

## Report on “Radiation Disaster Recovery Studies”

Course: Radioactivity Social Recovery Course  
Name: Russell Sarwar Kabir

### Regarding “Radiation Disaster Recovery Studies”

The thrust of response and arc of recovery to the disasters of March 11, 2011, have developed into environmental and social circumstances that are characterized by chronic features on the landscape and lived experience of those affected. The unprecedented character of the nuclear elements of the historical event loomed heavily over the minds of observers and disaster-affected residents alike through the mutual and intuitive acknowledgement of radionuclides as noxious agents that beget a pervasive sense of fear, anxiety, hopelessness, and helplessness (i.e., psychological distress) due to their uncertain effects in tandem with the frailty of human control over natural disasters and their consequences. Restoration from the duress of chronic environmental disasters onset by radiation is thought to require a long-view approach to reconstruction that both acknowledges pervasive uncertainty and takes aim at repairing the social fabric through community engagement (Reich & Goto, 2015).

Psychosocial consequences are known to be one of the most significant issues that emerge from these events, indicating that efforts should be made to improve existing frameworks of emergency consequence preparedness and recovery management. Due to their relative rarity and heterogeneity, numerous guidelines rather than explicit instructions have been proposed to equip commissioners and decision makers with key points to create flexible and actionable plans for public mental health. Recommendations for managing the psychological consequences of nuclear incidents derive from the evidence-informed effort spearheaded by Hobfoll et al. (2007). The five essential principles are to promote (1) a sense of safety, (2) calming, (3) self- and community efficacy, (4) social connectedness, and (5) hope (Hobfoll et al., 2007; Dainiak et al., 2011). In a seminal paper for this domain, Gouweloos et al. (2014) thoroughly reviewed the available literature on guidelines for psychosocial care after chronic contamination events but found that no studies met the design criteria suitable for effectiveness research. Instead, public resiliency to the circumstances of nuclear disaster response and recovery are thought to benefit from projects that invoke a sense of common purpose (Gouweloos et al., 2014). Self-determination of acceptable risks can be facilitated through *co-expertise activities* to create *radiological protection culture*, which creates a context for enabling personal control and empowerment for coping with disaster. Crucially, this is achieved by adopting adaptive behaviors for everyday life and facilitating habits, skills, and networks for instrumental and social support.

In one prominent and specific example of hospital nurses as individuals affected by and participants in the radiation disaster recovery process, the ability to cope with daily life burdens and work-related stressors was actually found to be more important for mental health support than that of acquiring greater knowledge, information, and know-how for control methods related to radiation as the source of the disaster (Nukui et al., 2017). This underscores the need to provide broadly appropriate, flexible, and evidence-based mental

health promotion programs as support for affected but individuals in the recovery phase. A major recommendation for continued efforts to improve mental health outcomes after these events would thus incorporate health promotion with activities that create or co-exist with efforts to establish services within communities to maintain public health services or foster environmental risk monitoring and protection culture. The field of public mental health is a burgeoning extension of epidemiological efforts to account for the distribution of mental conditions and the coordination of prevention and promotion activities related to their identification and management. In pursuit of the latter, public mental health tools that possess a track record under disaster recovery circumstances at the community level for calming, self-efficacy, and adaptive behavior among populations with known risk factors as areas of need (i.e., mothers, children, the elderly, caregivers, and community members) would be suitable for filling the gap in candidate templates for actionable and programmable solutions.

Matching major elements of the global standard Hobfoll guidelines for providing of calming and self-efficacy after disasters with chronic features, relaxation programs are known for their versatility, cost-effectiveness, and ability to help people obtain self-regulatory coping skills. Self-Active Relaxation Therapy (SART; Ohno, 2015) is a physical relaxation approach to psychological rehabilitation that grew out of the suite of movement tasks developed in the Japanese psychotherapy known as *Dohsa-hou*, or the body movement method. The program for SART is designed to stretch, twist, and release areas of the upper, lower, and whole body through a set of movements which are guided by a practitioner and performed “self-actively” by a client such that they can learn to recognize anxious tension in the body and perform instrumental actions on their own to achieve a relaxed state. A short version of SART has been investigated as a salon activity for the elderly, mothers raising children, special needs students, and children adapting to school as a context and means of psychological support. The full program has also been applied to clinical settings for psychological and developmental conditions, and longitudinally provided for community contexts as a means to assist residents facing long-term disaster recovery circumstances in Japan. My process toward “radiation disaster recovery studies” has been based in the training and experience I received for providing and evaluating stress management applications of SART. I have stipulated the properties and effects of the psychotherapy through academic research and synthesized them with the public mental health needs of disaster recovery. My progress toward vetting the program with valid methods and instrumentation is detailed in the thesis summary below.

**Title of Doctoral Thesis:**

*Interoceptive attention tendencies and their role in applications of Self-Active Relaxation Therapy*

**Summary of Doctoral Thesis:**

Mental health promotion programs targeted at the community recovery of disasters (e.g., areas with chronic environmental stressors) must be sufficiently broad and balanced enough to appeal to healthy people while still raising awareness of common mental disorders

and providing a skill that is meaningful for adaptive behavioral adjustments to relevant everyday stressors (Reich & Goto, 2015; Maeda, Oe, & Suzuki, 2018). This thesis identifies SART as a stress management program based on a Japanese psychotherapy that has been used as a vehicle for mental health support in disaster recovery and (1) provides comprehensive and culturally appropriate steps to address the validity of its underpinning framework in body awareness constructs, and (2) evaluates degrees of its effectiveness as a public mental health promotion program for applications to aforementioned contexts vis-à-vis its proposed mechanism of psychological change.

Despite its known utility and continuity as a program in disaster-affected areas, aspects of the evidence basis of SART have remained unspecified, especially with regard to the theoretical framework that should be used to assess effectiveness for its claims to providing changes in positively construed body awareness. Due to its systematic validation, cumulative evidence across numerous research contexts, and progress toward instrument maturity with operationalizable constructs, components of the regulatory awareness of bodily sensations, or *interoceptive attention tendencies*, captured by the instrument known as the Multidimensional Assessment of Interoceptive Awareness (MAIA) were chosen as a candidate system of constructs.

As a result of the psychometric evaluations of the properties of the Japanese version of the MAIA (Study 1), evidence of structural (internal) validity for the theoretical structure of the MAIA was supported. Concurrent with previous studies demonstrating criterion-related validity, the difference in mean scores among participants experienced and inexperienced with contemplative and bodymind health practices suggested that the MAIA framework for interoceptive attention tendencies constructs are sensitive to change related to behavioral health practices that hold promise as candidates for intervention in bodily-focused psychological conditions. For cross-cultural validity, approximate metric invariance was supported by comparison of information criteria, and analysis of salient loadings supported factor determinacy. These findings suggested that the Japanese and English MAIA instruments measure dimensions of interoceptive attention tendencies that are comparable in terms of factor loadings. Providing indications of empirical support for the MAIA dimensions in collaborative research with the cognitive psychology laboratory, Study 2 evaluated incremental validity considerations using resting-state EEG power indices. The negative relationship discovered between *Self-Regulation* and theta power aligns with other studies that have connected self-reported tendencies to cognitive interference reduction and relief from anxiety through their trait coherence and adds to the discussion of psychobiological implications for interoceptive processes. Predictive incremental validity for factor structures of the MAIA that retain *Self-Regulation* was also established through supported regressions onto trait anxiety that largely replicated the test of construct validity in the original validation (Study 3.1). Theoretical convergence between the scales made to track changes in SART applications also indicated emic-etic support for interoceptive attention tendencies as a common platform as focal body awareness constructs were found to correlate with the MAIA dimensions in a convergent manner (Study 3.2).

Finally, fitness for use of the MAIA with SART was evaluated in a series of applications of SART to a stress management program. Building upon the findings from Study 1 suggesting that interoceptive attention tendencies are sensitive to change, positive

body awareness enhancement was observed in two contexts of university students (Study 4) and nurses (Study 5) for state anxiety and the MAIA dimensions of *Attention Regulation*, *Self-Regulation*, and *Trusting*. These findings show that the MAIA framework and SART possess indicators and degrees of effectiveness in applications of targeted positive change via body awareness in public mental health settings. *Body Listening* was especially responsive to SART among hospital nurses with elevated trait anxiety. While former SART studies have observed qualitative reports of body awareness and within-subject changes in mood and stress responses with case-control designs in children, this is the first set of studies to systematically account for changes with a formal framework of body awareness in adults and compared with a test-retest control group.

The relaxation effect of SART has been triangulated across previous studies with electromyography and reports of mood state and body awareness regulation in clinical and applied settings. Consistent with this reporting, the manipulation check for state anxiety reduction as an indication of relaxation was also supported by the findings through strong effect sizes in samples of university students and hospital nurses. This suggests that SART provides one of the cardinal benefits advised by the Hobfoll et al. (2007) guidelines to provide “calming” in a systematic fashion. Furthermore, a line to the promotion of “self-efficacy” can be drawn through the web of relevant psychological indicators if the MAIA is utilized in SART programs designed for such purposes. Indicating “collective efficacy”, SART was consistently applied over seven years and seamlessly integrated into affected areas of Iwate Prefecture. Overall, SART was available and deliverable for public mental health in ways that connected community members of temporary housing complexes, and even recovery housing areas later in the disaster recovery process.

The psychosocial consequences of chronic events such as nuclear and radiation disasters are known to be some of the most significant issues that emerge in their wake, indicating that efforts should be made to explore and improve existing frameworks for their management. Public mental health tools such as stress management have shown such an ability to promote calming, self-efficacy, and adaptive behavior for populations with known risk factors at the community level and under disaster recovery circumstances. SART as a community program was successfully and continually applied bi-annually to disaster-affected areas for groups as diverse as mothers, children, elderly, caregivers, and community members. In this manner, comparing the criteria of Hobfoll et al. (2007), the results that as many as five of the MAIA factors for within-subject changes and three factors between, SART or similar programs might be suitable for filling the gap in candidate templates for psychologically informed recovery management. This would indicate that stress management configurations of SART possess high fitness and utility to the circumstances and processes of chronic disaster recovery.

## **Conclusion**

To fill a pressing need for a candidate disaster recovery management program for public mental health, the studies in this dissertation aimed: (1) to propose SART as a solution (i.e., chief independent variable) by leveraging an intact and globally utilized framework of constructs for body awareness changes from health practices and psychotherapies

operationalized by interoceptive attention tendencies (i.e., primary set of dependent variables); (2) to probe the previous literature on the framework of these constructs for open questions on their validity; (3) to address validity questions for the use of interoceptive attention tendencies in Japan vis-à-vis integrated measurement properties and cross-disciplinary inferences; and (4) to observe their role in applications of SART as a tool to determine its ability to contribute to domains of sensibility about the body, the regulation of mood states, and the management of stress through the deliberate practice of relaxation.

Overall, my dissertation provided a framework of common constructs of interest to the mechanism of body awareness change in SART with interoceptive attention tendencies measured by the MAIA and offers evidence of positive body awareness enhancement from stress management applications employing SART, especially with regard to the supported changes along the dimensions of *Attention Regulation*, *Self-Regulation*, and *Trusting* in healthy groups, and *Body Listening* among hospital nurses with anxiety proneness. Comprehensively addressing questions of validity, it offers indicators of effectiveness for a system of constructs in a mental health promotion format that could be flexibly and feasibly applied to address the needs of individuals undergoing community recovery from disasters with chronic features (Landsman-Dijkstra, van Wijck, Groothoff, & Rispens, 2004; Reich & Goto, 2015; Nukui et al., 2017).

## References:

- Dainiak, N., Gent, R. N., Carr, Z., Schneider, R., Bader, J., Buglova, E., ... & Hauer-Jensen, M. (2011). Literature review and global consensus on management of acute radiation syndrome affecting nonhematopoietic organ systems. *Disaster Medicine and Public Health Preparedness*, 5(3), 183-201.
- Gouweloos, J., Dückers, M., Te Brake, H., Kleber, R., & Drogendijk, A. (2014). Psychosocial care to affected citizens and communities in case of CBRN incidents: a systematic review. *Environment International*, 72, 46-65.
- Hobfoll, S. E., Watson, P., Bell, C. C., Bryant, R. A., Brymer, M. J., Friedman, M. J., ... and Maguen, S. (2007). Five essential elements of immediate and mid-term mass trauma intervention: Empirical evidence. *Psychiatry: Interpersonal and Biological Processes*, 70(4), 283-315.
- Landsman-Dijkstra, J. J., van Wijck, R., Groothoff, J. W., & Rispens, P. (2004). The short-term effects of a body awareness program: better self-management of health problems for individuals with chronic a-specific psychosomatic symptoms. *Patient Education and Counseling*, 55(2), 155-167.
- Maeda, M., Oe, M., & Suzuki, Y. (2018). Psychosocial effects of the Fukushima disaster and current tasks. *Journal of the National Institute of Public Health*, 67(1), 50-58.
- Nukui, H., Murakami, M., Midorikawa, S., Suenaga, M., Rokkaku, Y., Yabe, H., & Ohtsuru, A. (2017). Mental health and related factors of hospital nurses: an investigation conducted 4 years after the Fukushima disaster. *Asia Pacific Journal of Public Health*, 29(2\_suppl), 161S-170S.

Ohno, H. (2015). Applications of relaxation to stress management I: principles of self-active relaxation therapy. *Hiroshima Psychological Research Bulletin*, 14, 3–11. [In Japanese with English abstract]. doi: 10.15027/39583

Reich, M. R., & Goto, A. (2015). Towards long-term responses in Fukushima. *The Lancet*, 386(9992), 498-500.

### **Other theses published in academic research journals:**

Namba S, Makihara S, **Kabir RS**, Miyatani M, Nakao T. (2016). Spontaneous facial expressions are different from posed facial expressions: morphological properties and dynamic sequences. *Current Psychology*, 35 (129): 1-13.

Namba S, **Kabir RS**, Miyatani M, Nakao T. (2017). Spontaneous facial actions map onto emotional experiences in a non-social context: toward a component-based approach. *Frontiers in Psychology*, 8, 633.

**Kabir RS**, Haramaki Y, Ki H, Ohno H (2018). Self-Active Relaxation Therapy (SART) and self-regulation: a comprehensive review and comparison of the Japanese body movement approach. *Frontiers in Human Neuroscience*, 12, 21.

Namba S, **Kabir RS**, Miyatani M, Nakao T. (2018). Dynamic displays enhance the ability to discriminate genuine and posed facial expressions of emotion. *Frontiers in Psychology*, 9.

Haramaki Y, **Kabir RS**, Abe K, Yoshitake T. (2019). Promoting self-regulatory management of chronic pain through Dohsa-hou: single case series of low-functioning hemodialysis patients. *Frontiers in Psychology*, 10, 1394.

**Kabir RS**. (2019). Interoceptive attention tendencies predict trait anxiety in undergraduate students and hospital nurses participating in stress management programs. *Bulletin of the Graduate School of Education, Hiroshima University, Part III (68)*, 111-120.

**Kabir RS**, Abe K, Haramaki Y. (2019). Convergent associations between interoceptive attention tendencies and the experience of embodied self-awareness and feeling states related to self-active relaxation tasks. *The Japanese Journal of Rehabilitation Psychology*, 45 (1), 55-66.

Abe K, **Kabir RS**, Haramaki Y. (2019). Referencing the body for mood state regulation: an examination of stress management using Dohsa-hou as a primary prevention program for nurses. *Environmental and Occupational Health Practice*, 1-6.