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Pilot Study About the Effects of the Soma Experiencing Motion (Soma e-Motion) Program on Interoceptive Awareness and Self-Compassion

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Objective The purpose of this study was to examine the effects of the Soma experiencing motion (Soma e-motion) program on interoceptive awareness and self-compassion among novices.

Methods A total of 19 adults (clinical group=9, non-clinical group=10) participated in the intervention. Psychological and physical changes after program were qualitatively analyzed using in-depth interviews. The Korean Multidimensional Assessment of Interoceptive Awareness (K-MAIA) and the Korean version of the Self-Compassion Scale (K-SCS) were used as quantitative measures.

Results The non-clinical group showed statistically significant differences in the K-MAIA scores ($z=-2.805$, $p<0.01$) and K-SCS scores ($z=-2.191$, $p<0.05$); however, the clinical group showed no significant differences (K-MAIA: $z=-0.652$, $p>0.05$; K-SCS: $z=-0.178$, $p>0.05$). According to the in-depth interviews, the results of the qualitative analysis were categorized into five dimensions (psychological and emotional, physical, cognitive, behavioral, and aspects participants found challenging and needs improvement).

Conclusion The Soma e-motion program was feasible for improving interoceptive awareness and self-compassion in the non-clinical group. However, further research is needed to investigate the clinical efficacy of the Soma e-motion program for clinical group.

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Keywords Interoception; Somatics; Self-compassion; Emotion regulation.

INTRODUCTION

The connection between emotions and the body is an interesting topic for many mental health clinicians and researchers.[1] Recently, a new perspective that conceptualizes the mind as an embodied component, as opposed to an individual entity separate from the body, has been emerging in the field of cognitive neuroscience.[2,3] From that perspective, mind function cannot be understood without consideration of physical experiences and surrounding environments. Furthermore, to recognize emotions and understand their meanings, it is necessary to be aware of body sensations and movements.[4,5]

From that background, a concept that has recently emerged to link the body and emotions is interoception. Interoception is narrowly defined as awareness of internal bodily signals, such as heartbeat, breath, thirst, hunger, and pain.[6,7] In the broad sense, interoception goes beyond bodily sensation representations to include how individuals interpret and react to those sensations.[8]

Interoceptive awareness involves noticing and acknowledg-

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ing internal body sensations, emotional states, and movements and appraising those stimuli.[7,9] Therefore, interoception plays a role in emotional regulation and behavior because distressing stimuli generally signal a need to return to a homeostatic state.[10,11] Dysfunction of interoceptive processing has been postulated as a biomarker for numerous affective states.[12,13] Individuals with affective disorders such as depression and anxiety are particularly prone to abnormalities in interoceptive processes, which could contribute to illness development, clinical symptom severity, or disease progression.[14-16] Severalempirical studies have indicated that disturbed interoceptive processing occurs in depression and anxiety disorders.[16-18]

Therefore, interventions that improve interoceptive awareness could be helpful for emotion regulation. Accordingly, various types of body-based interventions are being developed to improve emotion regulation.[19-21] Several techniques based on somatics are attracting attention as interventions that can improve interoceptive awareness and related emotion regulation. Somatics is a field of body work and movement studies that emphasizes internal perception and experience.[22] It includes yoga, Tai Chi, Feldenkrais, and the Alexander technique. Soma, which is used in various forms of movement-based therapy, specifically focuses on "the body as perceived from within" instead of "the body and movements as externally observed by others."[23] Recently, a new perspective has emerged that views somatic-based techniques as mindful movement.[24] From that perspective, somatic techniques are conceptualized as movement-based contemplative practices.[25] Like mindfulness meditation, the non-judgmental recognition of body sensations and adjustments to them can improve interoceptive awareness and emotion regulation. Somatic-based movement can help individuals with emotional dysregulation learn mindfulness. As a form of contemplative movement, somatics can enhance body awareness, enabling attention and observation to an individual's senses and re-integrating inner awareness to create meaning.[26] These processes can lead to self-compassion.[27-30] Several previous studies have suggested that somatic movement practices such as yoga can enhance emotion regulation including body awareness and self-compassion. However, studies on the psychological effects of techniques based on somatics are insufficient, particularly how somatic-based techniques affect the emotion regulation process and the underlying mechanisms of those effects. To identify the clinical effects of the somatic technique, it is essential to apply existing somatic techniques in a treatment program that is easy to apply clinically.

Therefore, a clinically applicable somatic-based program, the Soma experiencing motion (Soma e-motion) program, was developed to improve participants' emotion regulation ability. The Soma e-motion program integrates several existing somatic techniques, Feldenkrais, yoga, and other soma movements, for individuals with emotion dysregulation.[31] This program was designed to help participants become non-judgmentally aware of the various sensations coming from their bodies while they perform relatively easy and simple movements under the guidance of a therapist using non-directive, friendly language.

This study qualitatively and quantitatively analyzed the efficacy of the Soma e-motion program in clinical and non-clinical individuals. Because no previous study has examined the efficacy of a program integrating somatic techniques, we conducted in-depth interviews with the program participants to explore the psychological and physical changes experienced. In addition, we hypothesized that the Soma e-motion program, which has characteristics of contemplative movements, would effectively enhance interoceptive awareness and self-compassion, and we quantitatively analyzed our results to test that hypothesis.

METHODS

Participants

We recruited participants for clinical and non-clinical groups. The clinical group contained patients diagnosed with and receiving treatment for depression and anxiety disorders at the department of psychiatry of a general hospital. Patients were recruited through the recommendation of their psychiatrist and advertisements posted in outpatient clinics. The non-clinical group contained students taking a psychology class at a university. All participants received a detailed explanation of the study process and provided written consent to participate. We enrolled 22 participants in the study. Three participants in the clinical group dropped out during the intervention, and no one dropped out of the non-clinical group. The three who dropped out refused to continue participating in the program because it was difficult for them to adapt to the group setting.

The final sample contained 19 participants (mean age=51.40, standard deviation [SD]=13.00; 73.68% female). The clinical sample of novices to somatic techniques (n=9, mean age=42.90, SD=13.30) received their self-report questionnaires from the department of psychiatry in the hospital. The non-clinical sample of novices to somatic techniques (n=10, mean age=59.00, SD=6.42) received their questionnaires from a graduate student at the university. This study was approved by the Institutional Review Board of Incheon St Mary's Hospital, College of Medicine, The Catholic University of Korea (No. XC19OEDI0068).

Procedure

In this study, four sessions of Soma e-motion program were conducted for the participants. At the end of the program, the participants were interviewed by clinicians and completed another set of questionnaires. Participants also completed demo-

graphic questions, the Korean Multidimensional Assessment of Interoceptive Awareness (K-MAIA), and the Korean version of the Self-Compassion Scale (K-SCS).

Our study involved one psychiatrist and one psychologist with previous psychotherapy experience. Clinicians received group supervision and peer supervision. The in-depth interviews were conducted offline and online about the experience of the participants in the Soma e-motion program from December 2019 to April 2020, and each interview took 20−30 minutes.

For qualitative analyses, one psychologist and one psychiatrist analyzed the data using verbatim records. The psychologist who performed the major qualitative analysis has a PhD. in public health and works as an assistant professor at the department of meditation psychology in a university. In addition, she has conducted numerous in-depth interviews and published qualitative research papers. The data obtained through the interviews were examined by extracting common content and discerning main categories using consensual qualitative research. Based on the first analysis, the psychiatrist responsible for this study reviewed the categories and contents, and then the researchers discussed their opinions and adjusted the content accordingly. The research and review process were conducted by two researchers (MS Lee, HJ Huh) from twice to third times, and only final consensus opinions were analyzed.

Soma e-motion program

The Soma e-motion program was designed to help participants attend to their own bodies and become aware of their personal states of mind connected to their bodies. The detailed protocol for the Soma e-motion program was described in a previous article.[31] The Soma e-motion program is composed of easy and comfortable movements because many participants have a low tolerance to pain or uncomfortable sensations. Furthermore, considering that participants might easily become tense in an unfamiliar setting, the program uses movements common in daily life such as sitting, standing, and walking. This protocol consists of four 60-minute sessions and is based on body scans, breath training, and soma movements. The body scan focuses attention on the body part that touches the floor and helps stabilize the body and mind through grounding. In the breathing exercise, participants notice when and how they breathe, move, and relax. During the program, participants practice self-regulation and choose the power and speed of each movement.[32]

The first session focuses on exploring the length of the spine and width of the back using pelvic movements, and the second session explores physical tension and breathing patterns using eye movements. The third session explores the lateral parts of the body using tilting movements. The fourth session explores the tension and relaxation of moving body parts using respiration and one's hands (Table 1).

Based on clinician guidance, participants gradually learn to perceive their inner sensations in more detail by performing intentional body movements. Through this process, participants learn to select and regulate their movements based on their own comfort.

Measures

K-MAIA

To measure body awareness, we used the K-MAIA by Gim et al.[33] who revised and validated the MAIA developed by Mehling et al.[34] The K-MAIA contains 32 questions divided into six subfactors: noticing, acceptance, attention regulation, mind-body connection awareness, return to the body, and trusting. This measure uses a 7-point Likert scale, and the total score ranges from 0 to 192 points. In Gim et al.[33] study, the Cronbach's α value of the K-MAIA was 0.94. In the present study, the Cronbach's α value was 0.92.

Table 1. Contents of the Soma e-motion program protocol

Body scan	Grounding of the body and psychological stability by awakening the sensations (e.g., touch, weight, length, etc.) of the body parts that touch the floor.
Breathing training	Rather than instructing movement and breathing, the therapist guides the patient to detect when and how they breathe and what movements and breaths feel tense or relaxed. The breathing guide in this program is different from the practice of focusing and observing breathing used in meditation and yoga. It is a process of finding one's own natural breathing.
Soma movement	In an easy, smooth, and slow-moving process, patients can learn to recognize the parts of their bodies that are tense or relaxed and select and control their movements.
	1st session: exploring the length of the spine and the width of the back using pelvic movements
	2nd session: exploring physical tension and breathing patterns using eye movements
	3rd session: exploring the lateral parts of the body using tilting movements
	4th session: exploring tension and relaxation bymoving body parts during respiration based on one's own hands-on

K-SCS

To measure self-compassion, we used the K-SCS, developed based on Neff's[35] SCS, revised by Kim et al.,[36] and validated by Lee and Lee.[37] The K-SCS contains 26 questions answered on a 5-point Likert scale that ranges from "almost never (1 point)" to "almost always (5 points)." The total score ranges from 26 to 130 points. The K-SCS is divided into six subscales self-kindness, common humanity, mindfulness, self-judgement, isolation, and over-identification. In Neff's study,[35] the Cronbach's α value of the SCS was 0.92. In the present study, the Cronbach's α value was 0.89.

Statistical analysis

All quantitative analyses were conducted using IBM SPSS Statistics Ver. 22.0 (IBM Corp., Armonk, NY, USA). Changes in K-MAIA and K-SCS scores from pre- to post-testing were evaluated using the Wilcoxon signed-rank test. The p-value significance threshold was a p-value of 0.05.

RESULTS

Analysis of pre-post differences in the K-MAIA

The total K-MAIA score of the non-clinical group improved from 121.30 in the pre-session to 150.00 in the post-session, a statistically significant difference (z=-2.805, p<0.01). However, in the clinical group, the total score improved from 97.89 to 104.56, which was not a significant difference (z=-0.652, p>0.05). In subfactor analysis, the non-clinical group significantly improved in noticing (z=-2.670, p<0.01), attention regulation (z=-2.706, p<0.01), mind–body connection awareness (z=-2.437, p<0.05), return to body (z=-2.451, p<0.05), and trust (z=-2.694, p<0.01). In the clinical group, on the other hand, the scores of all subfactors improved in the post-session compared with the pre-session, but none of the differences was statistically significant (Table 2).

Analysis of pre-post differences in the K-SCS

The total K-SCS score of the non-clinical group improved from 92.10 in the pre-session to 104.90 in the post-session, a statistically significant difference (z=-2.191, p<0.05). However, in the clinical group, the pre- and post-session scores were both 69.56 (z=-0.178, p>0.05). In the subfactor analysis, the non-clinical group showed statistically significant differences in self-judgement (z=-2.081, p<0.05) and over-identification (z=-1.997, p<0.05). In the clinical group, on the other hand, the scores for common humanity, mindfulness, and isolation all improved in the post-session compared with the pre-session, but none of the differences was statistically significant (Table 3).

Table 2. Analysis of pre-post differences in the K-MAIA for the body awareness (N=19)

Variables	Group	Time	Value	Z
Noticing	Clinical group	Pre	24.89±6.13	-8.31
		Post	27.33±4.85	
	Non-clinical group	Pre	23.40±4.95	-2.670**
		Post	29.80±5.90	
Acceptance	Clinical group	Pre	8.78±5.40	-0.679
		Post	7.22±6.02	
	Non-clinical group	Pre	13.50±2.55	-1.960
		Post	16.90±6.51	
Attention regulation	Clinical group	Pre	16.89±10.69	-0.415
		Post	17.89±10.96	
	Non-clinical group	Pre	26.00±5.25	-2.706**
		Post	31.60±7.62	
Mind–body connection awareness	Clinical group	Pre	22.11±6.21	-0.140
		Post	22.22±6.24	
	Non-clinical group	Pre	20.50±2.22	-2.437*
		Post	24.50±4.58	
Return to body	Clinical group	Pre	19.00±10.15	-1.272
		Post	21.67±6.42	
	Non-clinical group	Pre	26.90±5.71	-2.451*
		Post	32.50±8.50	
Trust	Clinical group	Pre	6.22±4.35	-1.633
		Post	8.22±4.63	
	Non-clinical group	Pre	11.00±2.11	-2.694**
		Post	14.70±3.30	
Total	Clinical group	Pre	97.89±33.19	-0.652
		Post	104.56±29.48	
	Non-clinical group	Pre	121.30±19.68	-2.805**
		Post	150.00±35.51	

Values are presented as mean±standard deviation. *p<0.05; **p<0.01

Qualitative analysis

When we analyzed the contents of the interviews, we were able to divide the main characteristics of participants' Soma e-motion experiences into five dimensions: psychological and emotional, physical, cognitive, behavioral, and difficulty and hope to improve. Across the dimensions, we derived 18 upper categories, 58 subcategories, and 131 semantic contents.

Psychological and emotional dimension

In the psychological and emotional dimension, we derived two upper categories, eight subcategories, and 28 semantic contents. The upper categories were "experiencing positive emotions" and "resolving negative emotions."

The subcategories were "felt relaxation and comfort," "want-

Table 3. Analysis of pre-post differences in the K-SCS for self-compassion (N=19)

Variables	Group	Time	Value	Z
Self-kindness	Clinical group	Pre	11.67±3.61	-0.496
		Post	11.11±4.08	
	Non-clinical group	Pre	15.20±3.43	-1.823
		Post	18.30±4.37	
Common humanity	Clinical group	Pre	9.56±2.79	-0.121
		Post	9.78±2.82	
	Non-clinical group	Pre	13.30±1.64	-0.896
		Post	14.10±4.58	
Mindfulness	Clinical group	Pre	10.56±2.79	-0.283
		Post	11.11±4.34	
	Non-clinical group	Pre	14.30±2.00	-1.735
		Post	16.30±3.09	
Isolation	Clinical group	Pre	10.44±3.94	-0.352
		Post	10.67±4.12	
	Non-clinical group	Pre	15.50±3.50	-1.740
		Post	18.30±2.36	
Self-judgment	Clinical group	Pre	13.33±6.38	-0.425
		Post	13.00±5.45	
	Non-clinical group	Pre	18.50±2.64	-2.081*
		Post	20.50±2.76	
Over-identification	Clinical group	Pre	14.00±3.43	-0.212
		Post	13.89±4.23	
	Non-clinical group	Pre	15.30±2.36	-1.997*
		Post	17.40±2.01	
Total	Clinical group	Pre	69.56±14.47	-0.178
		Post	69.56±13.10	
	Non-clinical group	Pre	92.10±9.68	-2.191*
		Post	104.90±14.47	

Values are presented as mean±standard deviation. *p<0.05

ed to stay withone's emotion," "felt joy and gratitude," "experienced the mind's rest and space," "freedom from pain and suffering," "mitigating lethargy," "reduced frustration," and "reduced anxiety symptoms" (Supplementary Table 1 in the online-only Data Supplement).

The main contents of the psychological and emotioanl dimensions experienced by the participants through Soma e-motion program were as follows:

• "I felt more supple and comfortable. Even small movements brought a lot of relaxation, which felt good." (Participant A)

• "With ordinary fitness activities I would compare my body's movements to others and sometimes feel relatively deprived and discouraged, but I liked this somatic program because I only need to progress up to where my body allows movement and observe the possibilities of my own body." (Participant F)

• "Through investigating my anxiety symptoms and feeling and identifying the level of such symptoms in this program, I think I made a great discovery that I can now measure the extent of my anxiety to a certain degree." (Participant P)

Physical dimension

In the physical dimension, we derived seven upper categories, 21 subcategories, and 48 semantic contents. The upper categories were "awareness of movement in each body part," "detected subtle sensations," "awareness of body balance," "activation of the body," "experienced physiological phenomena," "mitigation of pain," and "changes in body temperature." The subcategories were "felt changes in the spine," "noticed movement of rib cage," "felt movements of scapula and pelvis," "increased space between eyebrows," "felt subtle sensation of various muscles," "felt vivid bodily sensations," "experienced body vibration," "alignment of the body," "noticed differences between left and right side of body," "awareness of imbalance in body," "stimulated blood circulation," "flexibility," "increased metabolism," "urge to release intestinal gas," "belching," "activation of salivary glands," "reduced shoulder pain," "reduced pain in the arm," "relieved muscle pain," "sweating profusely," and "felt warm energy" (Supplementary Table 2 in the online-only Data Supplement).

The main contents of the physical dimensions experienced by the participants through Soma e-motion program were as follows:

• "While the last time my sensations were centered on the spine, this time I sensed delicate movements in the rib cage. As I contracted and stretched my body, I felt movements in not only my spine but also the rib bones and pelvis, and I also sensed them together when raising and lowering my arms." (Participant I)

• "Prior to the program I had a lot of chills in my body and poor blood circulation. But upon soma movements, it felt like warm energy was flowing to previously blocked, icy areas. Through a variety of movements, it felt as if the warmth in my body were expanding. I definitely felt my body was getting warm." (Participant E)

• "As I felt the movement of the muscle delicately, I experienced the mystery of the body. Also, as I moved my muscles delicately, my body alignment and posture improved." (Participant K)

• "At first, I didn't know how to conduct the movements, so I put a lot of effort on finding the correct movement. But as I investigated the movements of my spine, I think I found my own way of alignment." (Participant D)

• "There was a lot more saliva being created in my mouth than usual. I think the movements throughout the body stim-

ulated the secretion of saliva." (Participant C)

Cognitive dimension

In the cognitive dimension, we derived five upper categories, 16 subcategories, and 27 semantic contents. The upper categories were "awareness and perception of the body," "understood and focused on oneself," "increased concentration," "improved understanding of somatics," and "expected internal growth."

The subcategories were "perceived need of balance," "perceived body sensation," "systematically utilized the body," "ability to respond to physical symptoms," "discovered self-connected with the body," "learned to regulate body and mind," "immersed in the movements," "concentrated on the breath," "increased curiosity about somatics," "became comfortable with non-directive approach," "noticed differences with other interventions," "made effort to understand somatics," "benefitted from moving slowly," "mentioned benefits of using music," "expected positive change," and "intended to utilize as resource" (Supplementary Table 3 in the online-only Data Supplement).

The main contents of the cognitive dimensions experienced by the participants through Soma e-motion program were as follows:

- "At first, I was obtuse and oblivious to the movements of my body. Gradually I realized I was feeling my own bodily sensations." (Participant H)
- "I reminded myself about grounding techniques and the feeling of comfort and discovered how I can respond when my breathing gets out of control." (Participant S)
- "I realized that focusing on the body could result in regulating negative emotions. I learned that I could investigate my own emotions or states in different ways than with language." (Participant H)
- "I now look forward to seeing a lot of changes in my life if I repeatedly and regularly practice noticing my sensations and staying in the present." (Participant O)

Behavioral dimension

In the behavioral dimension, we derived one upper category, four subcategories, and 14 semantic contents. The upper categories were "changes in daily life."

The subcategories were "benefitted sleep," "attempted to incorporate somatics in daily routine," "applied somatics in public transit," and "formed habit" (Supplementary Table 4 in the online-only Data Supplement).

The main contents of the behavioral dimensions experienced by the participants through Soma e-motion program were as follows:

- "When I couldn't fall asleep, I tried the movements, and they helped me sleep." (Participant R)
- "I didn't do too much of it in my daily life, but when I had some free time, or when I felt anxious, I tried the movements to find a little peace of mind." (Participant K)
- "I tried concentrating on the pelvis in situations where noises were amplified and sounded violent, and even small movements of people felt aggressive. I felt comfort from grounding and could sense every single bone in the lumbar vertebrae. This gave a refreshing feeling of air passing through the gap between each bone, and I was able to endure four more stops by focusing on that feeling. This was my first and last successful experience outside the hospital setting." (Participant N)

Aspects participants found challenging and needs improvement

In the aspects participants found challenging and needs improvement, we derived two upper categories, nine subcategories, and 14 semantic contents. The upper categories were appeals for "reported physical/psychological difficulties" and "suggested improvements to program organization."

The sub-categories were "difficulty concentrating," "felt despair," "difficulty breathing," "difficulty in eye movement," "felt challenging," "felt pain," "difficult to tell apart movement," "dissatisfied with number of sessions," and "dissatisfied with environment" (Supplementary Table 5 in the online-only Data Supplement).

The main contents of the need and challenging dimensions experienced by the participants through Soma e-motion program were as follows:

- "I had difficulty in focusing on my breathing. I was filled with feelings of loss, shame, anxiety, and fear, so I couldn't recall the contents of the program due to dissociation − this was disappointing to me." (Participant O)
- "Perhaps due to my older age, I felt pain in the back of my thighs and lower back when doing one of the standing motions, when we slightly bent the knees and immediately straightened them." (Participant K)
- "I would like the program a bit longer. It feels like a short time to allow the body to get familiarized with the movements or the sensations." (Participant N)

DISCUSSION

In this study, we aimed to understand the effects of the Soma e-motion program on the body awareness and self-compassion of novices to somatic practices. To our knowledge, this study is the first study to evaluate the feasibility of using the Soma e-motion program to improve body awareness and self-compassion.

In the total K-MAIA score, the non-clinical group showed a statistically significant difference ($z=-2.805$, $p<0.01$). But the

clinical group did not (z=-0.652, p>0.05). Our results are consistent with a previous study[38] that a mindfulness-based intervention focusing on body awareness improved interoception relative to the control group. Additionally, the current study is similar to thepriorstudy[39] that yoga positively affected sensory awareness and interoception and increases parasympathetic activity. A recent study also suggested that mindfulness moderates the relationship between behavior and body awareness.[40] Body awareness is the phenomenological and subjective aspects of interoception and proprioception mediated by mental processes such as attention, appraisal, beliefs, conditioning, affect, and attitudes.[41] Similar to our findings, body awareness has been described as a key element and mechanism that can provide mental health benefits.[41] As previously mentioned, our protocol aimed to increase body awareness by allowing participants to experience openness, acceptance, and non-judgmental mindfulness.[41] Our findings indicate that body awareness during movement is a significant determinant of emotional wellbeing. In our qualitative findings, participants described shifts in their awareness of negative emotions and physical sensations, emotion regulation and self-care, engagement in self-regulation, and integration of their minds. Taken together, our results suggest that individuals who experience their bodily sensations as trustworthy and their bodies as safe might report greater body awareness than those who do not.[38] Better understanding the mechanisms between mental health and the processes of bodily sensations deserve continued investigation. Future studies should consider using a longer intervention period or booster sessions for the clinical group.

In the total K-SCS score, the non-clinical group showed a statistically significant difference (z=-2.191, p<0.05). But the clinical group did not (z=-0.178, p>0.05). The present result is similar to previous research[42] that underlined the importance of a self-compassion intervention in improving self-management behaviors and physical health. In addition, our findings are in close agreement with a previous study[29] that found that 47 nursing college students significantly improved their levels of self-compassion and mindfulness after experiencing yoga. As recent studies[42-45] showed, somatic experiences can help individuals expand what they may be feeling and their awareness of their bodies and minds. In the present study, Soma e-motion allowed participants to observe their inner experiences in the moment. Guiding them to observe their emotions and thoughts as they occur in the present moment could influence self-compassion.[43] Inparticular, previous studies[45-47] showed that self-compassion is related to psychological well-being, better quality of life, and decreased depression and anxiety. Self-compassion means offering non-judgmental empathy to one's inadequacies, shortcomings, and suffering, so that one's experience can be perceived as part of a broader human experience.[46] Furthermore, self-compassion generated through somatic movement could reassure participants that their experience is safe.[43] Our qualitative data show that better understanding of the underlying influences of self-compassion allowed participants to describe their particular phenomenological experiences. As reported in this study, novices experienced mind–body awareness and self-compassion more adaptively after completing Soma e-motion.

Despite offering qualitative and quantitative analyses of changes in the psychological, emotional, physical, cognitive, and behavioral dimensions that occurred after participants completed the Soma e-motion program, this study has some limitations that should be noted. First, we analyzed small clinical and community samples. Further studies should use larger randomized samples in various settings. Second, this study performed cross-sectional analyses, therefore, long-term follow-up with participants was infeasible. Third, qualitative responses and self-report measures reflect only personal reports. Thus, additional studies with observational designs are needed to triangulate the effects of self-reporting. Fourth, future research should establish the mechanism of action by which the Soma e-motion program affects the brain and confirm its applicability in clinical settings.

In conclusion, our results showed that the Soma e-motion program improved body awareness and self-compassion in the non-clinical group unfamiliar with somatic therapy. The body awareness and self-compassion offered by Soma e-motion program could produce resilience in dealing with psychological difficulties in daily life of non-clinical group. However, the Soma e-motion program showed no significant changes in body awareness or self-compassion in the clinical group. Nevertheless, the qualitative analysis indicated that the Soma e-motion program reduced anxiety symptoms and improved the emotional control of the clinical group participants. The current findings support the importance of further study of the intervention in both clinical and non-clinical populations.

Supplementary Materials

The online-only Data Supplement is available with this article at https://doi.org/10.30773/pi.2022.0312.

Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

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Supplementary Table 1. Qualitative analysis of changes in the psycho-emotional dimension following Soma e-motion program

Categories	Subcategories	Meaning unit
Non-clinical group		
Experienced positive emotion	Felt relaxation and comfort	Now I feel like I'm getting more comfortable. I can take care of my own breathing. It feels different from other technical movements. (Participant E)
		My mind became more comfortable. (Participant B)
		Once I closed my eyes, focused on of my body and tried to be more aware, I became much more comfortable. (Participant C)
		After doing this, I felt more supple and comfortable. Even small movements brought a lot of relaxation, which felt good. (Participant A)
		The more I relax my pelvis, scapula, waist, spine, back of the neck, the more I feel comfortable in my body. (Participant J)
		I felt a lot of relaxation in my body. I breathed in a lot of oxygen. After this, I feel refreshed and satisfied. (Participant H)
		I realized I could approach this program without feeling any pressure. (Participant L)
		I'm happy that I learned through the somatic program how slow movements could bring me so much comfort. (Participant R)
	Wanted to stay with one's emotion	It felt like moving slowly helped me focus on the body. When I feel a certain sensation in my body, I think it's good to stay in that moment for a sufficient amount of time. I wanted to spend enough time to savor the sensations I was getting from my body. (Participant B)
	Felt joy and gratitude	First, I felt very good after completing. I was looking forward to it as the program was once a week. (Participant I)
	Experienced the mind's rest and space	I felt that once I focused on my body, my mind was able to rest. (Participant H)
		I had felt constricted in my body and mind, but now I feel my mind has opened up and feel comfortable, and my outlook on life has expanded. (Participant F)
Resolving negative emotions	Freedom from pain and suffering	With ordinary fitness activities I would compare my body's movements to others and sometimes feel relatively deprived and discouraged, but I liked this somatic program because I only need to progress up to where my body allows movement and observe the possibilities of my own body. (Participant F)
	Reduced frustration	It felt like all my frustrations were relieved. As the program progressed, I was able to focus on my body. (Participant B)
Clinical group		
Experienced positive emotion	Felt joy and gratitude	It took a lot of effort and felt like I had exercised a lot as I moved parts of my body I wasn't used to moving, but it was a refreshing and beneficial experience. (Participant M)
		I felt gratitude and a sliver of hope during this time. (Participant O)
		It felt like giving my body the greatest kind of love; upon somatic experiencing, I feel hopeful and empowered that I know a method like this. (Participant K)
	Experienced the mind's rest and space	I felt I had more space in my mind. (Participant N)
		I thought I should try to create more space in my mind and body. (Participant Q)
Resolving negative emotions	Freedom from pain and suffering	I observed my body without pain and experienced relaxation. (Participant R)
		I realized that the negative things that had sedimented in my mind would disappear little by little through bodily movements. (Participant S)
	Mitigating lethargy	I had felt lethargic, depressed, lonely, avoided people, and didn't feel like doing anything, but from the somatic movements I felt a change. (Participant M)
	Reduced anxiety symptoms	Through investigating my anxiety symptoms and feeling and identifying the level of such symptoms in this program, I think I made a great discovery that I can now measure the extent of my anxiety to a certain degree. (Participant P)
		I was able to identify the state of my emotion. And when I was anxious, I could use breathing techniques to find stability. (Participant K)
		I used to feel nervous, vaguely anxious, and paranoid in my daily life. Even though this program didn't solve everything, it was good to learn how to feel more at ease. (Participant L)
		I saw a little bit of hope that I could find space in my mind apart from anxiety and tension. (Participant N)
		When I found myself hyperventilating and anxious, I followed the somatic movements and practiced grounding, which stabilized me slightly quicker than before. (Participant S)
		When I felt anxious and on edge, it had a positive effect of calming my mind. (Participant N)

Supplementary Table 2. Qualitative analysis of changes in the physical dimension following Soma-emotion program

Category	Subcategory	Meaning unit
Non-clinical group		
Awareness of movement in each body part	Felt changes in the spine	I sensed the warm movement of all parts in my body and spine where I had pain, which relieved the whole body. (Participant H)
		When I was stretching the spine, I felt it elongate like a rubber band being pulled. (Participant D)
		As I could precisely feel each and every part of the bone, I felt relief in the spine and grew more aware of my body. (Participant C)
		When I stretched my arm, I felt my back elongate all the way down the bones of the spine to the lower back area behind my lower abdomen. (Participant B)
		I also felt strength in my muscles, and felt my lower body and back were being stretched out. (Participant J)
	Noticed movement of rib cage	My rib cage felt to me like a large basket. As I breathed, I could feel this basket collapse into a circle, then expand like the spokes of a basket. (Participant H)
		While the last time my sensations were centered on the spine, this time I sensed delicate movements in the rib cage. As I contracted and stretched my body, I felt movements in not only my spine but also the rib bones and pelvis, and I also sensed them together when raising and lowering my arms. (Participant I)
	Felt movements of scapula and pelvis	I felt the movements of my scapula. (Participant H)
		I felt my scapula being stretched out and could feel better the movements of my pelvic bones. (Participant B)
	Increased space between eyebrows	When I am in a bad mood or feeling low-energy, I tend to frown in my face and furrow my eyebrows. However, after the soma e-motion program I feel refreshed in my body, which I think widened the space between my eyebrows. (Participant F)
Detected subtle sensations	Felt subtle sensation of various muscles	I could sense subtle and delicate changes as we observed each part of the body. (Participant D)
		At first, I didn't get the chance to feel minute movements or muscles, but gradually I became aware of them. (Participant E)
		As I felt the movement of the muscle delicately, I experienced the mystery of the body. Also, as I moved my muscles delicately, my body alignment and posture improved. (Participant K)
	Felt vivid bodily sensations	It felt as if my cells were awakening. I felt a different sensation from ordinary weight training. (Participant A)
		As I repeated the movement of rotating the eye and neck, it felt as if the functions of various muscles and the nerve cells connected to them were gradually improving. (Participant A)
		I could feel various parts of my body twitching and moving. Even when I drank water, I seemed to be able to perceive even when the smallest details, such as the sound of water flowing down my gastrointestinal tract. (Participant I)
		As the scapula stretched out broadly, this broadened my chest, and stimulated various nerves in all parts of my body. I appreciated moving each part of the body separately. (Participant F)
		When rotating from the waist, I thought I sensed the movements of the intestines also, and now I can also feel my rib bones moving. (Participant F)
	Experienced body vibration	While doing the sitting movements, I felt vibrations coming from my body. (Participant F)
		At first, I just followed the movements, but once the movements deepened a little, I started feeling a vibration in my body. From the pelvis to the waist, I felt a little spinning sensation, and felt a vibration. It felt as if the body and mind were organically moving together. (Participant G)
Awareness of body balance	Alignment of the body	At first, I didn't know how to conduct the movements, so I put a lot of effort on finding the correct movement. But as I investigated the movements of my spine, I think I found my own way of alignment. (Participant D)
	Noticed differences between left and right side of body	When moving the spine, I felt as if the right side was contracting, and left side was extending. The left side was feeling more comfortable, so I was curious to know why. (Participant D)
		Compared to before, I see a noticeable difference when rotating my body. I recognized that there is a difference between the right side and the left side in the way the body rotate. (Participant A)
	Awareness of imbalance in body	Originally my body moved easier on the right side than on the left side. I think it's because the balance is broken. Usually, people tend to keep moving the side that works better, but I realized more movement is needed on the other side. This time I focused more on moving the difficult side, and now I feel more balanced. (Participant G)
Activation of the body	Stimulated blood circulation	I felt my blood circulation was improving. (Participant C)
		It seemed like things were flowing well within the body, and I felt a burp coming up, which also indicated good circulation. (Participant H)
	Flexibility	I think my body flexibility improved. Somatics itself is quite a beneficial program. (Participant C)
		I feel my body becoming a bit more flexible than before. (Participant A)
	Increased metabolism	The program was more energy consuming than I expected. My body feels a bit more dynamic and active. (Participant H)
Experienced physiological phenomena	Urge to release intestinal gas	When I was contracting and extending my body, it really felt like gas was about to get released, so I paid a lot of attention. (Participant I)
		I noticed a change in my stomach, like a boiling sensation. I was concerned about a fart coming out and making a sound and wondered if it was only me feeling like this. (Participant D)
	Belching	I didn't notice at first, but perhaps because blood circulation improved, burps would come out, and afterwards the body started feeling hot. (Participant I)
		I get a feeling that air is coming out of the body and feel like burping. (Participant J)
	Activation of salivary glands	There was a lot more saliva being created in my mouth than usual. I think the movements throughout the body stimulated the secretion of saliva. (Participant C)
		I also felt like a lot of saliva was coming out. When I'm working, I would usually feel my mouth becomes dry, but after the soma e-motion program I'm noticing a lot of secretion from my salivary glands. (Participant B)
Mitigation of pain	Reduced shoulder pain	I often had severe shoulder pain before this program. When doing the shoulder motions in program, I felt the pain decrease even with a simple movement. (Participant B)
		I usually had rather rounded shoulders. My shoulders now feel more refreshed after I tried moving them back several times, even though it was difficult at first. (Participant H)
		I usually had issues with my shoulders. Through the soma movements, I was able to relax the parts where I had pain. (Participant I)
		My shoulder condition is usually not good. When doing the movements, I realized I was straining my shoulders a lot. I think that was the reason why I had shoulder pain. (Participant I)
	Reduced pain in the arm	I usually take medicine for carpal tunnel syndrome. At first, I felt a searing pain when I did the arm-raising movements, but with repetition the pain subsided, and I felt more relief. (Participant J)
	Relieved muscle tension	Through soma movements, I was able to release the muscles in my back that were tensed up. (Participant G)
Changes in body temperature	Sweating profusely	I was sweating so much even with sitting movements.I wondered if I were the only one. (Participant C)
		A lot of sweat came out. Once I focused and slowed down my movements, I felt a change. After 30 or so minutes, I felt my body heating up. (Participant I)
	Felt warm energy	Prior to the program I had a lot of chills in my body and poor blood circulation. But upon soma movements, it felt like warm energy was flowing to previously blocked, icy areas. Through a variety of movements, it felt as if the warmth in my body were expanding. I definitely felt my body was getting warm.(Participant E)
		At first, I felt quite out of breath, but eventually it felt like a warm energy was flowing inside and clearing out my entire body. (Participant C)
		I used to feel like I was forcing my body to move. Now, as I slowly move my body according to my rhythm, I can feel its warm energy. (Participant H)
		I felt my body heating up. (Participant I)
		It felt like my muscles were getting hot. (Participant A)
Clinical group		
None		

Supplementary Table 3. Qualitative analysis of changes in the cognitive dimension following Soma e-motion program

Category	Subcategory	Meaning unit
Non-clinical group		
Awareness and perception of the body	Perceived need for balance	I realized I only used the right side and didn't sufficiently use the left side of my body and thought I should try to find balance in my body. (Participant D)
		It wasn't easy to feel awareness of each movement. I only sleep on one side, so I knew generally that my body was out of balance, but when I rotated my body left and right, I could immediately feel one side was more difficult. I felt I needed to direct more movement to the side I don't normally use. (Participant I)
	Perceived body sensations	At first, I was obtuse and oblivious to the movements of my body. Gradually I realized I was feeling my own bodily sensations. (Participant H)
	Systematically utilized the body	I tried to systematically utilize my body to achieve relaxation, which was very helpful. (Participant G)
Understood and focused on oneself	Discovered self-connected with the body	I appreciated sensing how my body is awake. I think there is a difference between moving the body technically and moving for the purpose of getting to know myself. (Participant F)
	Learned to regulate body and mind	I think the key is how much one can intentionally modulate and control one's body. Experiencing the soma e-motion program, I was able to reflect on how intentionally I am moving my body. (Participant J)
		I realized that focusing on the body could result in regulating negative emotions. I learned that I could investigate my own emotions or states in different ways than with language. (Participant H)
		Through trying new movements, I came to enjoy the process of adjusting the range and speed of movements. There was space for me to adjust the margins between different movements, and I came to fully appreciate the process of making these adjustments. (Participant B)
Increased concentration	Immersed in the movements	Focusing on myself has increased my capacity to concentrate. By concentrating on one aspect or part of the body, I was able to turn away from distracting thoughts and immerse in my core self within the body. (Participant D)
		While doing the movements, I would sometimes let body sensations pass me by. Still, I liked the feeling of concentrating on the movements. I thought it would be good to allow sufficient time to fully feel each sensation. (Participant E)
		It gave me a chance to focus on the breath. I am now able to feel the air being drawn out with every breath, something I hadn't noticed before. (Participant B)
Improved understanding of somatics	Increased curiosity about somatics	As I became more comfortable with moving my body, I'm interested in learning more about somatics. I'm noticing more detailed insights about my body through this program. (Participant I)
	Became comfortable with non-directive approach	Before, I used to be more comfortable having someone explicitly direct and teach me how to do certain movements, but as time goes on, I am getting more comfortable with a non-directive approach. (Participant A)
	Noticed differences with other interventions	Somatics allows me to precisely notice body movements, and this sets it apart from other meditation practices. (Participant G)
	Made effort to understand somatics	I realized this is what somatics is intending, to make myself aware of my spine and re-align it. (Participant D)
	Benefitted from moving slowly	At times I felt that it was helpful to move more slowly. (Participant H)
		What makes somatics attractive is that I do the movements slowly. I felt that it released overburdened points in my body. When I slowly bent my upper body forward and slowly raised it, I could even feel the movements of each bone in my spine. (Participant J)
	Mentioned benefits of using music	The meditation music in the background was pleasant and calming. The music also helped me concentrate on my reflections. (Participant D)
Clinical group		
Awareness and perception of the body	Ability to respond to physical symptoms	I reminded myself about grounding techniques and the feeling of comfort and discovered how I can respond when my breathing gets out of control. (Participant S)
Understood and focused on oneself	Discovered self-connected with the body	I was able to focus on my own body and reflect on my present self. (Participant L)
	Learned to regulate body and mind	I concentrated on observing the condition of my body. During this process unwanted emotions sometimes arose, but I had the chance to practice working through these moments. (Participant P)
Increased concentration	Immersed in the movements	I completely immersed in my physical sensations and learned about the emotions connected to these physical sensations. (Participant Q)
	Concentrated on the breath	I learned how to use breathing meditation to turn my attention inwards and concentrate on the self. (Participant P)
Improved understanding of somatic	Noticed differences with other interventions	I think it's different from typical group programs where people simply gather and talk about themselves. (Participant L)
		It felt different from a big, sweaty workout. This program activated all parts of the body, and I could almost feel every corner of the body, even the bones. (Participant R)
Expected internal growth	Expected positive change	I now look forward to seeing a lot of changes in my life if I repeatedly and regularly practice noticing my sensations and staying in the present. (Participant O)
	Intended to utilize as resource	I expect to face a lot of challenges in the future; it is my earnest hope that I can use what I've learned in this program as a resource to keep me going forward, not to give up. (Participant N)

Supplementary Table 4. Qualitative analysis of changes in the behavioral dimension after Soma e-motion program

Category	Subcategory	Meaning unit
Non-clinical group		
Change in daily life	Attempted to incorporate somatics in daily routine	In my own way I'm incorporating the movements I learned from the program little by little in my daily life. It would be good to continue this practice. (Participant G)
		As I grow older, my body doesn't move like it used to and feels stiff. Now every morning as I wake up, I try the somatic movements either lying down or sitting. (Participant I)
		I planned to immediately apply what I've learned to my own breathing and body movements. (Participant D)
		Nowadays I try to practice the movements I remember at home. I think this definitely made a difference in my body condition. (Participant C)
	Formed habit	Even when I'm walking, I would notice 'Ah, this is how I walked,' then try the way I learned from somatics. Even when I'm breathing, I don't just breathe anymore – I breathe from the belly, inhale long enough, then release. Even when I'm taking out the food scraps, I do these movements slowly. It's becoming a habit in my daily life, since my body remembers these movements. (Participant F)
Clinical group		
Change in daily life	Benefitted sleep	Doing the eye movements before going to bed made my body and mind feel comfortable and helped me fall asleep. (Participant N)
		When I couldn't fall asleep, I tried the movements, and they helped me sleep. (Participant R)
		I felt comfort through the soma movements before going to bed. (Participant Q)
	Attempted to incorporate somatics in daily routine	I didn't do too much of it in my daily life, but when I had some free time, or when I felt anxious, I tried the movements to find a little peace of mind. (Participant K)
		Before meals, while taking a shower, or when I felt angry, I was able to calm my mind with some light movements. (Participant L)
		Sometimes when I was in a bad mood, felt stiff after waking up, or after meals, I tried the movements from time to time, which refreshed my mood. (Participant M)
	Applied somatics in public transit	When I was in the subway, I tried focusing on physical sensations through observing the feeling of my feet contacting the floor, practicing finding my balance without grabbing the handle, and elongating the spine by directing the crown of my head towards the ceiling. (Participant O)
		When I'm outside in transit, especially in a crowded subway car when my body is in contact with or bumps with other people (especially men), I would always feel difficulty breathing and would break out in a cold sweat. In these situations, I tried focusing on the feet when standing, and pelvis and feet when sitting. As a result, I found I was able to calm myself more quickly compared to when I only used breathing techniques to handle breathing difficulties. (Participant P)
		I tried concentrating on the pelvis in situations where noises were amplified and sounded violent, and even small movements of people felt aggressive. I felt comfort from grounding and could sense every single bone in the lumbar vertebrae. This gave a refreshing feeling of air passing through the gap between each bone, and I was able to endure four more stops by focusing on that feeling. This was my first and last successful experience outside the hospital setting. (Participant N)

Supplementary Table 5. Qualitative analysis of aspects participants found challenging and needs improvement

Category	Subcategory	Meaning unit
Non-clinical group		
	Felt challenging	Doing the motions felt challenging today. It was difficult to move my arms. (Participant D)
	Difficult to tell apart movements	When doing the pelvic motions simultaneously with the arms, I sometimes couldn't tell if I had to direct the arms forward or backwards. It seemed like I was doing it the opposite way from the others. (Participant C)
Clinical group		
Reported physical/ psychological difficulties	Difficulty concentrating	Because of symptoms, I wasn't able to fully concentrate in the program. (Participant O)
	Felt despair	I fell into greater despair once I realized that the left and right sides of my body was seriously unbalanced. The pain and discomfort from the ankle that was injured from the accident always follow me, which gave me difficulty. Upon confirming that my body condition was tense and not favorable, I felt greatly discouraged. (Participant P)
	Difficulty breathing	I had difficulty in focusing on my breathing. I was filled with feelings of loss, shame, anxiety, and fear, so I couldn't recall the contents of the program due to dissociation – this was disappointing to me. (Participant O)
	Difficulty in eye movements	I found it was difficult to move the pupils in opposite directions. (Participant M)
		When moving the eyes backwards or from side to side, I felt quite dizzy and frustrated. (Participant P)
	Felt pain	Perhaps due to my older age, I felt pain in the back of my thighs and lower back when doing one of the standing motions, when we slightly bent the knees and immediately straightened them. (Participant K)
Suggested improvements to program organization	Dissatisfied with number of sessions	I thought four sessions were too short. (Participant O)
		I wished the program was a little bit longer. (Participant L)
		It felt like time was short. (Participant R)
		I would like the program a bit longer. It feels like a short time to allow the body to get familiarized with the movements or the sensations. (Participant W)
	Dissatisfied with Environment	Improvements are needed with regards to the setting, number of participants, use of the space (even though the size of the space was sufficient). I would like the program to include a process that encourages participants to explore various movements on their own. (Participant S)
		The noise from outside bothered me a little and interfered with my concentration. (Participant P)