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Introduction

Salutogenic Japanese salutogenic studies research in Japan dates back to 1996. It was first introduced by Yoshihiko Yamazaki, a Japanese sociologist, and his colleagues via Aaron Antonovsky's seminal books, *Health, Stress, and Coping* and *Unraveling the Mystery of Health*. These scholars subsequently initiated a study group (still continuing), focusing on salutogenesis and the sense of coherence. *Unraveling the Mystery of Health* was translated into Japanese by members of the study group and published in 2001. The following year, Yamazaki and his colleagues also translated the sense of coherence scale into Japanese, which led to the initiation of empirical research. Moreover, the publication of *Introduction to the Sense of Coherence in the Salutogenic Model* (Yamazaki, Togari, & Sakano, 2008) and *Sense of Coherence in Adolescence* (Yamazaki, & Togari, 2011) within the Japanese academy has disseminated this research across various academic disciplines.

In this chapter, we identify and compile Japanese salutogenic studies, especially those that include the sense of coherence, identified in the databases of Japan Medical Abstracts and the National Institute of Informatics. We focus on publicly funded Japanese empirical research and research projects. We also review and present representative Japanese research papers.

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Original Japanese articles that included the keyword sense of coherence, or SOC and related terms soared from around 2003, with about 300 papers having been published since this date. A keyword search (“sense of coherence & Article”) using Ichushi-Web, an exhaustive Japanese biomedical literature search engine, yielded 284 Japanese studies. The number of citations in the database has increased, annually, by more than 300,000, and now exceeds eight million citations.

Additionally, 31 articles were identified through a search for the keyword “sense of coherence & Japan* & Article” in the Web of Science. Of these, eight overlapping articles and four articles focusing on Japanese living in the United States were excluded. Thus, we included a total of 303 papers published between June 2007 and June 2014 in our analysis. An examination of original papers published since 1998, according to the translated Japanese version of the sense of coherence scale, shows an annual increase in the number of publications since 2000. In particular, 30–50 papers have been published each consecutive year during the past 5 years.

About half of the studies (161 or 53.1 %) used sense of coherence as an independent variable. A total of 51 studies (16.8 %) used sense of coherence as the dependent variable, and 57 (18.8 %) examined the correlation between sense of coherence and psychological variables. Sense of coherence intervention studies commenced from around 2010, with a total count of nine studies (3 %).

Regarding study design, cross-sectional studies account for the majority of studies (232 or 76.2 %); there are 34 follow-up studies (11.2 %), and 23 qualitative studies (7.6 %). In recent years, the number of follow-up studies has shown an increase.

Regarding the participants (participants) in sense of coherence studies, 179 studies (59.1 %) focused on adults, 89 studies (29.4 %) examined students, 28 studies (9.2 %) focused on the elderly, and three studies (1.0 %) examined children. Among the studies focused on adults, the emphases were as follows: 23 studies (12.8 %) on general residents,

80 studies on workers (44.4 %), and 52 studies on patients (28.9 %). Over the last 3 years, college and nursing students have accounted for 30–40 % of research participants.

Research Funded by Grants-in-Aid for Scientific Research and Doctoral Theses

Grants-in-aid for scientific research (KAKENHI) are awarded in Japan to promote creative and pioneering research across a wide spectrum of scientific fields, ranging from the humanities and social sciences to the natural sciences. These KAKENHI grants are awarded to individual researchers or research groups at Japanese universities or research institutes engaged in basic research. As of 2014, 21 research projects that thematically included salutogenesis or sense of coherence obtained KAKENHI awards. Furthermore, 110 proposals included a component on salutogenesis or sense of coherence. The areas of investigation were nursing, public health, health sciences, psychology, social welfare, sociology, pedagogy, economics, engineering, agriculture, and other fields (see Table 43.1).

There were 16 doctoral theses in Japan's National Diet Library that thematically included salutogenesis and/or sense of coherence. Areas of investigations were medicine, health science, psychology, and economics.

The Japanese Version of Sense of Coherence Scale

The 29-item Japanese version of the sense of coherence scale was translated and made available by The University of Tokyo Antonovsky Study Group in 1998 (Yamazaki

1999). A shortened version with 13 items was subsequently explored for its construct validity (Togari, Yamazaki, Nakayama, Takayama, & Yamaki, 2008). In developing the 13-item version, a follow-up survey was conducted after 2 years with 407 college students in Tokyo, and the stability of a secondary three-factor structure was considered for predicting physical, mental, and psychosocial well-being. The stability of this factor structure was verified (stability coefficient = 0.72). An examination of the reliability and factor validity of a five-point version of the 13-item sense of coherence scale was also performed (Togari & Yamazaki, 2005). Item analysis, reliability analysis, and factor validity through confirmatory factor analysis were performed. Reliability (Cronbach's alpha = 0.82) and the secondary three-factor model were subsequently verified.

Moreover a 13-item, five-point sense of coherence scale was developed for children (Sakano, Togari, Yamazaki, Yajima, Kobayashi, & Ishibashi, 2009). This revised version, appropriate for Japanese elementary students, was based on the original sense of coherence 13-item scale and on previous versions developed for use with European adolescents (Torsheim, Aaroe, & Wold, 2001).

Simultaneously, SOC3-UTHS, a three-item, seven-point version of the SOC3 scale, developed by The University of Tokyo Department of Health Sociology, was applied in an extensive multipurpose general population survey (Togari, Yamazaki, Nakayama, & Shimizu, 2007). The reason for this was that whereas many researchers wish to measure sense of coherence within surveys, a 13-item sense of coherence scale cannot always be inserted into questionnaires because of the large space requirement.

Although the Japanese version of Lundberg's three-item sense of coherence scale (Lundberg & Nystrom, 1995) was applied, there were considerable difficulties translating it into Japanese. Therefore, a new three-item version of the sense of coherence scale was developed based on the conceptual definition of sense of coherence. Consequently, Cronbach's alpha coefficients were around 0.90, and the correlation coefficients between SOC3-UTHS and the sense of coherence 13-item scale were about 0.5–0.6. The SOC3-UTHS items are:

- I am able to find solutions to various problems and hardships that I face in my daily life (manageability)
- I am able to find value in confronting various hardships and problems that I face in my life (meaningfulness)
- I am able to understand and predict various hardships and problems that come up in my life (comprehensibility)

Until now, the 13-item, seven-point version of the sense of coherence scale has been predominant in Japan. A 13-item five-point version is also frequently applied in

Table 43.1 Areas of investigation incorporating salutogenic or sense of coherence research in Japan (1995–2014)

Areas	<i>n</i>	(%)
Nursing science	40	(36.4)
Public health	17	(15.5)
Health science	15	(13.6)
Psychology	14	(12.7)
Social welfare	7	(6.4)
Sociology	6	(5.5)
Sports science	3	(2.7)
Pedagogy	2	(1.8)
Nutritional science	1	(0.9)
Agriculture	1	(0.9)
Economics	1	(0.9)
Engineering	1	(0.9)
Psychiatry	1	(0.9)
Religious studies	1	(0.9)
Total	110	(100.0)

research on adolescents and the elderly. The three-item version has been more widely used in multipurpose survey research.

Empirical Studies in Japan

Here, we provide very brief synopses of research projects to aid the reader in identifying particular Japanese researchers' interests and key publications. The authors of this chapter are willing and eager to facilitate contact with Japanese researchers.

Takayama et al. (1999) examined sense of coherence stability and its buffering effect on psychological health in dealing with stressful life events. The participants were 200 adults randomly selected in Tokyo, and a follow-up survey was conducted 1 year after the first survey. The mean sense of coherence at follow-up in 1998 was 131.1 ± 23.9 , which was significantly lower than that at baseline. The results showed that sense of coherence was positively related to psychological health, but demonstrated a buffering effect in dealing with stressful life events only among men.

Tsuno and Yamazaki (2012) investigated associations among coping resources, sense of coherence, and health status by undertaking a comparison of urban and rural residents. A total of 2000 general residents aged 30–69 years in two areas were targeted. Sense of coherence was found to be significantly associated with mental health in both areas. Mental health was significantly associated with physical activity limitations and life stressors in both areas. However, the associations weakened when social and psychological resources and sense of coherence were added. This demonstrated their buffering effect on the negative influences of life stressors on health.

Kondo (2007) focused on an elderly population in a community to examine the relationship between person low sense of coherence-to-person high sense of coherence and depression and stressful life events. The greater the number of stressful life events, the more people suffered from a state of depression, with significant increases in the low sense of coherence group among both men and women. These findings demonstrated the buffering effect of sense of coherence.

Matsushita et al. (2010) examined the association of sense of coherence and QOL among 260 pregnant women. This was measured six times in total during pregnancy and up to postdelivery. The average sense of coherence score of pregnant women tended to be higher than the score of the general population of women. There was no significant difference between the scores of women in early and late pregnancy. Sense of coherence was found to be high from the beginning of pregnancy. A significant correlation was

observed between the QOL and sense of coherence. QOL showed a significant correlation between number of weeks of pregnancy and the time of pregnancies.

Togari (2012) collected longitudinal data obtained over 4 years from a Japanese life course survey. It aimed to investigate the following hypotheses regarding causal relationships: psychosocial work characteristics affect mental health, and sense of coherence mediates causal relations. Men living in Japan between the ages of 20 and 40 years were selected as participants. In this study, 1006 working males in each research location were recruited. The model of the mediated effect of sense of coherence on the causal relationship of the effect of psychosocial work characteristics on mental health was accepted. However, the direct causal relation between work characteristics and mental health was not significant. These results support Antonovsky's salutogenic model.

Urakawa and Yokoyama (2009) examined whether sense of coherence could reduce the adverse effects of job stress on mental health status. Self-administered questionnaires were distributed among 740 workers in a manufacturing industry. The study found that mental health status was adversely related to job demands, but positively associated with sense of coherence among both males and females.

Morita, Inoue, Konno, Ohta, and Yamato (2013) examined the degree of association of sense of coherence and job stressors with depression. A total of 185 workers completed the questionnaires. The impact of sense of coherence on depression was found to be greater than that of job strain. Sense of coherence may play an important role in the stress management of computer software workers.

To clarify a possible association of sense of coherence with stress reactions and related factors, Yoshida, Yamada, Shibataki, and Morioka (2013) surveyed 463 female nurses in a Japanese hospital. The results showed that sense of coherence had a significant association with stress reactions, along with quantitative overload, one of the factors related to stress reactions and age. It follows that sense of coherence could be an independent factor in decreasing the stress reactions of nurses.

Togari and Yamazaki (2009) focused on the identification of socioeconomic disparities in sense of coherence, including education, type of occupation and employment, and income in a representative survey sample of Japanese residents aged from 20 to 40 years. Unemployment was associated with the lowest sense of coherence in all socioeconomic groups. Sense of coherence declined with lower academic backgrounds. Also, those in the low income category had significantly lower sense of coherence. In multivariate analyses adjusted for academic background and occupation, a significant relationship was found in the female sample; however, no relationship was found between income and sense of coherence in the male sample.

Kimura et al. (2001) investigated factors related to sense of coherence among 593 university students in Tokyo. Those with a high level of sense of coherence tended to have a strong sense of responsibility. They reported an extensive social support network and a supportive family environment during childhood, and positive experiences at junior and senior high school.

Togari et al. (2009) examined relationships between past and present school experiences and changing sense of coherence patterns during a 10-month period among 1539 urban Japanese high school students. The direct determinants of sustained high sense of coherence scores were found to be participation in school club activities, not being bullied in elementary school, excellence in sports, art, and school work, and relationships with friends in senior high school. The direct determinants of ascending sense of coherence scores were active participation in school club activities, managing relationships with friends, and having a certain number of friends in senior high school. The results were basically supportive of Antonovsky's hypotheses. Successful coping experiences and negative experiences, such as getting bullied, were determinants of sense of coherence scores.

Tsuno and Yamazaki (2007) examined whether the living environment influenced the pattern of correlations of sense of coherence with generalized resistance resources. Sense of coherence was found to be correlated with economic status among urban but not rural residents. Further, in rural areas alone, sense of coherence was found to be correlated with trends toward stable settlement, ties with relatives, and sense of humor. Urban residents in general showed significantly higher sense of coherence scores than rural residents. This may be because of higher levels of social support, self-efficacy, and higher economic status of urban residents.

Kanamori, Kai, Ishiyama, and Arao (2013) focused on middle-aged community-dwelling adults to examine the relationship between social participation and sense of coherence. Among women but not men, sense of coherence tended to be higher among those participating in more social groups.

In a large-scale cross-sectional study of 20,742 Japanese white-collar workers, Tomotsune et al. (2009) observed that stronger sense of coherence enabled a worker to adopt a problem-focused coping profile that facilitated better coping with work-related stressors.

Nakamura et al. (2001) investigated sense of coherence and natural killer cell activity (NKCA). In 125 men engaged in office work, sense of coherence and smoking were significantly correlated to NKCA as well as CD57+ T-lymphocyte expression and CD16+ monocytes, independently of other psychosocial variables. Thus, sense of coherence may be an important psychological modifier in determining the relationship between cellular immunity and smoking cessation.

Maruyama and Eto (2010) investigated the present conditions of people with physical disabilities living in less populated areas. The study participants were 88 individuals with disabilities. Sense of coherence had a negative correlation with life stressors. Sense of coherence was related positively to healthy behaviors, better subjective health, and higher self-efficacy.

Matsushita and Sato (2010) aimed to clarify the relationship between sense of coherence and smoking and drinking status in 149 inpatients of an acute psychiatric unit. Age and the degree of nicotine dependence were significant predictors of sense of coherence scores.

Matsushita, Ito, and Arai (2007) administered a questionnaire to 85 alcoholics to assess smoking history and level of awareness about smoking, nicotine dependence, and sense of coherence. The average sense of coherence score for males was 51, lower than that of the general Japanese population. The later the age at which an individual began smoking, the lower the nicotine dependence score. The higher the nicotine dependence score, the lower the individual's sense of coherence score.

Haoka et al. (2011) investigated changes in stress-coping abilities during a return to work (RTW) program. The study participants were 20 participants in an RTW program initiated within a hospital. The sense of coherence score at the end of the RTW program was significantly higher compared with the score at the time of enrollment. The study revealed that the stress-coping ability of employees on medical leave due to depressive disorder became stronger during participation in the group RTW program.

Ooi et al. (2010) measured the sense of coherence and stress coping abilities of 58 participants at the start and conclusion of a walking campaign and observed no significant change in level of sense of coherence.

Nakamura et al. (2006) aimed to apply sense of coherence in developing a mental health program for employees and to examine its effects. A total of 40 male participants between the ages of 50 and 69 years old, who were mentally unhealthy, were targeted for the health education program. The program's main significant effects were on mental health, sense of coherence, diastolic blood pressure, total cholesterol, exercise, and drinking and smoking.

Yamazaki et al. (2008) assessed psychosocial needs of persons with medically transmitted HIV and observed that sense of coherence scores were significantly higher in those subjectively experiencing good health and having no bleeding. No significant association was found between sense of coherence and AIDS development or CD4 cell counts. Sense of coherence scores was significantly higher for individuals who worked, had children or spouses, or economic security. It was also significantly higher for those who self-regulated their lives, whose actions were minimally driven by anxiety, who had an

emotional support network, and who experienced fun in their lives.

Omiya, Ito, and Yamazaki (2012) used interview data collected from 19 participants to study the sense of coherence among people with a cleft lip and cleft palate (CLCP). Knowing about and understanding CLCP seemingly enabled individuals to acquire sense of coherence in their lives, which may be related to gaining a feeling of control over their cleft condition, acquiring a sense of autonomy, and finding meaning in their lives.

Conclusion

Almost all of the studies presented in this chapter focused on the study of the sense of coherence; research studies that focus on other aspects of the salutogenesis model, and/or the broad salutogenic paradigm, are extremely limited in number. Even if most of the Japanese research is on the sense of coherence, and is descriptive, intervention research aimed at increasing the sense of coherence is also evident, and seems to be on the rise.

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