0.843	3.1	0.842

Table 3. Unemployment Rate and Average of Degree of Isolation from Social Support Networks each Wave

	Male			Female		
	Wave1	Wave3	Wave5	Wave1	Wave3	Wave5
Unemployment (%)	5%	4%	5%	27%	26%	23%
Degree of isolation from social support (mean)	0.755	0.785	0.779	0.554	0.587	0.634
No support for asking about work and study (%)	8%	9%	9%	3%	4%	4%
No support for asking a job introduction (%)	37%	37%	35%	39%	40%	41%
No support for asking about relations (%)	16%	17%	17%	4%	5%	6%
No support for asking about borrowing money (%)	15%	15%	17%	10%	10%	12%

Note) The degree of isolation refers to the number of 'no one' across the four items.

Table 3 provides some descriptive figures about unemployment rates in Wave 1, 3, and 5 and the degree of complete social isolation by the type of social need. About five percent of the male sample was unemployed across the three waves against about twenty-five percent within the female sample. It appears that the most frequently cited item of social isolation is about asking for job introduction: 40% of the female sample and 36% of the male sample declared not having any kind of support for such a matter.

Estimates from Cross-lagged Panel Models

Results from the cross-lagged panel models are shown in Tables 4 (for men) and 5 (for women). Each table exhibits the results for the different models mentioned above. Model 1a looks at the cross-lagged association between unemployment and social isolation without considering the effects of covariates and without random intercepts. Model 1b controls the set of covariates but does not include random intercepts. Model 2a does not control the covariates but includes random intercepts. Finally, Model 2b accounts for both the set of covariates and the random intercepts.

Table 4. Cross-lagged Panel Models in the Male Sample (n = 957)

	Model 1a		Model 1b		Model 2a		Model 2b	
	Unemp. at t+2 Coef.	Isolation at t+2 Coef.	Unemp. at t+2 Coef.	Isolation at t+2 Coef.	Unemp. at t+2 Coef.	Isolation at t+2 Coef.	Unemp. at t+2 Coef.	Isolation at t+2 Coef.
Exogenous variables								
Unemployment at t	0.411 **	0.665 ***	0.278	0.366 †	0.533	2.246	-0.446	-0.181
Degree of isolation from support at t	0.024 **	0.663 ***	0.013 †	0.629 ***	0.005	0.056	-0.015	0.127
	Unemp. at each wave Coef.	Isolation at each wave Coef.	Unemp. at each wave Coef.	Isolation at each wave Coef.	L(Unemp.) Coef.	L(Isolation) Coef.	L(Unemp.) Coef.	L(Isolation) Coef.
Age at Wave1			0.003 **	0.366 †			0.005 *	0.016 *
Father's status at 15 years old (Ref: Other occupations)								
Professional			0.002	-0.046			0.000	-0.021
Managerial			-0.008	-0.089			-0.015	-0.176 †
Non-manual in large-sized firm			0.016	-0.089			0.019	-0.135
Self-employed			0.007	-0.030			0.007	-0.028
Unemployed/No father			0.032	0.020			0.053	0.075
DK			0.004	0.184			0.033	0.301
Educational status at Wave1 (Ref: Post secondary)								
Secondary			-0.007	0.052			0.001	0.107
Undergraduate or more			-0.020 †	-0.019			-0.036	-0.054
First job (Ref: Other occupations)								
Professional/Managerial			-0.012	0.095 †			0.000	0.181 *
Non-manual in large-sized firm			-0.017	0.130 †			-0.024	0.133
Self-employed			-0.051 **	-0.068			-0.088 **	-0.176
DK			-0.009	-0.017			-0.015	-0.019
Household income (Ref: 150-350 million JPY)								
150 million JPY or less			0.118 †	0.122			0.201 †	0.323
350-600 million JPY			0.007	0.029			0.023	0.133
600-850 million JPY			-0.013	-0.038			-0.013	0.042
850 million JPY or more			-0.002	-0.075			-0.003	-0.061
DK			0.031 †	-0.014			0.056	0.110
Marital status at Wave1 (Ref: Married)								
Unmarried			0.033 †	0.046			0.069	0.168
Divorce/Widowed			0.128	0.160			0.243	0.492
Having children at Wave1			-0.011	-0.081			-0.018	-0.112
Crime Victimization Experience			-0.003	-0.052			-0.010	-0.052
Experience having got a heavy disease			0.052 **	0.091 *			0.084 **	0.204 *
Home atmosphere at 15 years old			-0.004	-0.082 **			-0.018	-0.135 **
Variances of random intercepts					0.013 ***	0.558 ***	0.021 ***	0.483 ***
Covariance of two random intercepts					0.03 *		0.04 **	
SRMR	0.146		0.018		0.031		0.018	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$ (Two-tailed test)
Note1) SRMR refers to "Standardized Root Mean Squared Residual."
Note2) Standard errors in all of the models are robust ones.
Note3) Other variances, covariances, and intercepts are not shown in this table.

Table 5. Cross-lagged Panel Models in the Female Sample (n = 1269)

	Model 1a		Model 1b		Model 2a		Model 2b	
	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.
Exogenous variables								
Unemployment at t	0.611 ***	0.014	0.431 ***	0.092 †	0.346 †	0.507 **	-0.072 †	-0.004
Degree of isolation from support at t	0.008	0.674 ***	0.033 *	0.621 ***	0.172 **	0.899 ***	-0.042	0.127
	Unemp. at each wave Coef.	Isolation at each wave Coef.	Unemp. at each wave Coef.	Isolation at each wave Coef.	L(Unemp.) Coef.	L(Isolation) Coef.	L(Unemp.) Coef.	L(Isolation) Coef.
Age at Wave1			-0.007 ***	0.009 **			-0.011 ***	0.010 *
Father's status at 15 years old (Ref: Other occupations)								
Professional			-0.004	0.055			0.001	0.080
Managerial			0.005	-0.031			-0.003	-0.058
Non-manual in large-sized firm			-0.021	0.008			-0.030	0.009
Self-employed			-0.004	0.042			-0.013	0.062
Unemployed/No father			-0.044	0.041			-0.069 †	0.052
DK			0.003	-0.012			0.015	-0.015
Educational status at Wave1 (Ref: Post secondary)								
Secondary			-0.055 **	0.057 †			-0.066 **	0.073
Undergraduate or more			-0.013	0.035			-0.005	0.075 †
First job (Ref: Other occupations)								
Professional/Managerial			-0.056 **	-0.033			-0.076 **	-0.077 †
Non-manual in large-sized firm			0.009	0.035			0.027	0.062
Self-employed			0.061	-0.104			0.076	-0.152
DK			-0.059 *	0.117 *			-0.076 †	0.151 †
Household income (Ref: 150-350 million JPY)								
150 million JPY or less			0.129 *	0.018			0.236 *	0.039
350-600 million JPY			0.020	-0.012			-0.003	-0.114
600-850 million JPY			-0.018	-0.094 *			-0.062	-0.207 **
850 million JPY or more			-0.042 †	-0.063			-0.085 *	-0.156 *
DK			0.027	-0.051			0.015	-0.169 *
Marital status at Wave1 (Ref: Married)								
Unmarried			-0.189 ***	0.121 **			-0.266 ***	0.157 *
Divorce/Widowed			-0.168 ***	0.082			-0.284 ***	0.060
Having children at Wave1			0.041	-0.030			0.120 **	0.036
Crime Victimization Experience			0.038	0.149 *			0.068	0.268 *
Experience having got a heavy disease			0.052 **	0.011			0.077 **	0.023
Home atmosphere at 15 years old			-0.005	-0.067 ***			-0.019	-0.104 ***
Variances of random intercepts					0.040 ***	0.048 ***	0.060 ***	0.247 ***
Covariance of two random intercepts					-0.06 *		0.01	
SRMR	0.066		0.028		0.008		0.017	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$ (Two-tailed test)
 Note1) SRMR refers to "Standardized Root Mean Squared Residual."
 Note2) Standard errors in all of the models are robust ones.
 Note3) Other variances, covariances, and intercepts are not shown in this table.

What can be observed when looking at Model 1a is that there is a positive and statistically significant cross-lagged association between unemployment and social isolation for the male sample. The effect of unemployment at baseline on social isolation at follow-up is positive and statistically significant. However, unemployment at baseline is not associated with social isolation at follow-up for the female sample. The same type of association is observed when looking at the impact of social isolation at baseline on unemployment at follow-up: isolation from social support is slightly associated with unemployment for the male sample but the association is almost non-existent for the female sample.

Model 1b shows what happens when introducing the set of covariates. The cross-lagged coefficients are not significant at a 5 per cent level for the male sample, and the

magnitude of the estimates decreases compared to the Model 1a. By contrast, the cross-lagged effects for the female sample increase after controlling the individual covariates, though the effect of unemployment on the subsequent isolation is still insignificant. The way between-individual factors affect the cross-lagged effects is different between men and women. According to the result, however, it is adequate to consider the individual variations about the variables of interest.

Finally, Model 2a and 2b run the same analysis but integrating the variance components of unemployment and social isolation. It can be observed that the cross-lagged association between unemployment and social isolation loses its significance. Model 2a still show significant cross-lagged effects for the female sample. In Model 2b which is the most rigorous³, however, there is no significant cross-lagged coefficient for both male and female. The series of analyses indicate the first hypothesis does not hold, but the second one does⁴.

6. Conclusion

The results of a series of analyses do not support the first hypothesis but seem to confirm the second one to some extent. The seeming reciprocal relationship between unemployment and social isolation turned out to be spurious after distinguishing the between-individual level latent traits. Instead, individual variations improve the model fit, and they explain the observed relationship much better than the bi-directional paths of unemployment and social isolation. Unemployment is not a direct cause of social isolation nor vice versa, but these results indicate that some people are likely to experience both unemployment and social isolation simultaneously. It can be possible to interpret that they have a double disadvantage. The propensity of the disadvantage seems to be stem from states and events at an earlier life course stage, though they do not fully explain the propensity.

These results suggest that it would be challenging to overcome the initial social and economic disadvantages in contemporary Japanese society. Japan has maintained a system that makes it difficult for career development to occur through inter-firm mobility, which is a career opportunity in a fluid labour market. Japanese career development relies

³ The cross-lagged panel model with a random intercept separates stable between-person differences from within-person fluctuations (Hamaker et al., 2015; Usami et al., 2019).

⁴ In addition to the cross-lagged panel models in Table 5 and Table 6, we also perform the same model with considering missing values and show the results in Appendix table 1 and 2. We obtained the almost same results.

on skill formation based on a within-firm mobility through rearrangements and promotions. Its system has attracted (mainly male) workers and motivated them to keep working in the same company for a very long time with little mobility from one company to another, though this tendency is slowly weakening (Yu, 2010). As well, social networks are workplace-centric, and it is unlikely for Japanese workers to expand their networks. Under such a configuration, the first chance, which is the transition from school to work, is consequently the last one.

One plausible policy implication is to develop further support for new graduates. Japanese schools have already developed a system of job recommendation, which is called ‘institutional linkage’ (Rosenbaum and Kariya, 1989). While searching for a sustainable career development system which provides the second chances to Japanese workers, it is essential to strengthen and actively make use of the existing system for dealing with the confronting problems.

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Appendix: Results of the Models Considering Missing Values

**Appendix Table 1. Cross-lagged Panel Models in the Male Sample with Full Information
Maximum Likelihood Estimation (n = 1109)**

	Model 1a		Model 1b		Model 2a		Model 2b	
	Uemp. at t+2	Isolation at t+2	Uemp. at t+2	Isolation at t+2	Uemp. at t+2	Isolation at t+2	Uemp. at t+2	Isolation at t+2
Exogenous variables	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Unemployment at t	0.414 **	0.574 ***	0.282 †	0.263	0.297	1.017	-0.362	-0.266
Degree of isolation from support at t	0.021 *	0.643 ***	0.007	0.601 ***	-0.022	0.045	-0.028	0.133
	Unemp. at each wave	Isolation at each wave	Unemp. at each wave	Isolation at each wave	L(Unemp.)	L(Isolation)	L(Unemp.)	L(Isolation)
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Age at Wave1			0.003 **	0.008 *			0.004 **	0.014 *
Father's status at 15 years old (Ref: Other occupations)								
Professional			0.014	-0.044			0.021	0.011
Managerial			-0.006	-0.107			-0.017	-0.201 *
Non-manual in large-sized firm			0.034 †	-0.122 *			0.040	-0.184 *
Self-employed			0.006	-0.015			0.003	-0.020
Unemployed/No father			0.021	0.009			0.033	0.038
DK			0.059	0.074			0.088	0.146
Educational status at Wave1 (Ref: Post secondary)								
Secondary			-0.005	0.030			0.003	0.071
Undergraduate or more			-0.016	-0.020			-0.027	-0.056
First job (Ref: Other occupations)								
Professional/Managerial			-0.019	0.090 †			-0.011	0.162 †
Non-manual in large-sized firm			-0.027 †	0.111 †			-0.035	0.109
Self-employed			-0.054 **	-0.051			-0.086 **	-0.142
DK			-0.009	-0.011			-0.014	-0.011
Household income (Ref: 150-350 million JPY)								
150 million JPY or less			0.114 †	0.084			0.176 †	0.236
350-600 million JPY			-0.002	0.030			0.006	0.111
600-850 million JPY			-0.016	-0.030			-0.021	0.015
850 million JPY or more			-0.011	-0.106			-0.018	-0.111
DK			0.024	-0.006			0.046	0.087
Marital status at Wave1 (Ref: Married)								
Unmarried			0.037 *	0.071			0.071	0.188 †
Divorce/Widowed			0.116	0.140			0.216	0.419
Having children at Wave1			-0.013	-0.076			-0.021	-0.099
Crime Victimization Experience			-0.006	-0.072			-0.014	-0.104
Experience having got a heavy disease			0.053 **	0.107 *			0.086 ***	0.220 **
Home atmosphere at 15 years old			-0.010	-0.088 **			-0.026	-0.149 **
Variances of random intercepts					0.019 ***	0.549 ***	0.547 ***	0.462 ***
Covariance of two random intercepts					0.04 †		0.04 ***	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$ (Two-tailed test)

Note1) Standard errors in all of the models are robust ones.

Note2) Other variances, covariances, and intercepts are not shown in this table.

**Appendix Table 2. Cross-lagged Panel Models in the Female Sample with Full Information
Maximum Likelihood Estimation (n = 1479)**

	Model 1a		Model 1b		Model 2a		Model 2b	
	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.	Uemp. at t+2 Coef.	Isolation at t+2 Coef.
Exogenous variables								
Unemployment at t	0.593 ***	0.027	0.431 ***	0.080 †	0.217	0.426 †	-0.062	0.021
Degree of isolation from support at t	0.012	0.670 ***	0.032 *	0.622 ***	0.151 †	1.052 ***	-0.033	0.132
	Unemp. at each wave Coef.	Isolation at each wave Coef.	Unemp. at each wave Coef.	Isolation at each wave Coef.	L(Unemp.) Coef.	L(Isolation) Coef.	L(Unemp.) Coef.	L(Isolation) Coef.
Age at Wave1			-0.007 ***	0.008 **			-0.010 ***	0.011 **
Father's status at 15 years old (Ref: Other occupations)								
Professional			-0.008	0.056			-0.008	0.070
Managerial			-0.006	-0.041			-0.019	-0.069
Non-manual in large-sized firm			-0.024	0.000			-0.035	0.000
Self-employed			-0.008	0.048 †			-0.020	0.070
Unemployed/No father			-0.038	0.047			-0.052	0.072
DK			-0.029	0.010			-0.023	0.037
Educational status at Wave1 (Ref: Post secondary)								
Secondary			-0.056 **	0.054 †			-0.069 **	0.075 †
Undergraduate or more			-0.021	0.034			-0.014	0.074 †
First job (Ref: Other occupations)								
Professional/Managerial			-0.049 **	-0.038			-0.069 **	-0.078 *
Non-manual in large-sized firm			0.012	0.021			0.026	0.040
Self-employed			0.105	-0.121			0.125	-0.174
DK			-0.071 **	0.062			-0.101 **	0.067
Household income (Ref: 150-350 million JPY)								
150 million JPY or less			0.090	-0.078			0.141	-0.134
350-600 million JPY			0.016	-0.024			-0.003	-0.118 †
600-850 million JPY			-0.017	-0.116 **			-0.056	-0.230 **
850 million JPY or more			-0.041 †	-0.068			-0.080 *	-0.161 *
DK			0.023	-0.048			0.011	-0.165 *
Marital status at Wave1 (Ref: Married)								
Unmarried			-0.192 ***	0.094 *			-0.273 ***	0.127 *
Divorce/Widowed			-0.193 ***	0.025			-0.322 ***	-0.018
Having children at Wave1			0.027	-0.031			0.091 *	0.010
Crime Victimization Experience			0.048	0.160 *			0.095 †	0.288 *
Experience having got a heavy disease			0.056 **	0.003			0.077 **	0.007
Home atmosphere at 15 years old			-0.010	-0.066 ***			-0.024 *	-0.100 ***
Variances of random intercepts					0.051 ***	0.004 ***	0.331 ***	0.240 ***
Covariance of two random intercepts					-0.04 †		0.01	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$ (Two-tailed test)

Note1) Standard errors in all of the models are robust ones.

Note2) Other variances, covariances, and intercepts are not shown in this table.

東京大学社会科学研究所パネル調査プロジェクトについて

労働市場の構造変動、急激な少子高齢化、グローバル化の進展などにもない、日本社会における就業、結婚、家族、教育、意識、ライフスタイルのあり方は大きく変化を遂げようとしている。これからの日本社会がどのような方向に進むのかを考える上で、現在生じている変化がどのような原因によるものなのか、あるいはどこが変化してどこが変化していないのかを明確にすることはきわめて重要である。

本プロジェクトは、こうした問題をパネル調査の手法を用いることによって、実証的に解明することを研究課題とするものである。このため社会科学研究所では、若年パネル調査、壮年パネル調査、高卒パネル調査、中学生親子パネル調査の4つのパネル調査を実施している。

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東京大学社会科学研究所パネル調査プロジェクト ディスカッションペーパーシリーズについて

東京大学社会科学研究所パネル調査プロジェクトディスカッションペーパーシリーズは、東京大学社会科学研究所におけるパネル調査プロジェクト関連の研究成果を、速報性を重視し暫定的にまとめたものである。



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