Osaka Human Sciences, **3**, 171-183
March 2017

EXAMINATION OF THE RELATIONSHIP BETWEEN PREFERENCE FOR SOLITUDE AND EMOTIONAL WELL-BEING AFTER CONTROLLING FOR THE EFFECT OF LONELINESS

Aya Toyoshima*, Shinichi Sato*

Abstract

This study examined whether preference for solitude promotes emotional well-being after controlling for the influence of loneliness. We administered a questionnaire that included variables regarding preference for solitude, loneliness, positive affect, and negative affect. The sample consisted of 318 young adult university students and 253 individuals aged 65 and older. The results showed a significant negative correlation between preference for solitude and positive affect; however there was no significant correlation between preference for solitude and negative affect. Hierarchical multiple regression analysis confirmed a negative effect of preference for solitude on negative affect after controlling for the influence of loneliness, and there was no effect on positive affect. The results of this study supported the hypothesis concerning the relationship between preference for solitude and negative affect, and demonstrated that preference for solitude decreased negative affect and promotes emotional well-being.

Key words: preference for solitude, loneliness, emotional well-being, aging paradox

1. Introduction

As the phrase "human beings are a social animal" expresses, it is an important task for us, as people, to build social relationships with others in our lifetimes. From a psychological perspective, studies on social support (Ura, 1992; Ura, Minami, & Inaba, 1989) or self-esteem (Heatherton & Wyland, 2003) suggest that maintaining and forming good social relationships play important roles for one's subjective well-being. On the contrary, being isolated from social

This article is the English translation of the original one "Toyoshima, A. and Sato, S. (2015). Examination of the relationship between preference for solitude and emotional well-being after controlling for the effect of loneliness *Japanese Journal of Psychology*, **68**, 142–149 (in Japanese)". The publication of its English translation has been permitted by the Japanese Psychological Association.
* Graduate School of Human Sciences, Osaka University, 1-2, Yamadaoka, Suita, Osaka 565-0871, Japan

groups and being in conditions where one cannot blend in with groups are crisis states in terms of building social relationships. This leads us to feel uncomfortable emotions, namely loneliness, which prompts us to try and live away from states of being isolated from society (Cacioppo & Patrick, 2008 translated by Shibata, 2010).

Loneliness is caused by a lack of social relationships, which is a subjective experience felt along with discomfort and pain, but defined as not equivalent to social isolation (Peplau & Perlman, 1982 translated by Kato, 1988). There have been indications to its influences on depression (Koenig, Isaacs, & Schwartz, 1994; Lau, Chan, & Lau, 1999), aggression (Crick & Grotpeter, 1995; Diamant & Windholz, 1981), health condition (sleep (Cacioppo, Hawkley, Crawford, Ernst, Burleson, Kowalewski, & Berntson, 2002), and increase in blood pressure (Cacioppo, Ernst, Burleson, McClintock, Malarkey, Hawkley, & Berntson, 2000). Thus, an increase in loneliness has been considered as an undesirable state of being, and living alone has been raised as one of the causes of this increase.

However, it is not realistic that one would not spend even a moment alone in one's daily lives. The ratio of spending time alone increases as one gets older, and a study shows that the percentage is 29% for adults which increases to as much as 48% for older adults after retirement (Larson, 1990). There are cases where one isolates oneself as a coping mechanism for heavy stress (Heinrich & Gullone, 2006). Some studies describe some positive aspects of being alone, such as the fact that being alone (solitude) increases creativity (Storr, 1988) or that it is necessary to maintain privacy (Bates, 1964).[1]

The problem of solitude is the lack of social support due to increased loneliness or isolation, but recent studies are finding positive facets within this condition (Burger, 1995; Long & Averill, 2003). Long, Seburn, Averill, and More (2003) divided solitude into 3 groups: the Inner-directed factor (pertaining to self-discovery or inner calm due to reflection and creative activities), the Loneliness factor (pertaining to the condition of heightened loneliness and diversion as its remedy) and the Outer-directed factor (pertaining to longing for a connection with nature, religious beings, and someone intimate). In particular, the Inner-directed factor was demonstrated to have a positive aspect with respect to emotional levels in relation to low tendencies towards depression and high self-esteem.

Burger (1995) concluded that the difference between individuals regarding preference for solitude is an important factor in making solitude a positive condition. Preference for solitude is a preference indicator to show whether or not one prefers the condition of being alone, and it could also be considered as "competency in spending time alone" (Long et al., 2003). Because those who have a high preference for solitude choose independently to be alone, they tend to see

[1] In terms of a terms used, "solitude," which is understood as "the state or situation of being alone," will be described as "being alone," namely considered as "physically spending time alone" in this study in order to draw a clear line from "loneliness," which refers to "sadness because one has no friends or company." This is differentiated from "isolation," which indicates "socially separated."

time spent alone as positive. Burger (1995) concluded that the condition of being alone is needed to deepen one's thoughts and increase intellectual activities and creativity, and a preference for solitude positively influences one's subjective well-being. In Long et al. (2003), a correlation with the Inner-directed factor was observed. Leary, Herbst, and McCrary (2003) drew a conclusion that a group with a high preference for solitude preferred activities which could be conducted alone, and were more prone to enjoying it; solitude played a role as a pause in social activities.

Burger (1995) concluded that those who have a low preference for solitude are high in social anxiety and low in social skills, which causes avoidance of social activities, and their subjective well-being is hindered through their solitude. On the other hand, the study added that since those who have a high preference for solitude choose independently to be alone, their subjective well-being is not hindered.

However, results from quantitative studies do not support the theory. In the study of Waskowic and Cramer (1999), a preference for solitude indicated a positive correlation with social anxiety and no significant correlation with subjective well-being. The study of Long et al. (2003) did not show a correlation with subjective well-being, which was the dependent variable. These studies examined the correlation of 2 variables of preference for solitude and subjective well-being. However, in Burger (1995), preference for solitude demonstrated a moderate positive correlation with loneliness, wherein loneliness and preference for solitude share a similar concept in that it is repulsion to social activities. Thus, without considering the correlation with loneliness that is a hindering factor to one's subjective well-being, the influence of preference for solitude cannot accurately be examined. There is a correlation between preference for solitude and loneliness, but positivity/negativity of correlation with subjective well-being is reversed, and the influence of preference for solitude seems to be observable when considering the influence of loneliness. Furthermore, the element of subjective well-being, which is the dependent variable, consists of life satisfaction, positive affect and negative affect (Diener, E., Diener, C., & Diener, M., 1995). Though the studies of Waskowic and Cramer (1999) and Long et al. (2003) examined this using the scale which measures life satisfaction, the correlation not only with positive but also negative affect which are emotional aspects, was not examined. In psychological studies, there is a tendency for negative influences to be focused upon and it is hard to say that there has been enough studies accumulated on the correlation between a preference for solitude and subjective well-being.

Also, the majority of the targets of these studies on preference for solitude are young adults. Loneliness is said to be the highest at the young adult period, and becomes stable as the individual approaches older adult age (Sorensen & Pinquart, 2001). Nakagawa (2010) reported an aging paradox wherein subjective well-being is sustained while older adults come to experience various losses such as a decline in physical functions. Though they spend much longer hours by themselves than any other age bracket (Larson, 1990), level of loneliness is not so high compared to other ages. Therefore, the possibility where individuals under the condition of a high preference

for solitude will not be negatively influenced is discussed (Long & Averill, 2003). As an element to explain the aging paradox, it can be considered that the highness of preference for solitude makes it less likely for subjective well-being to be hindered due to the decline of social activities. However, since there is no material indicating a preference for solitude after the young adult period, it is unknown whether or not the same correlation between a preference for solitude and subjective well-being can be applicable for the post-young adult period.

Additionally, as indicators of subjective well-being, measurements of life satisfaction as well as positive and negative affect from an emotional facet are anticipated, but it is possible that the anticipated conditions of each individual vary by the age of the targets when measuring their life satisfaction. Since studies on preference for solitude by Long et al. (2003) showed a correlation between the Inner-directed factors, which are positive facets of solitude conditions, with the variable of emotional levels, this study will examine a correlation with emotional aspects. Therefore, this study will deal with emotional well-being as an emotional aspect of subjective well-being.

This study aims to examine the influences a preference for solitude has on emotional well-being. The study by Waskowic and Cramer (1999) and Long et al. (2003) could not demonstrate the influences of preference for solitude, but it may be possible to observe the influence of a preference for solitude through consideration of the influence of loneliness according to Burger (1995). Thus, this study proceeds with examinations using data of 2 generations of young and older adults to prove hypothesis of "preference for solitude can show positive correlation with emotional well-being if influences of loneliness are controlled."

2. Method

2.1. Survey participants and method

2.1.1. Young adult group

Targeted 318 students commuting to universities in the Kinki area (male: 121, female: 197, average age: 19.36 ± 1.12 years old, range: 18–25), a survey was conducted in June-July of 2012. Students were asked to assemble at their universities for the survey. A questionnaire was passed out after an approximately 10 minute instruction of the survey, and responses were collected in a collection box.

2.1.2. Older adult group

Conducted at a senior college in city A in the Kinki area. Targeting older adults in the region, a survey using a questionnaire took place in October through November 2011. The questionnaire was passed out after classes in the senior college, followed by an instruction of the survey. The responses were collected at the next class session. The number of questionnaire sheets was 515, and 374 of them were retrieved (collection rate: 72.6%). The targets of analysis were 253

individuals over the age of 65 (male: 175, female: 77, unknown: 1, average age: 69.85 ± 4.71 years old, range: 65–83)

2.2. Structure of questionnaire

2.2.1. Preference for solitude

The interpersonal preference scale used in Sato, Osada, Yatomi, Okamoto, Makita, Hayashi and Inoue (1989) was used. This scale consists of 6 items with 2 sentences, A and B, which included "A: Want to share successes or failures with friends and families. B: Want to digest successes or failures by myself," "A: Want to have a hobby that can be enjoyed with others. B: Want to have a hobby that can be enjoyed by myself." The targets were asked to assess themselves in a five-point scale of "1: A", "2: slightly A", "3: neither", "4: slightly B" and "5: B". Points were converted so that higher points indicate higher preference for solitude.

2.2.2. Loneliness

The Japanese Version of the UCLA loneliness scale in Toyoshima and Sato's (2013) version 3 was used. This scale consists of 20 items in total. For example, for questions regarding how often such statements like "How often do you feel you have a lot in common with the people around you" and "How often do you feel alone" are true, answer choices were given on a four-point scale, "1: Often", "2: Sometimes", "3:Rarely " and "4: Never". Points were converted so that higher points indicate higher loneliness.

2.2.3. Emotional well-being

The short form of the emotional well-being scale in Nakahara (2011) was used, which was developed as a scale to compare emotional well-being between young adults and older adults. This scale consists of 6 items, and asked for an assessment in a five-point scale with "1: None of the time", "2: A little of the time", "3: Some of the time", "4: Most of the time" and "5: All of the time".

2.2.4. Control variable (basic attributes)

As a basic attribute, age, gender, residence status (living alone) were asked. As a variable pertaining to older adults' loneliness or emotional well-being, subjective assessment of health as well as subjective economic condition were questioned in a five- point scale of "1: Bad", "2: Not good", "3: Can't choose from either", "4: Good" and "5: Very good" with reference to Toyoshima and Sato (2013).

2.3. Analysis techniques

SPSS19.0 and Mplus7.11 were used for analysis. This study examined the hypothesis with a hierarchical multiple regression analysis. We entered only control variables (gender, age,

subjective assessment of health, subjective economic condition, and residence status) for Step 1, preference for solitude for Step 2, and loneliness for Step 3 as dependent variables from the scores of the emotional well-being scale. Note that the points of preference for solitude and loneliness were centralized respectively for the multiple regression analysis. Also, in order to examine age differences as a related factor of the aging paradox, we created dummy variables as 0 for the young adult group and 1 for the older adult group, to conduct agent analyses on influences of preference for solitude in terms of correlation between age and emotional well-being.

3. Results

A *t*-test was conducted in order to examine the difference between ages through calculation of average values and standard deviation of each variable (Table 1). To start, the Levene test was conducted for homoscedasticity, which resulted in it having no results. Then, Welch's *t*-test was conducted.

As a result of the *t*-test, significant differences were observed between every variable. The young adult group earned higher scores for loneliness ($t = 4.47$, $df = 538$, $p < .01$) and negative affect ($t = 11.84$, $df = 560.22$, $p < .01$), and lower scores for preference for solitude ($t = -6.84$, $df = 561.87$, $p < .01$), positive affect ($t = -4.43$, $df = 563.14$, $p < .01$), subjective assessment of health ($t = -5.72$, $df = 561.60$, $p < .01$) and subjective economic condition ($t = -5.77$, $df = 563.96$, $p < .01$).

Next, the product-moment correlation coefficient between each variable was calculated and showed as on Table 2. In both groups, moderated positive correlations between loneliness and preference for solitude (young adult group: $r = .42$, $p < .01$; older adult group: $r = .43$, $p < .01$) were recognized, and negative correlations between preference for solitude and positive affect (young adult group: $r = -.11$, $p < .05$; older adult group: $r = -.29$, $p < .01$). On the other hand, no significant correlation was recognized between preference for solitude and negative affect

Table 1.
Descriptive statistics of variables

	Young Adults	Older Adults	Cohen's *d*	95% CI
PSS	15.35 (4.22)	17.50 (3.22)	.51	1.53–2.76
UCLA	43.50 (11.07)	39.37 (9.96)	.39	2.31–5.94
PA	3.43 (0.92)	3.75 (0.78)	.37	0.17–0.45
NA	2.31 (0.86)	1.57 (0.63)	.97	0.62–0.87
SH	3.55 (0.96)	3.94 (0.68)	.47	0.25–0.52
SEC	2.86 (0.96)	3.27 (0.70)	.47	0.26–0.53

Note. Cohen's *d* were calculated from mean scores and standard deviation in two groups. 95% CI indicated 95% confidence interval for the difference between two means. PSS = Preference for solitude scale, UCLA = UCLA Loneliness Scale, PA = Positive affect, NA = Negative affect, SH = Subjective assessment of health, SEC = Subjective economic condition.

Table 2.
Correlation coefficient between variables

Young Adults	1	2	3	4	5	6	7	8	9
1. Gender	—	−.07	−.11 *	−.01	−.01	−.08	−.08	−.02	.01
2. Age		—	.11†	.06	.03	−.09	−.07	.07	−.07
3. SH			—	.24 **	−.03	−.24 **	.00	.43 **	−.26 **
4. SEC				—	−.03	−.15 **	.10 †	.28 **	−.14 *
5. RS					—	.04	.04	−.01	−.01
6. PSS						—	**.42 ** **	**−.11 ***	**.06**
7. UCLA							—	−.46 **	.45 **
8. PA								—	−.45 **
9. NA									—

Older Adults	1	2	3	4	5	6	7	8	9
1. Gender	—	−.06	.02	.05	.35 **	−.13 *	−.11 †	.13 *	−.06
2. Age		—	−.09	.12 †	.18 **	.06	.00	.00	.10
3. SH			—	.04	−.14 *	−.15 *	.00	.29 **	−.13 *
4. SEC				—	.08	−.15 *	−.16 *	.20 **	−.14 *
5. RS					—	.03	−.01	.08	.03
6. PSS						—	**.43 ** **	**−.29 ** **	**.04**
7. UCLA							—	−.55 **	.45 **
8. PA								—	−.34 **
9. NA									—

Note. SH = Subjective assessment of health, SEC = Subjective economic condition, RS = Residence status, UCLA = UCLA Loneliness Scale, PSS = Preference for solitude scale, PA = Positive affect, NA = Negative affect, $^{**}p < .01$, $^{*}p < .05$, $^{\dagger}p < .10$.

(young adult group: $r = .06$; older adult group: $r = .04$). Now, for the outcomes of hierarchical multiple regression analysis, the results of handling positive and negative affect as dependent variables are shown in Table 3 and 4 respectively. Note that, as a result of multicollinearity diagnostic, the VIF of every variable in both analyses are 2 or smaller; this led to the judgment that there were no issues.

As for the models in which positive affect were entered as dependent variables, the adjusted R^2 values of each model was highest at Step 3 (young adult group: $AdjR^2 = .33$, older adult group: $AdjR^2 = .36$). Regarding the correlation between preference for solitude and positive affect, the partial regression coefficient value at Step 2 was significant with negative values (young adult group: $\beta = -.12$, $p < .01$; older adult group: $\beta = -.27$, $p < .01$), but the model of Step 3, where loneliness was entered, was not significant. The partial regression coefficient of loneliness at Step 3 was negative, which was significant (young adult group: $\beta = -.38$, $p < .01$; older adult group: $\beta = -.47$, $p < .01$).

Next, as for models in which negative affectation was entered as the dependent variable, the adjusted R^2 values of each model were highest at Step 3 (young adult group: $AdjR^2 = .23$, older adult group: $AdjR^2 = .22$). Regarding the correlation between preference for solitude and negative

TABLE 3.
The results of hierarchical multiple regression analysis for positive affect.

	Young Adults			Older Adults		
Step	1	2	3	1	2	3
Gender	.02	.01	−.02	.11	.08	.03
Age	.02	.01	−.01	.02	.03	.05
SH	.39 **	.38 **	.31 **	.29 **	.29 **	.24 **
SEC	.19 **	.20 **	.15 **	.17 **	.13 *	.09
RS	−.01	.00	.01	.00	.01	.03
PSS		**−.12 ***	**.04**		**−.27 ** **	**−.08**
UCLA			**−.38 ** **			**−.47 ** **
Adj R^2	.21 **	.22 **	.33 **	.12 **	.18 **	.36 **
ΔR^2		.01 *	.11 **		.07 **	.17 **

Note. Numerical values are standardization coefficients. SH = Subjective assessment of health, SEC = Subjective economic condition, RS = Residence status, PSS = Preference for solitude scale, UCLA = UCLA Loneliness Scale. $^{**}p < .01$, $^{*}p < .05$.

TABLE 4.
The results of hierarchical multiple regression analysis for negative affect.

	Young Adults			Older Adults		
Step	1	2	3	1	2	3
Gender	−.03	−.02	.01	−.06	−.06	−.02
Age	−.04	−.03	−.02	.09	.09	.07
SH	−.24 **	−.24 **	−.14 *	−.10	−.10	−.04
SEC	−.10 †	−.11 †	−.04	−.16 *	−.16 *	−.11 †
RS	−.01	−.01	−.01	.05	.05	.03
PSS		**.06**	**−.13 ***		**.02**	**−.18 ** **
UCLA			**.47 ** **			**.49 ** **
Adj R^2	.07 **	.07 **	.23 **	.03 *	.03 †	.22 **
ΔR^2		.00	.16 **		.00	.19 **

Note. Numerical values are standardization coefficients. SH = Subjective assessment of health, SEC = Subjective economic condition, RS = Residence status, PSS = Preference for solitude scale, UCLA = UCLA Loneliness Scale. $^{**}p < .01$, $^{*}p < .05$, $^{\dagger}p < .10$.

affectation, the partial regression coefficient value at Step 2 was not significant with a negative value, but the model of Step 3 where loneliness was entered was significant with a negative value (young adult group: $\beta = -.13$, $p < .05$; older adult group: $\beta = -.18$, $p < .05$). The partial regression coefficient of loneliness at Step 3 was positive, which was significant (young adult group: $\beta = .47$, $p < .01$; older adult group: $\beta = .49$, $p < .01$).

With respect to positive affect, the result did not support the hypothesis. However, we can anticipate the existence of mediation processes utilizing loneliness from the height of preference for solitude based on the result of the coefficient of correlation calculation afterwards, such as the existence of a correlation between preference for solitude and positive affect and that any correlation was found from Step 3 in which loneliness was entered for the multiple regression

analysis. This is why we have conducted a mediation analysis where loneliness is handled as the parameter in each group, to look for influences impacting positive affect by preference for solitude (Figure 1). It turned out that the direct path coefficient from preference for solitude to positive affect of the young adult group was −.21 ($p < .01$), and it changed to −.10 (*ns*) with loneliness as a mediator. It changed from −.22 ($p < .01$) to −.07 (*ns*) for the older adult group. As a result of examination on indirect effects through the bootstrap approach (resampling 1,000 times), the indirect effect of loneliness was significant for both groups (95% confidence interval: young adult group [−.06, −.03], older adult group [−.07, −.03]).

With respect to negative affect, the result supported the hypothesis. Then, it was followed by a mediation analysis for influences on negative affect by age using preference for solitude/ loneliness as parameters (Figure 2). As a result, the direct path from age to negative affect was

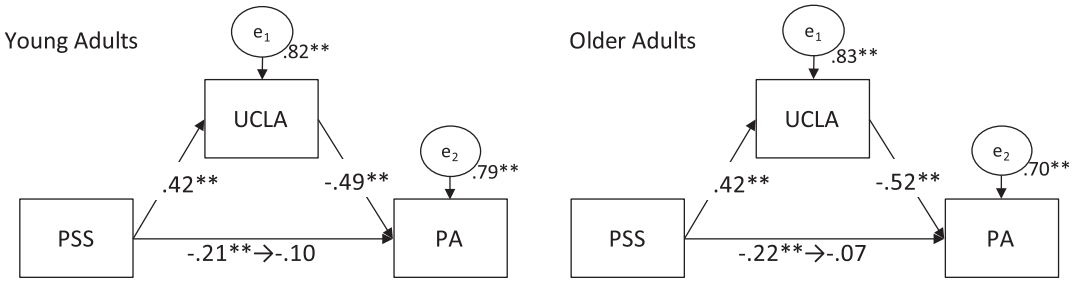

Figure 1. The result of indirect analysis for positive affect.
Note. Numerical values are standardization coefficients. PSS = Preference for solitude scale, UCLA = UCLA Loneliness Scale, PA = Positive affect, **$p < .01$.

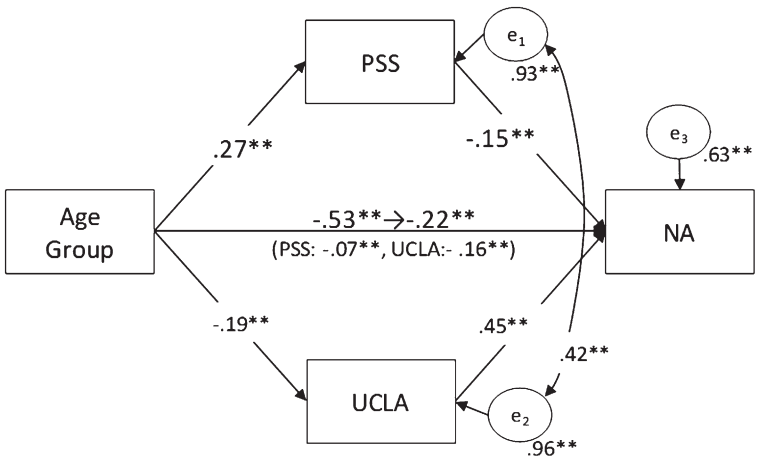

Figure 2. The result of indirect analysis for negative affect.
Note. Numerical values are standardization coefficients. Age Group = Dummy variable (0 = Young adults vs 1 = Older Adults), UCLA = UCLA Loneliness Scale, PSS = Preference for solitude scale, NA = Negative affect, **$p < .01$.

−.53 ($p < .01$), and it changed to −.22 ($p < .01$) through preference for solitude and loneliness. The indirect effect of preference for solitude was a negative value, and as a result of the examination of indirect effect through the bootstrap approach (resampling 1,000 times), the indirect effect of preference for solitude was significant (95% confidence interval: [−.11, −.03]).

4. Discussion

4.1. Correlation between preference for solitude and emotional well-being

This study examined the influences on emotional well-being by preference for solitude. Firstly, the examination took place for correlations with positive affect using a hierarchical multiple regression analysis. The result did not support the hypothesis of "preference for solitude can show positive correlation with emotional well-being if influences of loneliness are controlled." The result where the correlation coefficient value was sought showed that a preference for solitude has a negative correlation with positive affect, and that there was a negative correlation between loneliness and positive affect. The result of the mediation analysis on mediation processes through loneliness, from the height of the preference of solitude, showed a negative value on the indirect effect of loneliness. These outcomes induced the idea that highness of a preference for solitude is associated with highness of loneliness, and that it influences the lowness of positive affect. In the study of Burger (1995), the height of preference for solitude is considered to positively influence one's subjective well-being, but the results from this study suggest that when it comes to the emotional aspects, it lowers positive affect in relation with the height of loneliness. Since this result differs from this study's suppositions, another examination which involves a correlation with variables such as social contact frequency should be conducted in the future.

With respect to the correlation with negative affect, the result of the hierarchical multiple regression analysis showed a negative correlation between negative affect and preference for solitude, which supported the hypothesis. From the correlation coefficient value and the results of the hierarchical multiple regression analysis' Step 2, no significantly correlation with negative affect was found on preference of solitude, which was a supportive result for studies of Waskowic and Cramer (1999) and Long et al. (2003), despite having different indicators. However, Step 3 showed that preference for solitude has a negative correlation with negative affect, a result which supported Burger (1995).

4.2. Gap between generations

This study used data from 2 generations for examination: the young and older adult periods. In the result from the descriptive statistics, loneliness was low in the older adult group, which supports the study of Sorensen and Pinquart (2001). With respect to emotional well-being, the older adult group showed higher positive affect and lower negative affect than the young adult

group. We observed an aging paradox where people in their older adult period sustain their subjective well-being in spite of various experiences of loss such as declining physical functions in the emotional aspect, which was the only aspect of what was dealt with in this study for subjective well-being. Moreover, as a result of the mediation analysis, preference for solitude and indirect effects due to loneliness were observed between influences from age to negative affect. In other words, the older adult group is prone to having a higher preference for solitude and lower loneliness, which leads to low negative affect. In consideration of this, it has been suggested that even the increase in time spent alone due to partial changes in lifestyle along with aging, older adults' negative affect will not increase due to their highness of preference for solitude. A significance of this study can be found in presenting preference for solitude as a factor that supports theories on the aging paradox.

4.3. Issue and outlook

As for the issues for this study, the limitations of verification using transverse data can be brought up. In this study, we targeted 2 generations of people from the young adult and older adult periods, but we have not found out the generation in which the preference for solitude starts to rise. They say that the aging paradox starts at the older adult period, but still, another examination targeting the intermediate generation between the young adults and older adults will be needed in order to know whether the preference for solitude explains this or not. Plus, it cannot be denied that the results of this study were influenced by generations and not aging, and the cohort effect cannot be separated; further studies using longitudinal data are needed.

The next issue is that correlation with social contact frequency was not verified. According to Burger (1995), it seems that those who have a high preference for solitude tend to see time being spent alone as positive because they chose to be alone. This study targeted university students and senior college students who were relatively extroverted. However, variables regarding social contact frequency were not factored in. Thus, the possibility of its influence on the model cannot be denied by the obtained result of this study.

Lastly, between the generations, there was a difference in the scale scores, but the difference in the height of preference for solitude or loneliness could not be reasoned out in this study. Therefore, another necessity is to organize theories explaining aging paradoxes, such as socioemotional selectivity theory (Carstensen, 1991) and theory in Burger (1995) that we have verified in this study and to verify whether they can be in accordance with each other in the area of social relations.

Acknowledgement

This study is a reanalysis of a part of results presented at the 77th Annual Convention of the Japanese Psychological Association, 2013. The surveys were taken place with a grant from the

Sciences Research Grant (Basic study B: 23330211, representative of the study: Shinichi Sato). For the implementation of this survey, we received advice from Professor Katsuya Nakatani and Professor Yoichi Kishimoto from Faculty of Applied Sociology, Kindai University; Associate professor Aki Shimanouchi from Department of Social Welfare, Gunma University of Health and Welfare; Assistant professor Rui Nochi from International Research Institutes of Disaster Science, Tohoku University; Dr. Yuji Takano from NTT Communication Science Laboratories; Dr. Jun Nakahara from School of Arts and Sciences, Tokyo Woman's Christian University; Ms. Haruka Takano from Children -Family Support Center of Chiyoda; Specially-appointed Dr. Hikaru Oba from Graduate School of Human Sciences, Osaka University. Especially, Associate professor Yasuyuki Gondo and Assistant professor Takeshi Nakagawa from Graduate School of Human Sciences, Osaka University carefully supervised us. We would like to send our sincere gratitude to them.

References

Bates, A.P. (1964). Privacy: A useful concept? *Social Forces*, **42**, 429–434.

Burger, J. (1995). Individual differences in preference for solitude. *Journal of Research in Personality*, **29**, 85–108.

Cacioppo, J.T., Ernst, J.M., Burleson, M.H., McClintock, M.K., Malarkey, W.B., Hawkley, L.C., & Berntson, G.G. (2000). Lonely traits and concomitant physiological processes: The MacArthur social neuroscience studies. *International Journal of Psychophysiology*, **35**, 143–154.

Cacioppo, J.T., Hawkley, L.C., Crawford, L.E., Ernst, J.M., Burleson, M.H., Kowalewski, R.B., & Berntson, G.G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine*, **64**, 407–417.

Cacioppo, J.T., & Patrick, W. (2008). *Loneliness: Human nature and the need for social connection*. Massachusetts: The Garamond Agency.

Carstensen, L.L. (1991). Selectivity theory: Social activity in life-span context. *Annual Review of Gerontology and Geriatrics*, **11**, 195–217.

Crick, N.R., & Grotpeter, J.K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child development*, **66**, 710–722.

Diamant, L., & Windholz, G. (1981). Loneliness in college students: Some theoretical, empirical, and therapeutic considerations. *Journal of College Student Development*, **22**, 515–522.

Diener, E., Diener, C., & Diener, M. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology*, **69**, 851–864.

Heatherton, T.F., & Wyland, C.L. (2003). Assessing self-esteem. In L.J. Shane & C.R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures*. Washington, D C: American Psychological Association. pp. 219–233.

Heinrich, L., & Gullone, E. (2006). The clinical significance of loneliness: A literature review.

Clinical Psychology Review, **26**, 695–718.

Koenig, L.J., Isaacs, A.M., & Schwartz, J.A.J. (1994). Sex differences in adolescent depression and loneliness: Why are boys lonelier if girls are more depressed? *Journal of Research in Personality*, **28**, 27–43.

Larson, R.W. (1990). The solitary side of life: An examination of the time people spend alone from childhood to old age. *Developmental Review*, **10**, 155–183.

Lau, S., Chan, D.W., & Lau, P.S. (1999). Facets of loneliness and depression among Chinese children and adolescents. *Journal of Social Psychology*, **139**, 713–729.

Leary, M., Herbst, K., & McCrary, F. (2003). Finding pleasure in solitary activities: Desire for aloneness or disinterest in social contact? *Personality and Individual Differences*, **35**, 59–68.

Long, C.R., & Averill, J.R. (2003). Solitude: An exploration of benefits of being alone. *Journal for the Theory of Social Behavior*, **33**, 21–44.

Long, C.R., Seburn, M., Averill, J.R., & More, T.A. (2003). Solitude experiences: Varieties, settings, and individual differences. *Personality and Social Psychology Bulletin*, **29**, 578–583.

Nakagawa, T. (2010). Theories of psychological adaptation in old age. *Bulletin of Behavioral Science of Life, Aging, Sickness, and Death*, **15**, 31–39.

Nakahara, J. (2011). Deliberation on factor structure on affective well-being scale and the development of its version. *Japanese Journal of Gerontology*, **32**, 434–442.

Peplau, L.A., & Perlman, D. (1982). *Loneliness: A sourcebook of current theory, research and therapy*. New York: John Wiley & Sons Inc.

Sato, S., Osada, Y., Yatomi, N., Okamoto, T., Makita, H., Hayashi, Y., & Inoue, K. (1989). Intentionality and satisfaction for the life among middle-aged and older adults. *Japanese Journal of Gerontology*, **11**, 116–133.

Sorensen, S., & Pinquart, M. (2001). Influences on loneliness in older adults: A meta-analysis. *Basic and Applied Social Psychology*, **23**, 245–266.

Storr, A. (1988). *Solitude: A return to the self*. New York: Free Press.

Toyoshima, A., & Sato, S. (2013). Relationship between social support and mental health mediated by loneliness among the middle-aged and elderly: An investigation using the UCLA Loneliness Scale Version 3. *Japanese Journal of Gerontology*, **35**, 29–35.

Ura, M. (1992). *Sasae au hito to hito: Social support no shyakai shinrigaku [Individuals supporting each other: Social psychology of social support]*. Tokyo: Saiensu-sha.

Ura, M., Minami, T., & Inaba, A. (1989). Social support research: New trends of the research and its future directions. *Japanese Journal of Social Psychology*, **4**, 78–90.

Waskowic, T., & Cramer, K.M. (1999). Relation between preference for solitude scale and social functioning. *Psychological reports*, **85**, 1045–1050.