



Psychological Factors Associated with Social Withdrawal (Hikikomori)

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Objective Cases of prolonged social withdrawal (hikikomori) have recently been reported in several countries. This study examined the impact of cognitive-behavioral and emotional factors on hikikomori behavior to identify intervention targets. Identifying such targets could facilitate the development of techniques to address hikikomori characteristics.

Methods Two hundred Japanese individuals (mean age=38.73, SD=6.85) completed the Adaptive Behaviors Scale for Hikikomori and Stress Response Scale-18, along with the Japanese versions of the Self-Compassion Scale (Short Form), Acceptance and Action Questionnaire-II, and Brief Coping Orientation to Problems Experienced Inventory. Participants were divided into two groups: individuals with no experience of social withdrawal, and those with experience of social withdrawal.

Results Hierarchical multiple regression analysis showed that the use of instrumental support, behavioral disengagement stress coping skills, self-compassion, and psychological stress were associated with hikikomori behaviors. Furthermore, higher instrumental support levels, associated with a decrease in hikikomori behaviors, were found in the hikikomori group.

Conclusion The use of instrumental support, behavioral disengagement stress coping skills, self-compassion, and psychological stress should be targeted in hikikomori prevention interventions. Moreover, encouragement for the use of instrumental support is needed for improving hikikomori.

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Key Words Hikikomori, Social withdrawal, Self-compassion, Psychological inflexibility, Descriptive survey study.

INTRODUCTION

Prolonged social withdrawal (hikikomori) is a phenomenon characterized by the avoidance of social interactions for more than half a year.¹ This kind of social withdrawal has attracted the attention of psychologists and other medical professionals in Japan, and similar cases have recently been reported in countries such as Australia, France, Italy, South Korea, Spain, and the USA.²⁻⁴ An epidemiological study of hikikomori in a community-based population aged 20 to 49 years in Japan revealed that 1.2% had experienced the phenomenon in their lifetime,⁵ and a cross-sectional telephone-based survey in Hong Kong revealed that 1.9% of those aged 12 to 29 years had these expe-

riences as well.⁶

Most individuals undergoing long-term social withdrawal face health difficulties in their lives. For example, they have a significantly lower quality of life than those who have never experienced it,⁷ and show deterioration in physical health, including nutritional disorders and voice disturbances,⁸ obesity, and elevated blood pressure.⁹ Kondo et al.¹⁰ showed that 80.3% of individuals with hikikomori who utilized public mental health welfare services were diagnosed with some form of psychiatric disorder(s), including 33.3% who needed pharmacotherapy for conditions such as schizophrenia, mood disorders, or anxiety disorders, and that only one individual did not meet any DSM-IV-TR diagnostic criteria. Furthermore, the ambivalent attachment style is associated with hikikomori.¹¹ Previous studies have reported that the main characteristics of people in long-term withdrawal are restricted social activity^{12,13} and associated psychological, social, and behavioral effects.¹⁴ Thus, most previous psychological studies have concentrated on clarifying the psychological, social, and behavioral characteristics of individuals with hikikomori^{4,15} and identifying risks,¹⁶ but little has been identified in relation to an intervention target for hikikomori.

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It is presumed that psychological stress is one of the factors responsible for hikikomori.¹⁷ It could be argued that individuals use social withdrawal as a strategy for reducing psychological stress by avoiding social activities, but hikikomori is not necessarily reduced even when psychological stress is reduced. Therefore, there should be factors other than psychological stress that influence hikikomori, and identifying these factors can lead to the development of effective interventions for hikikomori. According to the psychological stress model,¹⁸ we can assume a process in which hikikomori is sustained by functioning as prolonged stress coping. In other words, it is plausible to investigate stress coping as a factor that influences hikikomori.

In addition, previous research reported people with hikikomori have low psychological flexibility.¹⁹ Psychological flexibility is described as the “ability to contact the present moment more fully as a conscious human being, and to change or persist in behavior when doing so serves valued ends.”²⁰ One can assume that psychological inflexibility influences hikikomori as experiential avoidance, which is one concept that is characteristic of psychological inflexibility, and is also related to psychological distress and maladaptive behavior.²¹

Self-compassion may also be associated with hikikomori, because self-compassion is associated with loneliness²² and loneliness is one of the factors associated with social withdrawal.²³ Neff²⁴ describes self-compassion as follows:

Being touched by and open to one’s own suffering, not avoiding or disconnecting from it, generating the desire to alleviate one’s suffering and to heal oneself with kindness. Self-compassion also involves facilitating nonjudgmental understanding to one’s pain, inadequacies and failures, so that one’s experience is seen as part of the larger human experience.²⁴

Self-compassion is negatively associated with depression, anxiety,²⁵ and homesickness,²⁶ and positively associated with well-being.²⁷

The current exploratory study investigates the effects of psychological stress, self-compassion, psychological inflexibility, and stress coping on hikikomori behaviors. Furthermore, this study examines the factors that change hikikomori by comparing the effects on hikikomori behaviors between people with hikikomori and people who have no experience of hikikomori. Clarifying these associations could be crucial for identifying intervention targets.

METHODS

Participants

Data were collected by recruiting participants from a large-scale web-based sample managed by a major, nationwide Internet research corporation, Rakuten Insight, Inc. (Tokyo, Japan),

which maintains a pool of 2.2 million members in Japan. The sample consisted of 200 individuals who were asked whether they met the criteria for prolonged social withdrawal (hikikomori).¹ First, we screened participants by asking 1) whether they had the experience of meeting the presented definition of hikikomori and 2) if they had the experience, how long it had lasted. If they answered that they had met the definition of hikikomori and that the duration was 6 months or more, they were classified into the hikikomori group. Recruitment was completed when each group had 100 people. Participants were classified into two groups: individuals with no experience of hikikomori (control group) and those who have experienced hikikomori (hikikomori group). To be eligible for the study, participants had to respond to all items. All participants voluntarily agreed to take part in the study, and were free to withdraw at any time. The age range of the participants was 23–49 years, the range of hikikomori duration in the hikikomori group was 6–304 months, the range of the number of days going out per month was 0–31 for the hikikomori group, and 4–31 for the control group (Table 1). Difficulty in social participation was scored on a 10-point scale ranging from 1 (“never experience difficulty”) to 10 (“certainly experience difficulty”), with the hikikomori group obtaining a mean score of 6.13 (SD=2.78), and the control group obtaining a mean score of 3.32 (SD=2.34). There was a significant difference between the groups in difficulty in social participation [$t(192.37)=7.73$, $p<0.001$, $d=1.09$]. Residences were distributed between the following regions: Hokkaido (8.0%), Tohoku (5.5%), Kanto (40.0%), Chubu (14.5%), Kinki (14.5%), Chugoku (5.0%), Shikoku (3.0%), and Kyushu (9.5%).

Instruments

Demographics

Participants reported their age, sex, and experience of hikikomori in the present or the past, and the duration of their experience.

Adaptive Behaviors Scale for Hikikomori (ABS-H)

We used the self-report version of the Adaptive Behaviors Scale for Hikikomori (ABS-H)^{12,28} to evaluate hikikomori behaviors. The ABS-H comprises 26 items to assess the level of social interaction for individuals with hikikomori. It includes four subscales: interaction (social interaction with others), family (social interaction with family members), values (behaviors that match the values of individuals with hikikomori), and social participation (going to school or work).^{12,28} A higher score indicated less frequent hikikomori behaviors. Participants rated the frequency of their social interaction on a 4-point Likert scale, ranging from 0 (“rarely”) to 3 (“often”). The ABS-H

Table 1. Demographics of participants

	Hikikomori group (N=100)	Control group (N=100)
	N (%)	N (%)
Male	63 (63.00)	44 (44.00)
Female	37 (37.00)	56 (56.00)
	M (SD)	M (SD)
Age	38.60 (6.63)	38.86 (7.10)
The number of days going out	16.20 (10.11)	22.84 (8.23)
Duration of hikikomori (months)	42.57 (55.32)	

M: mean, SD: standard deviation

achieved adequate reliability, as well as criterion-related, discriminant, and construct validity.¹² Cronbach's alpha coefficient for the total scale was 0.94, and each subscale ranged from 0.76 to 0.92 in this study.

Japanese version of the Self-Compassion Scale Short Form (SCS-J-SF)

We used the Japanese version of the Self-Compassion Scale Short Form (SCS-SF)²⁹⁻³² to evaluate self-compassion. The SCS-J-SF comprises 12 items and involves two factors. Positive factors include self-kindness, common humanity, and mindfulness; negative factors include self-judgment, isolation, and over-identification.³³ Participants rated the frequency of their self-compassion on a 5-point Likert scale ranging from 1 ("almost never") to 5 ("almost always"). The SCS-J-SF has adequate reliability and construct validity.³⁰ Cronbach's alpha coefficient was 0.80 in this study.

Japanese version of the Acceptance and Action Questionnaire-II (AAQ-II)

We used the Japanese version of the Acceptance and Action Questionnaire (AAQ-II)^{34,35} to evaluate psychological inflexibility. The AAQ-II comprises seven items and one factor.³⁴ Participants rated experienced avoidance on a 7-point Likert scale ranging from 1 ("never true") to 7 ("almost always true"). Higher scores indicated greater levels of psychological inflexibility. The AAQ-II has adequate reliability and discriminant and convergent validity.³⁴ Cronbach's alpha coefficient was 0.93 in this study.

Japanese version of the Brief Coping Orientation to Problems Experienced (COPE) inventory

We used the Japanese version of the Brief COPE inventory to evaluate stress coping.³⁶⁻³⁸ The Brief COPE comprises 28 items involving 14 factors: self-distraction, active coping, denial, substance use, using emotional support, using instrumental sup-

port, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame.^{36,38} Participants rated stress coping on a 4-point Likert scale ranging from 1 ("I usually don't do this at all") to 4 ("I usually do this a lot"). Higher scores indicated greater levels of coping skills. Previous studies reported the reliability and validity of the Brief COPE.^{36,38} Cronbach's alpha coefficient for each subscale ranged from 0.61 to 0.92; however, it was low for the self-distraction subscale (0.49) in this study. The low coefficient for the self-distraction subscale was consistent with a previous study (0.46).³⁸

Stress Response Scale-18 (SRS-18)

We used the Stress Response Scale (SRS-18) to evaluate psychological stress.³⁹ The SRS-18 has 18 items involving three factors: depression-anxiety, irritability-anger, and helplessness.³⁹ Participants rated stress response on a 4-point Likert scale ranging from 0 ("never true") to 3 ("almost always true"). Higher scores indicated greater levels of stress response. The SRS-18 has adequate reliability and content and discriminant validity.³⁹ Cronbach's alpha coefficient was 0.96 in this study.

Data analysis

Data were analyzed using R version 4.0.3 (R Foundation for Statistical Computing, Vienna, Austria).⁴⁰ We calculated the means, standard deviations, and correlation coefficients between hikikomori behavior and the other variables. We performed hierarchical multiple regression analyses wherein sex, age, and group (hikikomori or control group) were added in step 1 as control values, and psychological stress, self-compassion, psychological inflexibility, and stress coping were added in step 2. The interaction terms were added in step 3 to examine the differences between groups. As a result of the correlation analyses, variables showing medium or large correlation coefficients ($r > 0.40$) with hikikomori behaviors were inserted into the hierarchical multiple regression model.

Ethical considerations

The study was approved by the local research ethics committee of the institute to which the author belongs (Approval number 90). We obtained participants' informed consent before conducting the study. In consideration of individuals' privacy, the study was carried out anonymously. Participants were informed that submission of their responses would be regarded as consent.

RESULTS

Table 1 shows the demographic characteristics and Table 2 shows the mean values, standard deviations, and effect sizes of hikikomori behavior, psychological stress, self-compassion,

Table 2. Means, standard deviations, and differences between groups in each variable

	Hikikomori group		Control group		t	p	d	d 95% CI	
	M	SD	M	SD				Lower	Upper
Hikikomori behavior ($\alpha=0.94$)	37.25	14.72	52.67	13.05	7.84	<0.001	1.11	0.81	1.41
Interaction ($\alpha=0.92$)	19.41	8.59	27.22	7.76	6.75	<0.001	0.95	0.66	1.25
Family ($\alpha=0.91$)	6.54	3.66	8.76	2.95	4.73	<0.001	0.67	0.38	0.95
Value ($\alpha=0.84$)	5.42	2.83	7.56	2.49	5.68	<0.001	0.80	0.51	1.09
Social ($\alpha=0.76$)	5.88	2.96	9.13	2.30	8.67	<0.001	1.23	0.92	1.53
Psychological stress ($\alpha=0.96$)	25.44	12.91	13.86	12.01	6.57	<0.001	0.93	0.64	1.22
Self-compassion ($\alpha=0.80$)	32.00	6.65	38.21	7.21	6.33	<0.001	0.90	0.60	1.19
Psychological inflexibility ($\alpha=0.93$)	28.92	9.47	17.99	7.33	9.13	<0.001	1.29	0.98	1.60
Stress coping									
Self-distraction ($\alpha=0.49$)	5.27	1.28	5.03	1.45	1.24	0.22	0.18	-0.10	0.45
Active coping ($\alpha=0.65$)	4.98	1.32	5.53	1.27	3.01	0.003	0.43	0.14	0.71
Denial ($\alpha=0.77$)	3.63	1.52	3.33	1.33	1.49	0.14	0.21	-0.07	0.49
Substance use ($\alpha=0.92$)	4.13	2.08	3.47	1.63	2.50	0.01	0.35	0.07	0.63
Use of emotional support ($\alpha=0.82$)	4.16	1.70	4.79	1.55	2.73	0.007	0.39	0.11	0.67
Use of instrumental support ($\alpha=0.80$)	4.29	1.60	4.90	1.52	2.77	0.006	0.39	0.11	0.67
Behavioral disengagement ($\alpha=0.74$)	4.93	1.42	4.05	1.26	4.65	<0.001	0.66	0.37	0.94
Venting ($\alpha=0.72$)	4.70	1.51	4.86	1.46	0.76	0.45	0.11	-0.17	0.39
Positive reframing ($\alpha=0.78$)	4.62	1.54	5.08	1.48	2.16	0.03	0.30	0.02	0.59
Planning ($\alpha=0.77$)	4.97	1.48	5.51	1.49	2.57	0.01	0.36	0.08	0.64
Humor ($\alpha=0.76$)	3.94	1.47	4.25	1.53	1.46	0.15	0.21	-0.07	0.49
Acceptance ($\alpha=0.77$)	5.25	1.48	5.68	1.38	2.12	0.04	0.30	0.02	0.58
Religion ($\alpha=0.61$)	3.73	1.58	3.20	1.29	2.60	0.01	0.37	0.09	0.65
Self-blame ($\alpha=0.77$)	5.30	1.61	4.56	1.49	3.38	0.001	0.48	0.19	0.76

M: mean, SD: standard deviation

stress coping, and psychological inflexibility scores. The number of days going out was significantly higher in the control group than in the hikikomori group ($t=5.09$, $p<0.001$).

Pearson's correlation coefficient was significant between hikikomori behavior and psychological stress, self-compassion, psychological inflexibility, and stress coping scores (Supplementary Table 1 in the online-only Data Supplement). Variables (active coping and use of instrumental support, behavioral disengagement, planning stress coping, self-compassion, psychological stress, psychological inflexibility) showing a medium or large size correlation coefficient ($r>0.40$) for hikikomori behavior were selected as parameters.

The adjusted coefficient of determination in the hierarchical multiple regression analyses was significant in step 1 (R^2 adj=0.24, $p<0.001$), and the ΔR^2 in step 2 was significant ($\Delta R^2=0.32$, $p<0.001$). Use of instrumental support stress coping ($B=0.24$, $p<0.001$) and self-compassion ($B=0.19$, $p=0.01$) indicated a positively significant standardized partial regression coefficient, whereas behavioral disengagement stress coping ($B=-0.14$, $p=0.02$) and psychological stress ($B=-0.20$, $p=0.003$) indicated an

inverse relationship (Table 3). Psychological inflexibility, active coping, and planning coping indicated no significance.

The ΔR^2 in step 3 was significant ($\Delta R^2=0.03$, $p=0.04$) and demonstrated significant interaction effects between groups (hikikomori or control group) and use of instrumental support (Figure 1). Simple slope analysis showed that the use of instrumental support was significant for hikikomori behaviors in the hikikomori group (hikikomori group: $B=0.40$, $p<0.001$; control group: $B=0.11$, $p=0.16$). The variance inflation factor (VIF) did not indicate a problem of multicollinearity ($VIFs<3.20$).

DISCUSSION

This exploratory study investigated the effects of psychological stress, self-compassion, psychological inflexibility, and stress coping on hikikomori behaviors. It also studied the differences in the effects of psychological factors on hikikomori between people with hikikomori and people with no experience with hikikomori. The results showed that the use of instrumental

support and behavioral disengagement stress coping, self-compassion, and psychological stress influenced hikikomori behaviors, but psychological inflexibility and some stress coping skills did not influence the same. Furthermore, instrumental support levels were associated with lower hikikomori behaviors in

the hikikomori group, but not in the control group.

Influence of psychological stress, self-compassion, psychological inflexibility, and stress coping on hikikomori behaviors

The results suggested that the use of instrumental support and behavioral disengagement stress coping skills, self-compassion, and psychological stress influenced hikikomori; therefore, therapy targeting these factors may help improve hikikomori. As hikikomori is often triggered by high-stress events, interventions to reduce psychological stress have been used for early hikikomori tendencies.¹ The results indicate that it is necessary to assess not only psychological stress but also stress coping skills (support seeking or disengagement coping) and self-compassion when clinicians choose a psychological approach. Further studies are needed to determine whether interventions that focus on self-compassion can, in fact, relieve hikikomori characteristics as this finding suggests. Previous findings have shown that self-compassion can play a mediating role between psychosocial factors. For instance, Terry et al.²⁶ showed that self-compassion negatively mediated the relationship between satisfaction with social life and homesickness, and Zhang et al.⁴¹ showed that self-compassion negatively mediated the relationship between stressful experiences and negative affect. The findings of this study support those of previous studies. Compassion-based interventions are one approach to reducing psychological distress and improving well-being by increasing self-compassion.⁴² This intervention may be effective in improving hikikomori, because these individuals often have high chronic psychological stress.

Psychological inflexibility, active coping, and planning coping did not influence hikikomori. Based on the fact that all of these variables showed a medium-sized or larger correlation with hikikomori, it is possible that the relationship with psychological inflexibility or stress coping skills and hikikomori are spurious correlations.

Table 3. Hierarchical multiple regression analysis

	β
Step 1	
Age	-0.08
Sex	0.07
Group	-0.47***
R ² adj	0.24***
Step 2	
Age	-0.10
Sex	-0.02
Group	-0.18**
Psychological stress	-0.20**
Psychological inflexibility	-0.05
Self-compassion	0.19*
Active coping	0.09
Use of instrumental support	0.24***
Behavioral disengagement	-0.14*
Planning	0.07
R ² adj	0.55***
ΔR^2	0.32***
Step 3	
Age	-0.10*
Sex	-0.03
Group	-0.18**
Psychological stress	-0.20**
Psychological inflexibility	-0.07
Self-compassion	0.18*
Active coping	0.06
Use of instrumental support	0.26***
Behavioral disengagement	-0.15**
Planning	0.07
Psychological stress \times group	0.05
Psychological inflexibility \times group	0.15
Self-compassion \times group	0.05
Active coping \times group	-0.03
Use of instrumental support \times group	0.15*
Behavioral disengagement \times group	-0.01
Planning \times group	-0.10
R ² adj	0.57***
ΔR^2	0.03*

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

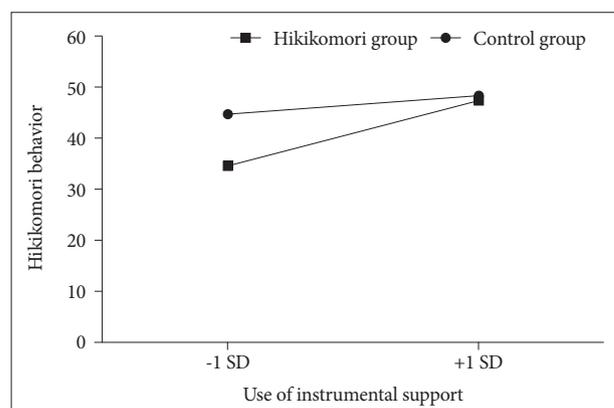


Figure 1. A simple slope analysis between use of instrumental support and group for the Hikikomori behavior.

Results for the hikikomori group showed that higher hikikomori behaviors were present in individuals with low use of instrumental support than in people with high use of instrumental support. Kondo et al.¹⁰ found that non-help-seeking hikikomori people had lower Global Assessment of Functioning (GAF) scores than those who engaged in treatment. The result of this study supports this finding because “use of instrumental support” includes support-seeking coping. Psychosocial support will be needed depending on the characteristics of the case. More specifically, in the case of low support seeking, the first step will be family support,^{43,44} home visiting support,^{45,46} or an Internet-based approach to increase support seeking, and the next step will be therapy focused on psychological stress and self-compassion for the person with hikikomori. It may be also useful to include the findings of this study in the knowledge that families should acquire. In addition, it may help prevent the reduction of self-compassion in people with hikikomori by telling their families, for example, not to blame them for being in a state of hikikomori.

Limitations

Although the study could identify the factors that influence hikikomori, it also has some limitations. First, although the average duration of hikikomori among participants in this study was about three and a half years, recent epidemiological studies have indicated that long-term hikikomori cases are the most frequent. For example, 34.7% of those aged between 15 and 39 years⁴⁷ and 46.7% aged between 40 and 64 years⁴⁸ had been socially withdrawn for more than seven years. Therefore, further studies are needed to clarify whether the findings of this study can be generalized to longer-term cases and whether the difference in the length is due to the recruitment method. In addition, the potential limited representativeness of a web-based sample also limits this study. To be sure, many people with hikikomori avoid others, including researchers and clinicians, so web-based research has the benefit of increasing access. However, it will be necessary to determine if the web-based sample is biased as the hikikomori sample.

This study is a cross-sectional study and no causal relationship has been identified. In this study, we examined the effects of psycho-behavioral factors on hikikomori to clarify the target of intervention in treating the condition, but it is quite possible that these factors interact with each other. Therefore, further follow-up and intervention studies may be needed to identify causal relationships. Previous studies reported that AAQ-II has poor construct validity as a measure of experiential avoidance;⁴⁹ therefore, the findings of this study should be interpreted with caution.

Further studies are also needed to clarify whether the findings are the same in cultures other than Japan, since it is known

that there are cultural differences in self-compassion; self-compassion has been found to be lower in Japan than in the United States and Thailand.^{29,50} Furthermore, the characteristics of hikikomori behavior may also be influenced by cultural differences.⁵¹ For example, investigating the effects of differences in family relationships, work styles, and gender roles on the findings of this study could help develop a type-specific approach to intervene with hikikomori characteristics.

The hikikomori group had more men than women, which is consistent with many previous studies.^{5,10} However, the proportion of women in the control group was higher than in the hikikomori group. This gender-ratio difference may have influenced the results.

In conclusion, this study suggests that not only psychological stress but also behavioral disengagement stress coping are positively associated with hikikomori behaviors, while instrumental support stress coping and self-compassion are negatively associated with these behaviors. Psychological inflexibility and the others stress coping skills do not directly associate with hikikomori behaviors. Assessing not only psychological stress but also instrumental support stress coping, including support seeking, will help hikikomori improve. In the future, it will be necessary to clarify effective support including family support, home visitation, or an Internet-based approach according to the characteristics of support seeking and self-compassion in people with hikikomori.

Supplementary Materials

The online-only Data Supplement is available with this article at <https://doi.org/10.30773/pi.2021.0050>.

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Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Shunsuke Nonaka, Motohiro Sakai. Data curation: Shunsuke Nonaka. Formal analysis: Shunsuke Nonaka. Funding acquisition: Shunsuke Nonaka. Investigation: Shunsuke Nonaka. Methodology: Shunsuke Nonaka. Project administration: Shunsuke Nonaka. Resources: Shunsuke Nonaka. Software: Shunsuke Nonaka. Supervision: Motohiro Sakai. Validation: Shunsuke Nonaka. Visualization: Shunsuke Nonaka. Writing—original draft: Shunsuke Nonaka. Writing—review & editing: Shunsuke Nonaka, Motohiro Sakai.

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REFERENCES

1. Japanese Ministry of Health, Labour and Welfare. Guidelines for assessment and support of hikikomori. 2010. Available at: <https://www.mhlw.go.jp/file/06-Seisakujouhou-12000000-Shakaiengokyoku-Shakai/0000147789.pdf>. Accessed March 3, 2021.
2. Chauliac N, Couillet A, Faivre S, Brochard N, Terra JL. Characteristics of socially withdrawn youth in France: a retrospective study. *Int J Soc Psychiatry* 2017;63:339-344.
3. Kato T, Tateno M, Shinfuku N, Fujisawa D, Teo A, Sartorius N, et al. Does the "hikikomori" syndrome of social withdrawal exist outside Japan? A preliminary international investigation. *Soc Psychiatry Psychiatr Epidemiol* 2012;47:1061-1075.
4. Teo AR, Fetters MD, Stufflebam K, Tateno M, Balhara Y, Choi TY, et al. Identification of the hikikomori syndrome of social withdrawal: psychosocial features and treatment preferences in four countries. *Int J Soc Psychiatry* 2015;61:64-72.
5. Koyama A, Miyake Y, Kawakami N, Tsuchiya M, Tachimori H, Takeshima T, et al. Lifetime prevalence, psychiatric comorbidity and demographic correlates of "hikikomori" in a community population in Japan. *Psychiatry Res* 2010;176:69-74.
6. Wong PWC, Li TMH, Chan M, Law YW, Chau M, Cheng C, et al. The prevalence and correlates of severe social withdrawal (hikikomori) in Hong Kong: a cross-sectional telephone-based survey study. *Int J Soc Psychiatry* 2015;61:330-342.
7. Nonaka S, Sakai M. The effect of hikikomori on quality of life. *Shinrigaku Kenkyu* 2014;85:313-318.
8. Nakagaito M, Komatsu S, Inotsume K, Gotoh K. Long term hikikomori: a study of the changes in mental and physical functions. *Jpn J Addict Family* 2010;26:207-216.
9. Yuen JWM, Yan YKY, Wong VCW, Tam WWS, So KW, Chien WT. A physical health profile of youths living with a "hikikomori" lifestyle. *Int J Environ Res Public Health* 2018;15:315.
10. Kondo N, Sakai M, Kuroda Y, Kiyota Y, Kitabata Y, Kurosawa M. General condition of hikikomori (prolonged social withdrawal) in Japan: psychiatric diagnosis and outcome in mental health welfare centres. *Int J Soc Psychiatry* 2013;59:79-86.
11. Krieg A, Dickie JR. Attachment and hikikomori: a psychosocial developmental model. *Int J Soc Psychiatry* 2013;59:61-72.
12. Nonaka S, Shimada H, Sakai M. Assessing adaptive behaviors of individuals with hikikomori (prolonged social withdrawal): development and psychometric evaluation of the parent-report scale. *Int J Cult Ment Health* 2018;11:280-294.
13. Yong R, Nomura K. Hikikomori is most associated with interpersonal relationships, followed by suicide risks: a secondary analysis of a national cross-sectional study. *Front Psychiatry* 2019;10:247.
14. Li TMH, Wong PWC. Youth social withdrawal behavior (hikikomori): a systematic review of qualitative and quantitative studies. *Aust N Z J Psychiatry* 2015;25:1-15.
15. Malagón-Amora A, Martín-López LM, Córcoles D, González A, Bellsolà M, Teo AR, et al. A 12-month study of the hikikomori syndrome of social withdrawal: clinical characterization and different subtypes proposal. *Psychiatry Res* 2018;270:139-1046.
16. Umeda M, Kawakami N; World Mental Health Japan Survey Group 2002-2006. Association of childhood family environments with the risk of social withdrawal ('hikikomori') in the community population in Japan. *Psychiatry Clin Neurosci* 2012;66:121-129.
17. Ito J. Guideline on mental health activities in communities for social withdrawal. Tokyo: Ministry of Health, Labor and Welfare; 2003. Available at: <http://www.ncnp.go.jp/nimh/fukki/documents/guide.pdf>. Accessed February 26, 2021.
18. Lazarus RS, Folkman S. *Stress, Appraisal and Coping*. New York: Springer; 1984.
19. Sakai M, Nonaka S, Ono A, KHJ National Federation of Families with Hikikomori Persons in Japan. Research report on the actual condition of hikikomori; 2010. Available at: https://www.khj-h.com/wp/wp-content/uploads/2018/05/tyousa_7.pdf. Accessed February 26, 2021.
20. Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: model, processes and outcomes. *Behav Res Ther* 2006;44:1-25.
21. Chawla N, Ostafin B. Experiential avoidance as a functional dimensional approach to psychopathology: an empirical review. *J Clin Psychol* 2007;63:871-890.
22. Akin A. Self-compassion and loneliness. *Int Online J Educ Sci* 2010;2:702-718.
23. Rubin KH, Coplan RJ, Bowker JC. Social withdrawal in childhood. *Annu Rev Psychol* 2009;60:141-171.
24. Neff KD. Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self Identity* 2003;2:85-101.
25. MacBeth A, Gumley A. Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology. *Clin Psychol Rev* 2012;32:545-552.
26. Terry ML, Leary MR, Mehta S. Self-compassion as a buffer against homesickness, depression, and dissatisfaction in the transition to college. *Self Identity* 2013;12:278-290.
27. Zessin U, Dickhauser O, Garbade S. The relationship between self-compassion and well-being: a meta-analysis. *Appl Psychol Health Well Being* 2015;7:340-364.
28. Nonaka S, Sakai M. The psychometric properties of a self-report scale on assessing social interaction of people with prolonged social withdrawal (HIKIKOMORI). *Curr Psychol* 2020. [Epub ahead of print]
29. Arimitsu K. Development and validation of the Japanese version of the Self-Compassion Scale. *Shinrigaku Kenkyu* 2014;85:50-59.
30. Arimitsu K, Aoki Y, Furukita M, Tada A, Togashi R. Construction and validation of a short form of the Japanese version of the Self-Compassion Scale. *Komazawa Ann Rep Psych* 2016;18:1-9.
31. Neff KD. The development and validation of a scale to measure self-compassion. *Self Identity* 2003;2:223-250.
32. Raes F, Pommier E, Neff KD, Van Gucht D. Construction and factorial validation of a short form of the Self-Compassion Scale. *Clin Psychol Psychother* 2011;18:250-255.
33. Neff KD. The Self-Compassion Scale is a valid and theoretically coherent measure of self-compassion. *Mindfulness* 2016;7:264-274.
34. Bond FW, Hayes SC, Baer RA, Carpenter KM, Guenole N, Orcutt HK, et al. Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: a revised measure of psychological inflexibility and experiential avoidance. *Behav Ther* 2011;42:676-688.
35. Shima T, Yanagihara M, Kawai T, Kumano H. Validation of the Japanese version of the Acceptance and Action Questionnaire-II. *Proceedings of the 77th Annual Convention Japanese Psychological Association (Sapporo, Japan)* 2013;271.
36. Carver CS. You want to measure coping but your protocol's too long: considering brief COPE. *Int J Behav Med* 1997;4:92-100.
37. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol* 1989;56:267-283.
38. Otsuka Y, Sasaki T, Iwasaki K, Mori I. Working hours, coping skills, and psychological health in Japanese daytime workers. *Ind Health* 2009;47:22-32.
39. Suzuki S, Shimada H, Miura M, Katayanagi K, Umamo R, Sakano Y. Development of a new psychological stress response scale (SRS-18) and investigation of the reliability and the validity. *Jpn J Behav Med* 1997;4:22-29.
40. R Core Team. R: A language and environment for statistical computing. <https://www.R-project.org/>. Vienna, Austria: R Foundation for Statistical Computing; 2020.
41. Zhang Y, Luo X, Che X, Duan W. Protective effect of self-compassion to emotional response among students with chronic academic stress. *Front Psychol* 2016;7:1802.
42. Kirby JN, Tellegen CL, Steindl SR. A meta-analysis of compassion-based interventions: current state of knowledge and future directions. *Behav*

- Ther 2017;48:778-792.
43. Kubo H, Urata H, Sakai M, Nonaka S, Saito K, Tateno M, et al. Development of 5-day hikikomori intervention program for family members: a single-arm pilot trial. *Heliyon* 2020;6:e03011.
 44. Sakai M, Hirakawa S, Nonaka S, Okazaki T, Seo K, Yokose Y, et al. Effectiveness of Community Reinforcement and Family Training (CRAFT) for parents of individuals with “hikikomori.” *Jpn J Behav Ther* 2015; 41:167-178.
 45. Kondo N, Sakai M, Ishikawa S, Niimura J, Tanoue M. Home visits for social withdrawal cases in community mental health and child welfare services. *Seishin Shinkeigaku Zasshi* 2008;110:536-545.
 46. Lee YS, Lee JY, Choi TY, Choi JT. Home visitation program for detecting, evaluating and treating socially withdrawn youth in Korea. *Psychiatry Clin Neurosci* 2013;67:193-202.
 47. Japanese Cabinet Office. Survey on youth consciousness. 2016. Available at: <https://www8.cao.go.jp/youth/kenkyu/hikikomori/h27/pdf-index.html>. Accessed February 26, 2021.
 48. Japanese Cabinet Office. Survey on living conditions. 2019. Available at: <https://www8.cao.go.jp/youth/kenkyu/life/h30/pdf-index.html>. Accessed February 26, 2021.
 49. Tyndall I, Waldeck D, Pancani L, Whelan R, Roche B, Dawson DL. The Acceptance and Action Questionnaire-II (AAQ-II) as a measure of experiential avoidance: concerns over discriminant validity. *J Contextual Behav Sci* 2019;12:278-284.
 50. Neff KD, Pisitsungkagarn K, Hsieh Y. Self-compassion and self-construal in the United States, Thailand, and Taiwan. *J Cross Cult Psychol* 2008;39:267-285.
 51. Tajan N. Social withdrawal and psychiatry: a comprehensive review of hikikomori. *Neuropsychiatr Enfance Adolesc* 2015;63:324-331.

Supplementary Table 1. Correlation coefficient of each variable

	SRS	SCS	AAQ	COPE														
				Self-distraction	Active coping	Denial	Substance use	Use of emotional support	Use of instrumental support	Behavioral disengagement	Venting	Positive reframing	Planning	Humor	Acceptance	Religion	Self-blame	
ABS-H	-0.54***	0.60***	-0.52***	0.09	0.43***	-0.15*	-0.07	0.40***	0.44***	-0.42***	0.09	0.37***	0.41***	0.24***	0.29***	-0.11	-0.20**	
SRS		-0.55***	0.63***	0.20**	-0.21**	0.34***	0.33***	-0.01	-0.08	0.51***	0.20**	-0.09	-0.18**	-0.01	-0.16*	0.29***	0.41***	
SCS			-0.66***	0.02	0.44***	-0.12	-0.17*	0.32***	0.30***	-0.43***	0.08	0.48***	0.42***	0.29***	0.34***	0.00	-0.48***	
AAQ				0.22**	-0.12	0.21**	0.30***	-0.11	-0.12	0.49***	0.10	-0.13	-0.12	-0.07	-0.07	0.22**	0.55***	
COPE																		
Self-distraction					0.47***	0.29***	0.25***	0.31***	0.28***	0.36***	0.44***	0.42***	0.36***	0.30***	0.33***	0.21**	0.27***	
Active coping						0.03	0.06	0.46***	0.49***	-0.10	0.34***	0.58***	0.69***	0.31***	0.54***	0.13	0.03	
Denial							0.32***	0.21**	0.13	0.43***	0.27***	0.09	0.02	0.24***	-0.11	0.38***	0.16*	
Substance use								0.34***	0.19**	0.43***	0.22**	0.18**	0.06	0.17*	0.04	0.35***	0.23**	
Use of emotional support									0.80***	0.05	0.46***	0.46***	0.39***	0.40***	0.36***	0.23**	0.09	
Use of instrumental support										-0.04	0.43***	0.53***	0.48***	0.40***	0.35***	0.18**	0.09	
Behavioral disengagement											0.22**	0.03	-0.05	0.18*	0.10	0.20**	0.40***	
Venting												0.38***	0.29***	0.31***	0.26***	0.28***	0.10	
Positive reframing													0.67***	0.46***	0.53***	0.23**	-0.01	
Planning														0.33***	0.64***	0.12	0.02	
Humor															0.28***	0.32***	0.03	
Acceptance																-0.01	0.06	
Religion																		0.15*

*p<0.05, **p<0.01, ***p<0.001. ABS-H: Adaptive Behaviors Scale for Hikikomori, SRS: Stress Response Scale-18, SCS: Self-Compassion Scale Short Form, AAQ: Acceptance and Action Questionnaire-II, COPE: Brief Coping Orientation to Problems Experienced inventory