






CSRDA Discussion Paper

Life Course Study on Adult Health and Social Exclusion in Japan

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Introduction

The need to focus on social exclusion in adulthood

The purpose of this study is to empirically clarify the process by which social exclusion interferes with health in adulthood. Social exclusion is considered a major social determinant of health inequalities; however, research on the relationship between social exclusion and health is in its initial stages (van Bergen 2014). This is because most early quantitative studies considered the dimension of health as one of the indicators of social exclusion along with other dimensions, such as economic status, unemployment, lack of political involvement, and social isolation (e.g., EU Commission 2000; Halleröd and Larsson 2008).

For example, the EU Commission (2000), which produced the first empirical report on social exclusion, considered subjective health to be one of the indicators of social exclusion. Some previous studies have considered only the economic, social, and political dimensions of social exclusion, and have not discussed the health dimension (e.g., Burchardt et al. 1999).

Consequently, the relationship between health status and other economic and social dimensions used as indicators of social exclusion has been overlooked. Sacker et al. (2017) pointed out that because health and social exclusion are seemingly independent, the relationship between the two has been overlooked. They used panel data for people over 65 years of age and found that poor health is likely to lead to social exclusion one to two years later and that social exclusion causes a subsequent decline in health status.

Since the work of Sacker et al. (2017), health has increasingly been addressed as a cause or consequence of social exclusion. For example, Prattley et al. (2020) stated that social exclusion is associated with poorer health and quality of life and that age is associated with increased social exclusion. This means that elderly people who experience cumulative risks throughout their life course are particularly vulnerable to situations of social exclusion.

Saito et al. (2012) addressed health status as an outcome for elderly people. Specifically, using panel data (for four years beginning in 2003), the study clarified the effects of relative poverty, social isolation, and nonparticipation in social activities on mortality rates among elderly individuals aged 65 years and older in Aichi Prefecture, Japan. Similar to Saito et al. (2012), Momose (2021) focused on elderly individuals; however, the latter study addressed health status as a cause. The study revealed the impacts of disease and difficulties in childhood, early adolescence, late adolescence, mature adulthood, and advanced age on social exclusion; these impacts occur simultaneously with persistent poverty and isolation in old age. Although a growing number of studies have focused on the relationship between health and social exclusion, there is insufficient research on adulthood.

As mentioned, the major international empirical studies on the relationship between health and social exclusion have focused mainly on elderly individuals, including those in Japan (e.g., Saito 2012; Sacker et al. 2017; Feng et al. 2019; Prattley et al. 2020; Momose 2021; Hossain et al. 2022). Empirical research on social exclusion and exclusion has

examined a diverse range of subjects. However, with regard to research on the relationship between health and social exclusion, there have been few studies on adulthood (working-age adults aged 15-59, excluding those who are neither in school nor elderly).

Quantitative research on social exclusion has been conducted on whole generations in early studies, while later studies have focused on a single area, mainly the situation in different countries and sociological issues. There is a tendency to focus on specific groups identified as being at risk of exclusion with diverse subjects, such as people who are long-term or temporarily unemployed, those in precarious or unskilled jobs, elderly people, those who are not protected by labor laws, the low-wage poor, single parents, young people, and people without work experience or qualifications (Silver 1994: 548-549). Other recent studies on NEET have examined social exclusion after graduation (e.g., Bynner and Parsons 2002).

Nevertheless, studies on social exclusion in adulthood have pointed to a lack of research on young people, especially those in their twenties and thirties. Figgou et al. (2021) mentioned that the lack of studies on social exclusion in young people is surprising given that young people are disproportionately affected by rising unemployment rates. Studies on youth and young people, as noted earlier, also consider the dimension of health as one of the indicators of social exclusion (e.g., Peruzzi 2015), so the relationship between the two has been overlooked. In empirical research on the relationship between health and social exclusion, it is important to target young people. However, to demonstrate the relationship between health and social exclusion in adulthood, is it important to study only youth and young adults or is it also necessary to study other working-age people, including those in their forties and fifties?

Given the current state of Japanese society, where the concept of “Zen Sedai Gata Syakai Hosyoku” (social security for all generations) (Cabinet Secretariat 2022) is under consideration, it is necessary to focus on adults, including young adults. In Japan, the safety net in adulthood is weak. This problem has recently prompted a need to reduce the safety net gap in adulthood because if the traditional system is followed, it will lead to the creation of difficult situations in the future for elderly individuals.

The current debate on social security for all generations is problematic because, as Sakai (2020) noted, the government is considering social security for all generations due to the fragility of the safety net in adulthood, but this social policy is biased toward the generation that is raising children. The following principles were proposed at the conference to discuss social security for all generations. To achieve a virtuous cycle of social growth and distribution, it is necessary to build a social security system for all generations that ensures a balance between benefits and burdens and that provides security for all generations, including those in their prime, in middle age, and in their elderly years (Cabinet Secretariat 2022, 1). Despite this philosophy, the conference, which was held in May 2022 and which organized interim discussions regarding the development of social security for all generations (May 2022 conference), placed the topic of balancing work and child-rearing at

the center of the discussion.

If the government aims to consider social security for all generations, why has the discussion been biased toward the child-rearing generation? There are several possible reasons, but one of them may be that the problems that the working-age population face and the ways that they face these problems have not been sufficiently clarified.

Although it is recognized that the problems of building a safety net for all generations are multidimensional, no specific support policies were put in place at the May 2022 conference. As a result of the conference, it was concluded that the increase in the number of people and households that experienced problems of isolation or loneliness and that lived in poverty is a problem for all generations. However, as a specific measure, it was only stated that it is important to provide consultation support from social workers and to develop a general support system through multiagency collaboration.

The importance of consultative support from social workers that was established at the May 2022 conference cannot be denied. However, consultative support alone is not sufficient. The problem is that consultation sometimes occurs without the identification of concrete solutions.

Even if multiagency collaboration is performed, it is difficult to provide support unless the underlying causes of the problems are clarified in the case of multidimensional difficulties. If the mechanism of multidimensional difficulties remains unclear, no concrete measures for the development of a support system will emerge. As a process to solve this problem, this paper first identifies who experiences what difficulties and how these difficulties affect them and then moves on to discuss what kind of support is needed.

This study clarifies the process by which social exclusion leads to mental and physical problems in adulthood. Specifically, the study examines the mechanisms by which social exclusion is linked to health problems after considering the economic (e.g., living in poverty) and social (e.g., experiencing isolation and loneliness) dimensions as situations of social exclusion in childhood and adulthood. These economic and social dimensions are an important issue for social security to cover all generations and constitute an urgent social policy issue that is being discussed by the Japanese government.

It is important to focus attention on these issues not only in Japan but also in other countries that are facing similar problems. There are three reasons. The first reason is that previous studies have not clarified how the most important dimensions of social exclusion, the economic and social dimensions, are related to health conditions. Sacker et al. (2017) considered three areas of social exclusion: service provision and access, civic participation, and social relations and resources. Prattley et al. (2020) also considered access to services and amenities, civic participation, cultural and leisure activities, and social relations. The debate continues regarding what the dimensions of social exclusion are. However, given the paradigm shift from poverty to social exclusion, which is characterized by multiple dimensions and dynamics, it is important to address both economic and social aspects. Poverty research has focused on only one economic dimension, such as relative poverty. In

contrast, the importance of the social as well as economic dimension has been recognized, and research on social exclusion has advanced.

The second reason is that previous studies have not considered the importance of each dimension. These studies have created a social exclusion index by adding the items of social exclusion and then identifying the relationship between social exclusion and health. Calculating a social exclusion index allows for a focus on individuals who are excluded from many dimensions. However, this makes it difficult to compare which dimension is the most important. When comparing these situations, it is important to consider whether the situation of social exclusion is temporary, persistent or cumulative. This is because the theory of social exclusion focuses on whether the fact of economic poverty and the inability to lead a comfortable social life are temporary or permanent (Tachibanaki and Urakawa 2006). The concept of social exclusion is significant for extending the analysis to the nature of human life over a long period of time.

The third reason is that previous studies that attempted to identify the relationship between social exclusion and health have rarely included a childhood perspective. For example, Abe (2010) and Momose (2021) demonstrated that childhood influences are linked to current social exclusion. Therefore, this study considers the entire life course, including social exclusion not only in adulthood but also in childhood.

Life course research on social exclusion

The need to consider the entire life course has been emphasized since Lenoir ([1974]1989), who initially proposed the concept of social exclusion. Lenoir ([1974]1989) was concerned about the “snowball effect”, whereby childhood difficulties accumulate in adulthood or a similar chain of transgenerational events occurs when one becomes a parent.

The problems faced by socially excluded people are diverse and include problems related to health, poverty, human relations, education, family, and social class. Byrne (1999) noted that disparities in access to collective services directly define day-to-day living conditions and that these disparities determine, even partially, the direction of the subsequent life course. This study states that disparities in access to schooling are a cause of social fragmentation.

As noted above, early theoretical work on social exclusion highlighted the importance of considering the life course. More recently, Dewilde (2003), Zinn (2013), Foster and Hagan (2015), and others have emphasized the importance of analyses that consider the entire life course beyond individual and intergenerational aspects.

On the other hand, life course research originally was conducted in a different context than research on social exclusion and has been growing since the 1960s, with longitudinal studies focusing on the causal relationship between health and illness. Bernardi et al. (2019) summarized the development of life course research as follows. Sociologists first created the

concept of the "life course" and gave it conceptual structure. Just as psychologists created the concept of the "life span" in the 1960s and 1970s, research on the life course emerged from gerontology. Gerontologists needed to account for a long-lived past in order to understand the last decades of life.

Sociology and psychology, despite having similar research interests, engage in different levels of analysis and focus on different explained and dependent variables. A sociologist focuses on external factors such as social circumstances beyond interpersonal relationships as well as socially structured life course inequalities related to race, class, gender, or other aspects of social life. On the other hand, a psychologist focuses on internal factors, such as the effects of social and emotional factors.

Developments related to life course research have occurred outside of psychology and sociology. These include cohort effects in demography, life cycle theory in economics, life history theory in anthropology, life cycle in biology, age structuration theory in social anthropology, prosopography, life story, and oral history approaches in historical science, delinquent careers in criminology, and the modelling of pathways linking early life circumstances and subsequent health outcomes in epidemiology (Bernardi et al. 2019:1-2).

While research on the life course is advancing in various fields, in epidemiology, attention to life course research focusing on health and disease has increased in recent years with Kuh and Ben-shlomo's (1997) establishment of the field of life course epidemiology. This field addresses the long-term effects on adult disease risk of physical and social exposure during the fetal, childhood, adolescence, young adulthood, and later adulthood stages with a focus on the life course. The goal of this field is to elucidate the biological, behavioral, and psychosocial processes that act across an individual's life course and across generations to influence the development of disease risk (Kuh and Ben-shlomo 1997; Kuh et al. 2003).

Life course epidemiology is particularly relevant to understanding and addressing health inequalities and the social determinants of health (SDH) (Marmot and Wilkinson 1999, 2006), which are non-medical factors (social, economic, and political) that influence health inequalities. Since the 2000s, health inequalities (Kawachi and Kennedy 2002) have been proposed and it has been noted that social stratification, such as income, employment status, and educational background, have a negative impact on the health conditions of individuals. Research on health inequalities by social stratification has been conducted in sociology as well as economics, medicine/public health, psychology, and other sciences from their particular standpoints.

More recently, expectations have emerged for a wider and deeper understanding of the phenomenon of social stratification and health by promoting research as a single integrated field called the science of social stratification and health. Despite the interdisciplinary approach, it is also necessary to adopt a life course perspective on the relationship between social class and health (Kawakami et al. 2015).

Understanding health inequalities requires tracking of the health conditions of

different groups of people as well as consideration of multiple dimensions, such as social disadvantage and discrimination. A major focus of life course epidemiology leads to an understanding of how early life experiences (especially economic adversity and associated socially disadvantageous experiences) have an impact on health (chronic diseases and factors leading to chronic diseases) in adulthood (Braveman and Barclay 2009).

According to Ojima and Kondo (2011), research on health inequalities and SDH has progressed to elucidate the relationship between lifestyle habits in adulthood and subsequent lifestyle-related diseases. Therefore, as the next research step, it is important to elucidate important factors during childhood and the fetal period that cannot be changed through the efforts of the individual. This has led to increased attention to life course epidemiology, which integrates biological and socioeconomic factors to elucidate causal relationships and mechanisms, including whether various factors are true causes, confounders, or intermediate steps.

There are four general life course models in life course research in relation to health and illness: the sensitive period model, the accumulation life course model, the pathway model, and the social mobility model (Kuh et al. 2003; Hallqvist et al. 2004; Ojima and Kondo 2011; Harris and Schorpp 2018).

The sensitive period model suggests that early childhood exposure has a stronger impact on health outcomes than exposure in other life stages because problems during this sensitive period may manifest later in life. The effects during the sensitive period of childhood generally have latency periods, and health effects may not appear until a decade or more later. Similar to the sensitive period is the concept of critical periods.

In the sensitive period, effects appear at other times, whereas in the critical period, effects appear only during that period of exposure and not at other times. Strictly speaking, there is a difference between the sensitive period and the critical period as described above, but these terms are often used without a clear distinction. In other words, the sensitive period model can reveal timing effects to determine whether childhood conditions are a risk factor in adulthood.

The cumulative life course model holds that multiple exposures throughout life interact and have a synergistic effect on health outcomes. For example, the gradual accumulation of various factors over the course of a person's life can lead to poor health in adulthood. Specifically, poverty experienced only in childhood is no more detrimental to subsequent adult health than poverty that occurs throughout childhood, adolescence, and adulthood. Other situations that the model reveals include the cumulative effects of traffic accidents, unemployment, and spousal deaths, which lead to poor health in adulthood. This model is also referred to as the accumulation of risk.

The pathway model, referred to as the chain of risk model, traces how social exposure at one life stage affects subsequent exposures. For example, the relationship between early life status and adult health as well as illness may be explained by the pathways through which early socioeconomic status (SES) determines adult SES. Other hypothesized pathways

include economic difficulties caused by unemployment, which may lead to the deterioration of marital relationships and domestic violence and ultimately to divorce.

The fourth life course model, the social mobility model, assumes that social and economic mobility can affect health outcomes. Upward mobility may mitigate the adverse effects of childhood adversity, while downward mobility is detrimental to health. Therefore, this model predicts that the health effects of exposure in young adulthood can be modified by SES in later years. This is because upward mobility mitigates the adverse effects of adversity in young adulthood. While this model provides a framework for considering the role of social mobility in shaping health outcomes, it is difficult to isolate its unique effects from other life course models.

Among the four life course models, the sensitive period model and the cumulative life course model are the models of interest in life course epidemiology when examining why factors early in life, including the fetal and childhood periods, present a risk for disease in adulthood (Ojima and Kondo 2011). According to Kuh et al. (2003), the cumulative life course model is a concept that refers to causal pathways in relation to time, while the sensitive period model is concerned with the timing of causal action. Early life in this context refers to experiences up to the age of eighteen. For example, there has been a recent focus on studies of adverse childhood experiences (ACE), which identify how multiple adverse childhood experiences affect later health inequalities. Using these life course models, this group of studies has focused on negative life experiences and stressful events such as child abuse, poverty, and bullying prior to age eighteen (e.g., Rutter 1985; Hughes et al. 2017).

Of the general life course models described above, the sensitive period model in particular is considered have a similar perspective for conducting life course research on the relationship between social exclusion and health in this study. This is because it examines the timing of causal effects, such as whether social exclusion in childhood has a stronger impact on health than social exclusion in adulthood. However, this study also includes perspectives unique to social exclusion research, such as whether social exclusion is temporary or persistent. While it is debatable to what extent this model is compatible with life course research, it is possible to analyze it from a life course perspective.

This life course study is based on social exclusion in childhood and adulthood, particularly in terms of the economic and social dimensions. This study focuses on these dimensions for two reasons.

The first reason is that the economic and social dimensions are highly important in childhood. Child poverty (Abe 2008) is an economic dimension of social exclusion. Income, material deprivation and subjective poverty are all important. These economic dimensions are important indicators of social exclusion in empirical studies (Tsakloglou and Papadopoulos 2002, Abe 2010). In terms of social dimensions, this study focuses on friendships and family environments. A lack of friendships in childhood presents a risk of being a target of bullying, and family relationships are an important dimension for children (Ridge 2002).

Second, political and cultural dimensions are sometimes considered dimensions of social exclusion, but compared to economic and social dimensions, political and cultural dimensions are considered less important than social exclusion in childhood. For example, in the political dimension (Nishimura and Uzuki 2007; Sloam 2007) of social exclusion, one common difficulty is a lack of political participation. Therefore, it can be said that problems arise in adulthood when people have the right to vote. Additionally, in the cultural dimension (Higuchi 2004; Mikulionienė et al. 2021) of social exclusion, occupational identity is often discussed. It is not until adulthood when an individual completes his or her education and enters an occupation that occupational identity becomes an issue. Considering the above, this study examines the economic and social dimensions of social exclusion in both childhood and adulthood.

Notably, this study does not consider the labor market as a major dimension. The reasons for this are the exclusion of a considerable number of subjects from the analysis who are unable to participate in the labor market and the risk of mixing causes (an employment history that is disadvantageous in the labor market) and consequences (exclusion) (Tsakloglou and Papadopoulos 2002). Regardless of employment status, this study focuses on the economic dimensions of relative poverty, material deprivation, and subjective poverty, as well as the social dimensions of friendships and family relationships, and examines their effects on mental and physical health problems in adulthood.

Research Methods

Data

The data are from the "Japanese Life Course Panel Surveys; JLPS" of the Institute of Social Science at the University of Tokyo, which covers people aged 20-40 (born between 1966 and 1986) as of 2007. This is part of the panel data covering all of Japan.

This study uses a continuous sample from 2007 to 2017 (waves 1-11). There are two reasons for using 11 years of data. The first is that the survey asks about childhood circumstances retrospectively in 2007 (wave 1) and 2008 (wave 2). The second reason is to examine the effects of the accumulation of ten years of social exclusion in adulthood leading to physical and mental illness in adulthood.

For the situation in adulthood, data from the period of 2007-2016 (waves 1-10) are used. Therefore, this study compares the difference between two impacts. The first is the medium-long-term impact, in which the cumulative economic and social dimensions over ten years lead to physical and mental illness in 2017 (wave 11). The other is the short-term impact, in which the economic and social dimensions of 2016 (wave 10), i.e., at one point in time, lead to physical and mental illness in 2017 (wave 11), i.e., at the next point in time. This study compares cumulative social exclusion over ten years with temporary social

exclusion. These comparisons are intended to take into account whether the situation of social exclusion is a temporary situation or a persistent or cumulative one, as Tachibanaki and Urakawa (2006) note. It is conceivable that physical and mental health problems in adulthood may also change from one point in time to another. However, this study first examines the difference between medium-long-term and short-term effects because research on the relationship between social exclusion and health is in its early stages.

Variables

Three physical and mental problems (poor subjective health, mental disorders, and activity restriction caused by health problems) were used as dependent variables. Subjective health was assessed using a five-question scale (Table 1). If the respondent's health was "not so poor" or "poor," this was defined as "poor subjective health." For mental health, the JLPS used the five-item version of the Mental Health Inventory (MHI-5). The MHI-5 uses values ranging from 0 to 100 points. Using this scale with the cut-offs defined by Yamazaki et al. (2005), the respondents were categorized as severe (0-52 points), moderate (53-60 points), mild (61-68 points), and healthy (69-100 points). Severe and moderate subjects were classified as having "mental disorders." Activity restriction caused by health problems was identified by a 5-question set that asked about the inability to perform housework or work due to health reasons in the past month, with "sometimes," "almost always" and "always" indicating "activity restriction." Time-invariant variables were used for mental and physical problems because it was necessary to clarify whether the current health status was poor due to the effects of the previous year's social exclusion. As noted above, the relationship between social exclusion and health is in the early stages of examination.

The independent variables were as follows. For the economic dimension of adulthood, the indicators of relative poverty, material deprivation, and subjective poverty were used. Relative poverty was calculated as an indicator like the relative poverty rate, which is calculated by dividing household income by the square root of the number of people living together, with less than 50% of the median representing relative poverty. For each of the years from 2007-2016 (waves 1-10), a dummy variable was created with a value of 1 for less than 50% of the median and 0 for the others. The reason for using a dummy variable is that low income is not the issue; rather, the policy focus is often on whether a person is above or below the poverty line.

Six items were used to assess material deprivation (a phone, including a mobile phone; a refrigerator; a bath; a cooler/air conditioner; a computer/word processor; and a passenger car). These items were owned by more than 80% of respondents from 2007-2016 (waves 1-10)¹⁾. Material deprivation was equal to 1 if the respondent did not have two or more items and 0 otherwise²⁾.

Subjective poverty was measured using the current living arrangements variable (2007-

2016, waves 1-10). Respondents were asked about their current living conditions using a five-question scale: “affluent,” “somewhat affluent,” “normal,” “somewhat poor,” and “poor.” A dummy variable was created, with 1 indicating a response of “somewhat poor” or “poor” for current living conditions and 0 indicating all other responses.

The economic dimensions of childhood are not always easy to ascertain. It is desirable to use variables that indicate childhood circumstances such as those of relative poverty; however, since childhood income is derived from the parents, the exact income is not known. To capture the economic dimensions of childhood, the OECD's International Survey of Adult Competencies (PIAAC) or Program for International Student Assessment (PISA) uses the number of books at home at age 15 as a surrogate indicator (e.g., Hampf and Woessmann 2017; OECD 2018). Cathles et al. (2021) stated that “the number of books in the home can be a proxy for income, or for family ‘culture’ towards learning” (Cathles et al. 2021:7) and used the number of books in a household as a socioeconomic variable. This may be because the number of books in the home is associated with poverty in families with children. Bradley et al. (2001) concluded that non-poor children were much more likely than poor children to have 10 or more developmentally appropriate books. They found that this trend was confirmed for all ethnic groups in the United States. Therefore, this study also used the number of books to represent the status of childhood income.

Respondents were asked about the number of books they had in their homes at age 15 in the following 10 categories: 0 (no books at home), 10 or fewer books, 11-25 books, 26-50 books, 51-100 books, 101-200 books, 201-500 books, 501 or more books, do not know, and no response. The responses for these categorical variables were replaced with quantitative variables, taking the median value for each category. For “do not know” and “no response,” the overall mean was assigned. In addition, a dummy variable was created, with 1 for fewer than ten books and 0 for all others.

Material deprivation in childhood was based on 8 of the 20 items of goods and resources that were in the home at age 15 and that were possessed by 80% or more of the respondents (a satellite and cable TV; a refrigerator; a bath; a study desk; a phone, including a mobile phone; a radio; a passenger car; and a VCR and DVD recorder). As in adulthood, material deprivation was equal to 1 for not having two or more items and 0 otherwise. For subjective poverty, the dummy variable was 1 if the respondent selected “somewhat poor” or “poor” as his or her living situation at age 15.

Friendships and family relationships were used as the social dimensions of adulthood. For friendships, a dummy variable was used, with 1 corresponding to “I have no friends” (2007-2016, waves 1-10). For family relationships, an item assessing satisfaction with the relationship with parents was used, and the variable of “parental dissatisfaction” was set to 1 if the respondent was dissatisfied (2010-2016, waves 4-10).

The social dimension of childhood, as in adulthood, involves friendships and family relationships. A variable related to school bullying victimization was used for friendships. As Ridge (2002) pointed out, a lack of friendships in childhood is one of the risks of being

a target for bullying. Children who are victims of bullying indicate that they do not have friends. This study used school bullying victimization as the variable for childhood friendships.

Regarding bullying victimization at school, respondents were asked retrospectively whether they had experienced bullying in the past, and the variable was set to 1, if applicable. Regarding family relationships, a variable related to the family atmosphere during childhood was used: the family atmosphere at age 15 was asked using a four-question method, and the variable was set to 1 if the atmosphere was negative.

As explained above, dummy variables were used for variables related to various aspects of social exclusion in childhood. Regarding variables related to social exclusion in adulthood, a dummy variable for 2016 (wave 10) and a quantitative variable calculating the rate of experiencing situations with difficulties between 2007 and 2016 (waves 1 to 10) were used³⁾. The former allowed us to examine short-term effects (temporary effects before one point in time) on physical and mental health problems in 2017 (wave 11), while the latter allowed us to examine medium-long-term effects (cumulative effects over the past approximately ten years).

Table 1 Descriptive Statistics: N=1,831

Dependent Variable	Mean	Std. dev.	Min	Max	Control Variables	Mean	Std. dev.	Min	Max
Physical and Mental Problems					Male Dummy	0.44	0.50	0	1
Poor Subjective Health	0.19	0.39	0	1	Age (w1)	31.72	5.58	20	40
Mental Disorders	0.46	0.50	0	1	Illness/Disability before Age 18	0.03	0.18	0	1
Activity Restriction	0.15	0.36	0	1	Father's Work Style at Age 15				
Independent Variable					Management/Full-time Employment	0.71	0.45	0	1
Childhood					Non-employed	0.01	0.11	0	1
Economic Dimensions					Self-employed, etc.	0.22	0.41	0	1
Number of Books at Age 15	0.13	0.33	0	1	Unemployed	0.00	0.06	0	1
Material Deprivation at Age 15	0.14	0.35	0	1	Father Gone at the Time	0.04	0.19	0	1
Subjective Poverty at Age 15	0.17	0.37	0	1	Unknown	0.02	0.12	0	1
Social Dimensions					Mother's Work Style at Age 15				
Bullying Victimization at School	0.22	0.42	0	1	Management/Full-time Employment	0.19	0.39	0	1
Bad Family Atmosphere at Age 15	0.17	0.38	0	1	Non-employed	0.34	0.47	0	1
Temporary Social Exclusion in Adulthood (2016, w10)					Self-employed, etc.	0.19	0.39	0	1
Economic Dimensions					Unemployed	0.24	0.43	0	1
Relative Poverty (w10)	0.10	0.29	0	1	Mother Gone at the Time	0.01	0.08	0	1
Material Deprivation (w10)	0.05	0.22	0	1	Unknown	0.04	0.20	0	1
Subjective Poverty (w10)	0.16	0.37	0	1	Father's Education				
Social Dimensions					Non-higher Education	0.63	0.48	0	1
Friendlessness (w10)	0.02	0.15	0	1	Higher Education	0.27	0.44	0	1
Parental Dissatisfaction (w10)	0.05	0.23	0	1	Unknown	0.11	0.31	0	1
Cumulative Social Exclusion in Adulthood (2007-16, w1-10)					Mother's Education				
Economic Dimensions					Non-higher Education	0.75	0.44	0	1
Relative Poverty Incidence(w1-10)	0.09	0.20	0	1	Higher Education	0.16	0.36	0	1
Material Deprivation Incidence(w1-10)	0.04	0.14	0	1	Unknown	0.10	0.30	0	1
Subjective Poverty Incidence(w1-10)	0.16	0.27	0	1	Home Ownership at Age 15	0.78	0.42	0	1
Social Dimensions					Disability Pensions Incidence (w1-10)	0.01	0.09	0	1
Friendlessness Incidence (w1-10)	0.01	0.08	0	0.9	School (w1-10)	0.18	0.71	0	6
Parental Dissatisfaction Incidence (w1-10)	0.06	0.16	0	1					

Non-higher Education: Junior High School, High School and Vocational Graduation.Higher Education: Junior College, College of Technology, University and Graduate School.

Regarding the control variables, the individual attributes that were controlled for were gender and age. In addition to these variables, the presence or absence of illness/disability before age 18 was also controlled, and it was possible to examine whether acquired secondary disabilities resulting from multidimensional difficulties, regardless of inherent illness or disability, led to mental and physical problems. Other control variables were the father's and mother's work styles when the child was aged 15, the father's and mother's education, and

home ownership when the child was aged 15. Moreover, a variable for receipt of disability pensions was used, which was a quantitative variable calculating the rate at which a person received the benefit between 2007 and 2016 (waves 1-10), respectively, setting the rate at 1 if the person received the benefit and 0 if the person did not. When conducting causality analysis using panel data, dependent variables at a past point in time are sometimes controlled to eliminate the effects of unobserved heterogeneity. However, in this study, variables related to health status in adulthood prior to 2017 (wave 11) were not controlled to avoid overcontrol bias (Elwert and Winship 2014) because of the use of variables related to childhood status as independent variables.

To focus on the working population, a variable for school attendance counts (waves 1-10) was used. This variable was created by creating a dummy variable for those enrolled in school in each year between 2007 and 2016 (waves 1-10), with 1 being the number of those enrolled in school in each year, and then adding up the ten years.

Analytical Methods

The present study aimed to examine the effects of economic and social dimensions in childhood and adulthood on physical and mental health problems. Binomial logistic regression analysis was employed, using dummy variables for poor subjective health, mental disorders, and activity restriction caused by health problems in 2017 (wave 11) as dependent variables.

In Model 1, the variables for the economic and social aspects of childhood were used as independent variables. In Model 2, in addition to the variables for childhood in Model 1, the variables for economic and social aspects of adulthood in 2016 (wave 10) were input. In Model 3, variables for the economic and social aspects of adulthood from 2007 to 2016 (waves 1-10) were additionally entered into Model 1.

Model 2 focused on exploring the impact of social exclusion in adulthood before one point in time on mental and physical disability in adulthood, while Model 3 showed the impact of cumulative social exclusion over ten years. Models 1 through 3 were analyzed controlling for gender, age, illness/disability before age 18, fathers' and mothers' work style at age 15, fathers' and mothers' education, home ownership at age 15, disability pension receipt rate, and school attendance counts.

Analysis Results

Table 2 shows the results of the binomial logistic regression analysis with three dependent variables: poor subjective health, mental disorders, and activity restrictions caused by health problems. This section examines each of these in turn.

**Table 2 Binomial Logistic Regression Analysis
with Mental and Physical Problems (wave 11 as of 2017) as Dependent Variable**

	Poor Subjective Health			Mental Disorders			Activity Restriction		
	Model 1 <i>Odds ratio</i>	Model 2 <i>Odds ratio</i>	Model 3 <i>Odds ratio</i>	Model 1 <i>Odds ratio</i>	Model 2 <i>Odds ratio</i>	Model 3 <i>Odds ratio</i>	Model 1 <i>Odds ratio</i>	Model 2 <i>Odds ratio</i>	Model 3 <i>Odds ratio</i>
Childhood									
Economic Dimensions									
Number of Books at Age 15	1.01	1.00	0.98	1.19	1.21	1.17	0.98	0.98	0.97
Material Deprivation at Age 15	1.05	1.06	1.07	1.13	1.13	1.12	1.56 *	1.56 *	1.59 *
Subjective Poverty at Age 15	1.44 *	1.29	1.18	1.26	1.18	1.08	1.23	1.20	1.13
Social Dimensions									
Bullying Victimization at School	1.73 **	1.57 **	1.61 **	1.59 **	1.50 **	1.48 **	1.96 **	1.93 **	1.90 **
Bad Family Atmosphere at Age 15	1.72 **	1.73 **	1.60 **	1.52 **	1.48 **	1.31 *	1.45 *	1.46 *	1.31
Temporary Social Exclusion in Adulthood (2016, w10)									
Economic Dimensions									
Relative Poverty (w10)		1.12			0.84			1.17	
Material Deprivation (w10)		1.02			1.45			0.93	
Subjective Poverty (w10)		2.36 **			1.79 **			1.19	
Social Dimensions									
Friendlessness (w10)		2.20 *			1.46			1.00	
Parental Dissatisfaction (w10)		1.32			1.57 *			0.84	
Cumulative Social Exclusion in Adulthood (2007-16, w1-10)									
Economic Dimensions									
Relative Poverty Incidence(w1-10)			0.82			0.78			0.77
Material Deprivation Incidence(w1-10)			0.96			1.98			1.13
Subjective Poverty Incidence(w1-10)			3.40 **			2.45 **			1.35
Social Dimensions									
Friendlessness Incidence (w1-10)			1.96			1.98			1.29
Parental Dissatisfaction Incidence (w1-10)			2.17 *			5.68 **			2.86 **
Control Variables									
Male Dummy	1.05	1.04	1.02	0.96	0.95	0.93	0.68 **	0.68 **	0.66 **
Age (w1)	1.02	1.02	1.02	1.00	1.00	0.99	0.98	0.98	0.97 *
Illness/Disability before Age 18	2.28 **	2.17 **	2.17 **	1.28	1.26	1.21	3.07 **	3.01 **	2.99 **
Father's Work Style at Age 15 (Ref: Management/Full-time Employment)									
Non-employed	1.80	1.66	1.52	0.86	0.77	0.71	0.77	0.76	0.71
Self-employed, etc.	0.89	0.86	0.85	1.03	1.03	0.99	1.03	1.02	1.01
Unemployed	0.42	0.52	0.47	0.45	0.49	0.46	0.84	0.89	0.88
Father Gone at the Time	1.58	1.61	1.50	0.98	0.98	0.91	0.98	1.00	0.97
Unknown	0.70	0.65	0.66	0.65	0.62	0.59	0.72	0.73	0.72
Mother's Work Style at Age 15 (Ref: Management/Full-time Employment)									
Non-employed	0.94	0.96	0.94	0.95	0.97	0.96	0.82	0.82	0.82
Self-employed, etc.	1.24	1.28	1.27	0.83	0.83	0.83	0.70	0.70	0.70
Unemployed	1.28	1.30	1.26	1.08	1.10	1.06	0.84	0.84	0.82
Mother Gone at the Time	1.78	1.59	1.51	3.94 *	3.43	3.49	1.16	1.20	1.03
Unknown	0.67	0.68	0.69	0.97	0.99	1.01	0.41	0.41	0.42
Father's Education (Ref: Non-higher Education)									
Higher Education	0.82	0.86	0.85	0.88	0.90	0.88	1.19	1.21	1.19
Unknown	0.86	0.81	0.78	0.91	0.89	0.85	0.92	0.92	0.87
Mother's Education (Ref: Non-higher Education)									
Higher Education	1.19	1.22	1.22	0.84	0.86	0.88	1.00	1.00	1.03
Unknown	1.27	1.24	1.27	1.01	1.00	0.99	1.36	1.35	1.37
Home Ownership at Age 15	1.02	1.03	1.05	0.92	0.94	0.95	0.92	0.92	0.94
Disability Pensions Incidence (w1-10)	1.70	1.56	1.72	0.52	0.46	0.44	1.36	1.35	1.39
School (w1-10)	1.11	1.12	1.10	1.11	1.11	1.08	1.17	1.17	1.15
constant	0.07 **	0.06 **	0.06 **	0.85	0.77	0.78	0.36 *	0.35 *	0.36 *
N	1,831								
Pseudo R2	0.04	0.07	0.07	0.02	0.03	0.05	0.05	0.06	0.06

**p <.01, *p <.05. (Bilateral Verification).

In Model 1, with poor subjective health as the dependent variable, experiencing “subjective poverty at age 15,” which is an economic dimension of childhood, and “bullying victimization at school” and “negative family atmosphere at age 15,” which are social dimensions of childhood, were associated with poor subjective health in 2017 (wave 11). The odds ratio for “bullying victimization at school” was the highest at 1.73.

When the situation in adulthood before the one-time point was added in Model 2, the effect of the economic dimension of childhood, “subjective poverty at age 15,” became statistically insignificant, but the effect of the social dimension of childhood remained. In the economic dimension of adulthood, subjective poverty (wave 10) before the age of one point in time was found to influence poor subjective health. The social dimension of adulthood, “friendlessness (wave 10),” also influenced poor subjective health. The odds ratios showed that “subjective poverty (wave 10)” in adulthood had the largest effect on poor subjective health, at 2.36, followed by “friendlessness (wave 10)” in adulthood, at 2.20; “negative family atmosphere at age 15” in childhood, at 1.73; and “bullying victimization at school” in childhood, at 1.57.

Comparing the odds ratios of Model 1 and Model 2, “negative family atmosphere at age 15” in childhood was larger in Model 2 than in Model 1. Conversely, the odds ratio for bullying victimization at school in childhood was smaller in Model 2 than in Model 1.

In Model 1, as in Model 2, the effects of “bullying victimization at school” and “negative family atmosphere at age 15” in childhood remained. In Model 1, the “subjective poverty incidence (waves 1-10),” which indicates a cumulative situation, was statistically significant. In addition, “parental dissatisfaction incidence (waves 1-10),” which also indicates a cumulative situation, influenced poor subjective health.

Looking at the odds ratios, the cumulative “subjective poverty incidence (waves 1-10)” in adulthood was the largest, at 3.40, followed by “parental dissatisfaction incidence (waves 1-10)”, at 2.17; “bullying victimization at school”, at 1.61; and “negative family atmosphere at age 15”, at 1.60. Comparing the odds ratios of Models 2 and 1, the odds ratio for bullying victimization at school in childhood was greater in Model 1 than in Model 2. In contrast, the odds ratio for “negative family atmosphere at age 15” in childhood was smaller in Model 1 than in Model 2.

The cumulative indicators allowed us to see the impact of social exclusion over the medium-long term. For example, the odds ratio of "subjective poverty incidence (waves 1-10)" in Model 1 was approximately 1.4 times larger than that of "subjective poverty (wave 10)" in Model 2. This means that when both temporary and cumulative situations were observed over ten years, people were more likely to be subjectively unhealthy when difficulties persisted.

In addition, “friendlessness (wave 10)” influenced poor subjective health in Model 2, whereas an effect of “friendlessness (waves 1-10)” was not found in Model 1. Conversely, the effect of “parental dissatisfaction (wave 10)” was not found in Model 2, whereas the “parental dissatisfaction incidence (waves 1-10)” in Model 1 affected poor subjective health. From the above, these results indicate that temporary situations in adulthood and cumulative situations over ten years have different effects on poor subjective health in adulthood.

This study subsequently examined the impact on mental disorders. Model 1 showed that experiencing the social dimension of “bullying victimization at school” or “negative atmosphere at home at age 15” in childhood increased the probability of having a mental health problem in 2017 (wave 11).

From Model 2, it was observed that the influence of social dimensions of childhood as well as poor subjective health remained, even when the situation in adulthood before the one-time point was added. Regarding adulthood, the economic aspect, “subjective poverty (wave 10),” and the social dimension, “parental dissatisfaction (wave 10),” had impacts on mental disorders. Looking at the odds ratios, “subjective poverty (wave 10)” in adulthood was the largest, at 1.79, followed by “parental dissatisfaction (wave 10)” in adulthood, at 1.57; “bullying victimization at school” in childhood, at 1.50; and “negative family atmosphere at age 15” in childhood, at 1.48.

In Model 1, there were still statistically significant effects of “bullying victimization

at school” and “negative family atmosphere at age 15” in childhood. For the variables in adulthood, as in Model 2, the economic dimension, “subjective poverty incidence (waves 1-10),” and the social dimension, “parental dissatisfaction incidence (waves 1-10),” influenced mental disorders. Looking at the odds ratios, the largest was 5.68 for “parental dissatisfaction incidence (waves 1-10)” in adulthood, followed by 2.45 for “subjective poverty incidence (waves 1-10)” in adulthood, 1.48 for “bullying victimization at school” in childhood, and 1.31 for “bad family atmosphere at age 15” in childhood.

The same trend was observed for mental disorders, as this study showed earlier that the impact of medium-to-long-term social exclusion on poor subjective health was greater than that of temporary social exclusion. The odds ratio of “parental dissatisfaction incidence (waves 1-10)” in Model 1 was approximately 3.6 times larger than that of “parental dissatisfaction (wave 10)” in Model 2, and the odds ratio of “subjective poverty incidence (waves 1-10)” in Model 1 was approximately 1.4 times larger than that of “subjective poverty (wave 10)” in Model 2.

Next, this study examined the impact of health problems on activity restriction. Similar to poor subjective health and mental disorder, Model 1 still showed that the social aspect of childhood, the experience of “bullying victimization at school” and “negative family atmosphere at age 15,” affected activity restriction caused by health problems in 2017 (WAVE 11). Furthermore, a similar effect was found for the economic dimension of childhood, “material deprivation at age 15.”

The odds ratio for bullying victimization at school was the highest, at 1.96, followed by material deprivation at age 15, at 1.56, and a negative family atmosphere at age 15, at 1.45. Even after the adult situation at one time point earlier was added to Model 2, no variable with a statistically significant effect on the adult situation was found, and the effect of the childhood situation remained intact.

In Model 1, a “negative family atmosphere at age 15” in childhood, which remained an effect in Model 2, was no longer statistically significant, but the social aspect of childhood, bullying victimization at school, and the economic aspect, material deprivation at age 15, were statistically significant. Regarding the cumulative effects in adulthood, the greater the social dimension, “parental dissatisfaction incidence (waves 1-10)” was, the more likely one was to be restricted in activities due to health problems.

The odds ratio for Model 1 was the largest for “parental dissatisfaction incidence (waves 1-10)” in adulthood, at 2.86, while the odds ratio for “bullying victimization at school” in childhood was 1.90, which was smaller than in Model 2, and the odds ratio for “material deprivation at age 15” in childhood was 1.59, which was larger than in Model 2. In both Model 2 and Model 1, the odds ratio for bullying victimization at school, the social aspect of childhood, was larger than that for material deprivation at age 15, the economic dimension of childhood.

Comparing Model 2 and Model 1 for the situation in adulthood, “parental dissatisfaction incidence (waves 1-10)” had an impact in Model 1, whereas in Model 2,

“parental dissatisfaction (wave 10)” had no statistically significant effect on activity restriction caused by health problems. The incidence of “parental dissatisfaction incidence (waves 1-10)” influenced poor subjective health, mental disorders, and activity restriction caused by health problems, indicating that persistent parental dissatisfaction is more likely to lead to physical and mental health problems.

Conclusion

This study aimed to clarify the mechanisms by which social exclusion (economic and social dimensions) in childhood and adulthood affects mental and physical health problems in adulthood, using panel data covering the entire country of Japan. This study was positioned as a life-course study to elucidate the impact of social exclusion on health.

The analysis revealed the following two findings. First, the social exclusion experienced in childhood has an impact on physical and mental problems in adulthood, even after considering social exclusion in adulthood. Second, short-term effects (temporary effects before one point in time) and medium-long-term effects (cumulative effects accumulated over the past approximately ten years) have different effects on physical and mental problems. Each of these points is discussed below:

First, social exclusion in childhood affects mental and physical health problems in adulthood, even when social exclusion in adulthood is considered. The social dimensions of childhood are friendships (being victimized by bullying at school) and family relationships (a negative family atmosphere at age 15), and one of the economic dimensions is material deprivation (material deprivation at age 15). Among other experiences, being victimized by bullying at school, which is a social dimension in childhood, has an impact on poor subjective health, mental disorders, and activity restrictions caused by health problems, even when temporary or cumulative social exclusion is considered, leading to physical and mental problems in adulthood.

The social dimension of childhood, a negative family atmosphere at age 15, leads to poor subjective health, mental disorders, and activity restrictions caused by health problems, even when temporary social exclusion is considered. Even when cumulative social exclusion is considered, poor subjective health and mental disorders are more likely to occur. Furthermore, the economic dimension of childhood, material deprivation at age 15, is more likely to lead to activity restrictions caused by health problems, even when temporary or cumulative social exclusion is considered.

These results were not a sensitive period model in which effects appear at other times of the year but a critical period model in which effects appear only at a specific time of exposure and not at other times (Kuh et al. 2003; Hallqvist et al. 2004; Ojima and Kondo 2011; Harris and Schorpp 2018). In the case of temporary or cumulative social exclusion in adulthood, social exclusion in adulthood has a greater impact on mental and physical health

problems than in childhood. On the other hand, there are cases where a situation of social exclusion appears in childhood but not in adulthood.

Second, short-term effects or medium-long-term effects both influence physical and mental problems. In Sacker et al. (2017), more severe conditions of social exclusion were linked to lower health status. This result was similar to previous studies, although the findings were limited to elderly subjects.

This study expands on previous research to show that the factors leading to mental and physical problems in adulthood differ between short-term social exclusion in adulthood and medium-long-term social exclusion. Temporary social exclusion affects physical and mental problems, but cumulative social exclusion over ten years does not lead to physical and mental problems; conversely, temporary social exclusion has no effect, but only cumulative social exclusion does.

Regarding the social aspect of adulthood, temporary friendlessness affects poor subjective health, but this effect is not found for cumulative friendlessness. On the other hand, cumulative parental dissatisfaction leads to poor subjective health and activity restriction, but this trend is not observed for the temporary situation. Therefore, there is a danger of overlooking or underestimating the cumulative effects if social exclusion is judged solely based on temporary circumstances.

Another result indicated that temporary social exclusion affects mental and physical problems, and cumulative social exclusion also leads to mental and physical problems. Subjective poverty, the economic dimension of adulthood, falls into this category: temporary subjective poverty has an impact on poor subjective health and mental disorders in the following year. Furthermore, cumulative subjective poverty over ten years, calculated as the incidence, also affects poor subjective health and mental disorders. While both differ in that subjective poverty affects physical and mental health problems, the probability of poor subjective health and mental disorders is greater for cumulative subjective poverty than for temporary subjective poverty. Looking at the impact on mental disorders, the social dimension of adulthood, cumulative parental dissatisfaction is also greater than temporary parental dissatisfaction.

This study's findings should be discussed in terms of their significance. There are three main observations. First, the study was able to elucidate the process by which the multidimensional difficulties of the economic and social dimensions of childhood and adulthood affect the mental and physical problems of adulthood. This was possible because the study focused on the multidimensionality that characterizes the concept of social exclusion rather than focusing only on economic or social dimensions. In this sense, the significance of social exclusion research taking a multidimensional perspective on multifaceted difficulties is profound.

Second, there is a need for support and policies for those who are socially excluded in the economic and social dimensions of their childhood. Support and policies for the economic and social dimensions of social exclusion in childhood should consider not only

the children of today but also children of today who have had similar problems in the past.

The subjects of the JLPS, the source of the data analyzed in this study, were born between 1966 and 1986, and as of 2023, they had reached the age of 37-57. Strengthening policies for today's children alone will not be sufficient to save them. Lenoir ([1974]1989), the originator of the concept of social exclusion, also stated that regardless of how much effort is put into primary prevention, people will always be excluded from society. Therefore, secondary prevention is necessary for individuals as soon as symptoms appear. In recent years, child poverty has been the focus of attention in Japan, and efforts have focused on improving the situation of today's children, but current adults cannot redo their childhood. One criterion for determining the need for policy intervention is whether a child has had social problems in the past.

Finally, this study shows that temporary and cumulative social exclusion have different effects on mental and physical problems in adulthood. This is an important point that would be missed in analyses based on cross-sectional data and is the result of using a panel survey in the analysis that shows changes over time over ten years. In future empirical studies on social exclusion in Japan, panel data should be emphasized. This study confirms the significance of multidimensional and dynamic social exclusion research using panel data.

Notes

- 1) The items to assess material deprivation in childhood, such as televisions and DVD recorders, were still asked about in adulthood, but more than 80% of the respondents did not fall into the category of material deprivation. Other items not used in this analysis were a microwave oven, a washing machine, and a flush toilet, which were not continuously asked about but were asked about temporarily.
- 2) There is a method to determine the material deprivation index by checking whether the individual cannot afford an item financially, but these data do not enable us to distinguish between whether the individual cannot afford the item financially or does not need the item. However, in the present data, more than 90% of respondents were not materially deprived.
- 3) For example, if the respondent had responded for ten years and had difficulties twice, the rate was 0.2; if the respondent had responded for four years and had difficulties twice, the rate was 0.5; and if the respondent had responded for four years and had difficulties twice, the rate was 0.4. There are two reasons for this rate. First, limiting the number of respondents to those who responded in all cases may underestimate the number of difficulties. Second, counting the number of occurrences would treat a case in which the difficulty occurred twice in ten years the same as a case in which the difficulty occurred twice in four years.

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