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The pitfall of empathic concern with chronic fatigue after a disaster in young adults

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Abstract

Background: Empathic concern (EC) is an important interpersonal resilience factor that represents positive adaptation, such as “relating to others” (a factor of posttraumatic growth [PTG]) after disaster. However, controversy exists regarding whether the changes in EC (e.g., the intra-personal change between the acute phase and the disillusionment phase) positively or negatively affect mental health after a disaster. We hypothesized that increased EC may increase chronic fatigue due to over-adjustment (hypothesis 1). We also hypothesized that increasing the changes in “relating to others” could decrease the changes in chronic fatigue (hypothesis 2).

Methods: Forty-nine young, healthy volunteers (M/F: 36/13; age at 3 months after the disaster [3 months]: mean \pm SD: 21.1 \pm 1.7 years) underwent assessments of EC using the Japanese version of the Interpersonal Reactivity Index, chronic fatigue using the Japanese version of the Checklist Individual Strength (CIS-J) questionnaire, and “relating to others” using the Japanese version of the PTG inventory during the acute phase (3 months) and the disillusionment phase (1 year after the disaster). Pearson product moment correlations at 3 months and 1 year were determined for all scores related to EC.

The changes (delta = degree of change from 3 months to 1 year) or scores at 1 year were entered into linear structural equation systems to test the hypotheses.

Results: The delta of EC positively affected the delta of the CIS-J, and the delta of relating to others negatively affected the delta of the CIS-J. Both the EC and relating to others scores were negatively associated with the CIS-J score at 1 year. These results were in accordance with hypothesis 1 and 2.

Conclusions: We demonstrated the opposite effects of 2 types of ECs, i.e., stability (inherent disposition) and flexibility (degree of change), on the degree of chronic fatigue. Increasing EC with increasing chronic fatigue, but not the change in relating to others, may be a red flag for individuals during the disillusionment phase.

Keywords: Chronic fatigue, Empathic concern, Disaster, Disillusionment phase, Relating to others

Background

Empathic concern (EC), which relates to other-oriented feelings of sympathy and concerns for unfortunate others [1], is an important emotion that enhances resilience [2]. From a longitudinal perspective, resilience is

defined as the ability to recover from adversity [3] and go on with life [4]. Enhancing resilience is important for recovery from severe shocks resulting from disasters [5]. However, to our knowledge, there are two controversial issues regarding EC.

One issue is that there may be two opposing aspects of the stability of EC, i.e., that of EC as an inherent characteristic and that of its changes (flexibility). Some studies have examined inherent EC and its relation to related symptoms and statuses [6–8]. Inherent EC has been positively associated with compassion fatigue and satisfaction [6]

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and negatively associated with burnout among nurses in public hospitals [6] and among general practitioners [7]. To the best of our knowledge, no study has clearly described the changes (intra-personal change) of EC [7, 9], although a review demonstrated that empathic ability could be increased in nursing professionals through empathy education programmes [10].

The other issue is that EC has positive and negative effects with respect to traumatic events [11]. Regarding positive effects, EC has been related to prosocial behaviour [12], stress alleviation, and social support [13]. Furthermore, compassion, which is defined as a deep sense or awareness of the suffering of other people with the desire and empathy to relieve it [14], is a desired attitude in medical and social work practice [14, 15]. Given the health effects of disasters, positive adaptation is an inevitable aspect of preventive medicine in the face of disasters [16]. One type of positive adaptation, posttraumatic growth (PTG), is the experience of positive change that occurs as a result of the struggle with highly challenging life crises [17]. Importantly, indirect exposure to traumatic experiences (secondary post-traumatic stress) also causes symptoms that are similar to those of post-traumatic stress [18]. Accordingly, “secondary PTG” could occur through the enormous continuing distress and struggle of people who care for direct victims [18]. There are several specific terms related to secondary PTG. For example, vicarious exposure to a victim’s trauma experience leads to “vicarious PTG” [19]. Post-traumatic “relational growth” with support by mutual empathy and empowerment is frequently observed in the relatives of patients with cancer [20, 21].

Regarding the negative view, empathy confers a risk of depression [11]. In particular, compassion fatigue is a growing chronic psychological syndrome in the health care field, affecting professionals such as nurses [22], social workers [23], and family caregivers [24]. Compassion fatigue occurs when a caregiver feels overwhelmed by repeated empathic engagement with distressed clients [25] and results from knowledge of other people’s traumatic events [26]. Empathic ability is considered central to compassion fatigue [27].

After a disaster, the prevalence rates of medically unexplained symptoms seem to increase [28]. We used the degree of chronic fatigue as an index of mental health because chronic fatigue is one of the main medically unexplained symptoms after life events [28]. No study has focused on the association between the changes in EC and mental health. We focused on the disillusionment phase (1 year after a disaster), which is typified by deteriorated mental health, such as extreme fatigue, stress, and low energy [16].

We hypothesized that increasing the changes (intra-personal change) of EC may increase the changes in

chronic fatigue from the acute phase to the disillusionment phase after a disaster due to over-adjustment (hypothesis 1) [11, 27]. Importantly, only when they are accompanied by reciprocal behaviours do both EC and altruism seem to become resilience factors via the enhancement of group resilience [29].

In comparison, relating to others, which is a factor of PTG that reflects human ties and mutual help [30], is an interpersonal dynamic of salutogenic change. Relating to others implies a change in subjective relationships, including a sense of EC and mutual intimacy and closeness [31]. Accordingly, we also hypothesized that increasing the changes in “relating to others” could decrease the changes in chronic fatigue (hypothesis 2).

Our purposes were to test the two hypotheses by examining the effects of the changes in EC and relating to others on chronic fatigue.

Methods

We researched the associations among the changes (delta = degree of change between 3 months and 1 year post-disaster) in EC and relating to others as distinguished salutogenic factors, chronic fatigue as a proxy for mental health, and depression as a main confounding factor of chronic fatigue [11, 32, 33] for all hypotheses. We also researched the interpersonal aspects (via a cross-sectional analysis at 3 months and 1 year) of EC and other psychological measures.

Subjects

We recruited Tohoku University students who had been in residence during the Great East Japan earthquake, which caused serious damage to the Tohoku area. This huge disaster had negative psychological effects on both the general population and those who were directly impacted [34].

Fifty-nine subjects (M/F: 42/17; age: mean \pm SD: 21.1 \pm 1.7 years) were recruited from among undergraduate and postgraduate students in the Tohoku University community 3 months after the disaster (mean days \pm SD: 104 \pm 9). Forty-nine (M/F: 36/13; age: mean \pm SD: 21.1 \pm 1.7 years) of the 59 subjects were available to participate in the research at 1 year (mean \pm SD: 362 \pm 18 days). The 49 subjects were in Miyagi prefecture (the disaster area) when the earthquake occurred, and they stayed there for at least 1 year. They were screened for the absence of neuropsychiatric disorders, including post-traumatic disorder (PTSD), using the Mini International Neuropsychiatric Interview (M.I.N.I.) [35, 36] at 3 months. Through the M.I.N.I., we could confirm that none of the subjects had been exposed to life-threatening trauma due to the earthquake and tsunami and that no subject had any history of psychiatric illness. However, all subjects who lived in Miyagi prefecture

were strongly affected by this earthquake. For more details, see our previous study [31].

Assessments

Assessment of empathy

Empathy is defined as the “reactions of one individual to the observed experiences of another” [1]. The Interpersonal Reactivity Index (IRI) [1] is the most widely used multidimensional empathy research measure [37]. We used the Japanese version of the IRI, the IRI-J [38]. The IRI-J has 4 subscales, each comprising 7 different items; the EC subscale assesses other-oriented feelings of sympathy and concern for the unfortunate, e.g., “I often have tender, concerned feelings for people less fortunate than me” [38]. The IRI-J has shown good validity in Japanese subjects [38]. The 7 items are answered on a 5-point Likert scale ranging from “Does not describe me well (4 points)” to “Describes me very well (0 points)” [1, 38].

Assessment of chronic fatigue

The Checklist Individual Strength (CIS) questionnaire is the most commonly used chronic fatigue questionnaire worldwide [39, 40]. Furthermore, the questionnaire has been used for both patients with chronic fatigue syndrome [41, 42] and healthy subjects [40, 43, 44]. The Japanese version of the CIS (CIS-J) comprises 20 statements and has shown good reliability and acceptable validity [44]. The total score is an index of chronic fatigue [40, 44]. A higher score indicates higher fatigue. On the CIS-J, subjects rate their perceptions of subjective symptoms over the previous 2 weeks from 1 to 7.

Assessment of posttraumatic growth (PTG)

The Post-traumatic Growth Inventory (PTGI) was administered by anchoring each question specifically to the earthquake [30]. The original PTGI is a 21-item scale that evaluates the subject’s success in coping with the aftermath of a trauma by measuring the degree of positive change in the individual in terms of reconstructing or strengthening perceptions of him/herself, others, and the meaning of events [30]. We used the Japanese version of the PTGI (PTGI-J) [45]. The PTGI-J has good reliability and validity [45]. In this study, a particular focus was placed on the social factor of relating to others. This factor suggests that people who are agreeable might find that others respond more supportively to them after a trauma experience than they had before [30, 45]. All items are rated on a 6-point Likert scale that ranges from 0 (*not at all*) to 5 (*to a very great degree*).

Assessment of depression (main confounding factor of chronic fatigue [46])

The Center for Epidemiologic Studies Depression Scale (CES-D) was developed to assess the epidemiology of

depressive symptoms, including demonstrable sensitivity to significant life events, in the general population [47, 48]. We used the Japanese version of the CES-D, the CES-D-J [49]. The CES-D-J has shown good validity [49, 50]. It contains 20 items that are rated on a 4-point scale ranging from 0 (*rarely or never*) to 3 (*most or all of the time*).

Analysis

We conducted two-tailed paired *t*-tests on the scores for the CIS-J, EC, relating to others as a distinct salutogenic factor, and CES-D-J scores obtained at 3 months and 1 year to show a significant distinction between the acute and disillusionment phases. Pearson product moment correlations were used to examine the relationships among the CIS-J, EC, relating to others, and CES-D-J scores to test the hypotheses. These analyses were conducted using IBM SPSS Statistics for Windows (Version 22.0).

All the change factors that made a significant independent contribution to the delta of the EC scores were entered into linear structural equation systems (AMOS 25) to explore the interrelationships among these variables (CIS-J, relating to others, and CES-D-J) and EC for the hypotheses. Because our hypotheses were based on the effect of EC on related variables, we fixed the “effects of EC” in all models. The CIS-J was affected by relating to others and the CES-D-J (model 1). The CIS-J was affected by relating to others, but it effected the CES-D-J (model 2). The CIS-J effected relating to others and the CES-D-J (model 3). Models 1 to 3 used the scores at 1 year. Models 4 to 6 used the delta.

Results

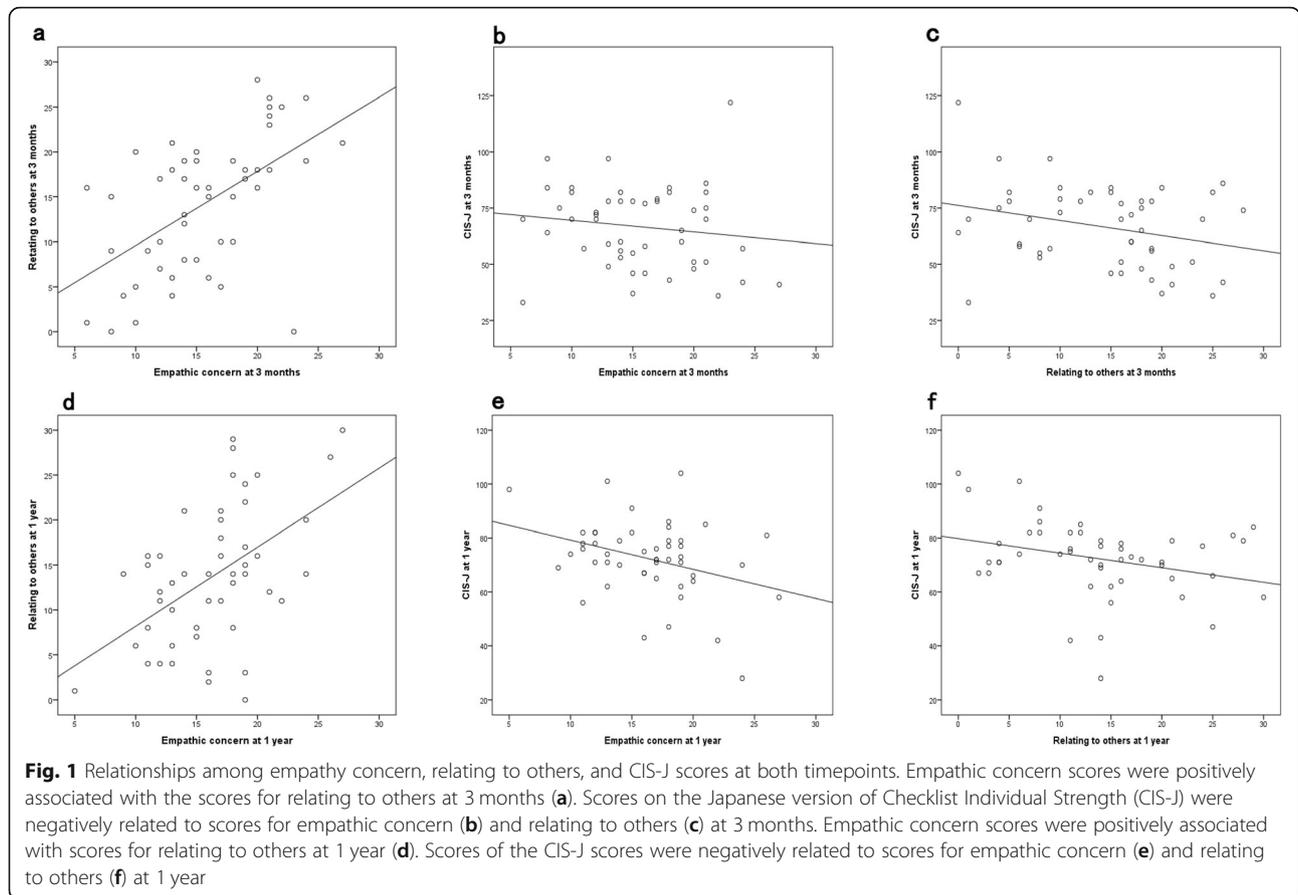
The subjects’ scores on the psychological measures at 3 months and 1 year are shown in Table 1. The two-tailed paired *t*-test ($t [48] = -2.30, P < 0.05$) revealed a significant difference between the CIS-J scores at 3 months and those at 1 year (Table 1), showing the difference between the acute and disillusionment phases. Relationships among empathy concern, relating to others, and CIS-J scores illustrated by the scatter plots at 3 months and 1 year (Fig. 1). There was a significant negative association between the EC and CIS-J scores at 1 year (Table 2). A significant

Table 1 CIS-J, empathic concern, relating to others, and CES-D-J scores

| | 3-month (mean ± SE) | 1-year (mean ± SE) | <i>P</i> value |
|--------------------|---------------------|--------------------|----------------|
| CIS-J | 66.7 ± 2.6 | 72.4 ± 2.0 | 0.026* |
| Empathic concern | 15.6 ± 0.7 | 16.3 ± 0.6 | 0.124 |
| Relating to others | 14.2 ± 1.1 | 13.7 ± 1.1 | 0.674 |
| CES-D-J | 11.9 ± 1.3 | 11.7 ± 1.4 | 0.889 |

CES-D-J Japanese version of the Center for Epidemiologic Studies Depression Scale, CIS-J Japanese version of the Checklist Individual Strength questionnaire, SE standard error

* $P < 0.05$



positive correlation was found between the scores of relating to others, as an extinguished salutogenic factor, and EC at both timepoints (Table 2).

All models showed a good fit (goodness of fit [GFI] = 1, adjusted goodness of fit [AGFI] = 0.999, comparative fit index [CFI] = 1.000, and root mean square error of approximation [RMSEA] < 0.001 for Models 1 (Fig. 2a), 2 (Fig. 2b), and 3 (Fig. 2c); GFI = 0.997, AGFI = 0.973, CFI = 1.000, and RMSEA < 0.001 for Model 4 (Fig. 2d); GFI = 0.995, AGFI = 0.951, CFI = 1.000, and RMSEA < 0.001 for Models 5 (Fig. 2e) and 6 (Fig. 2f). The delta of EC was positively related to the delta of the CIS (Fig. 2d, e, f) for Hypothesis 1, whereas the degree of EC at 1 year was negatively related to the degree of CIS-J (Fig. 2a, b, c).

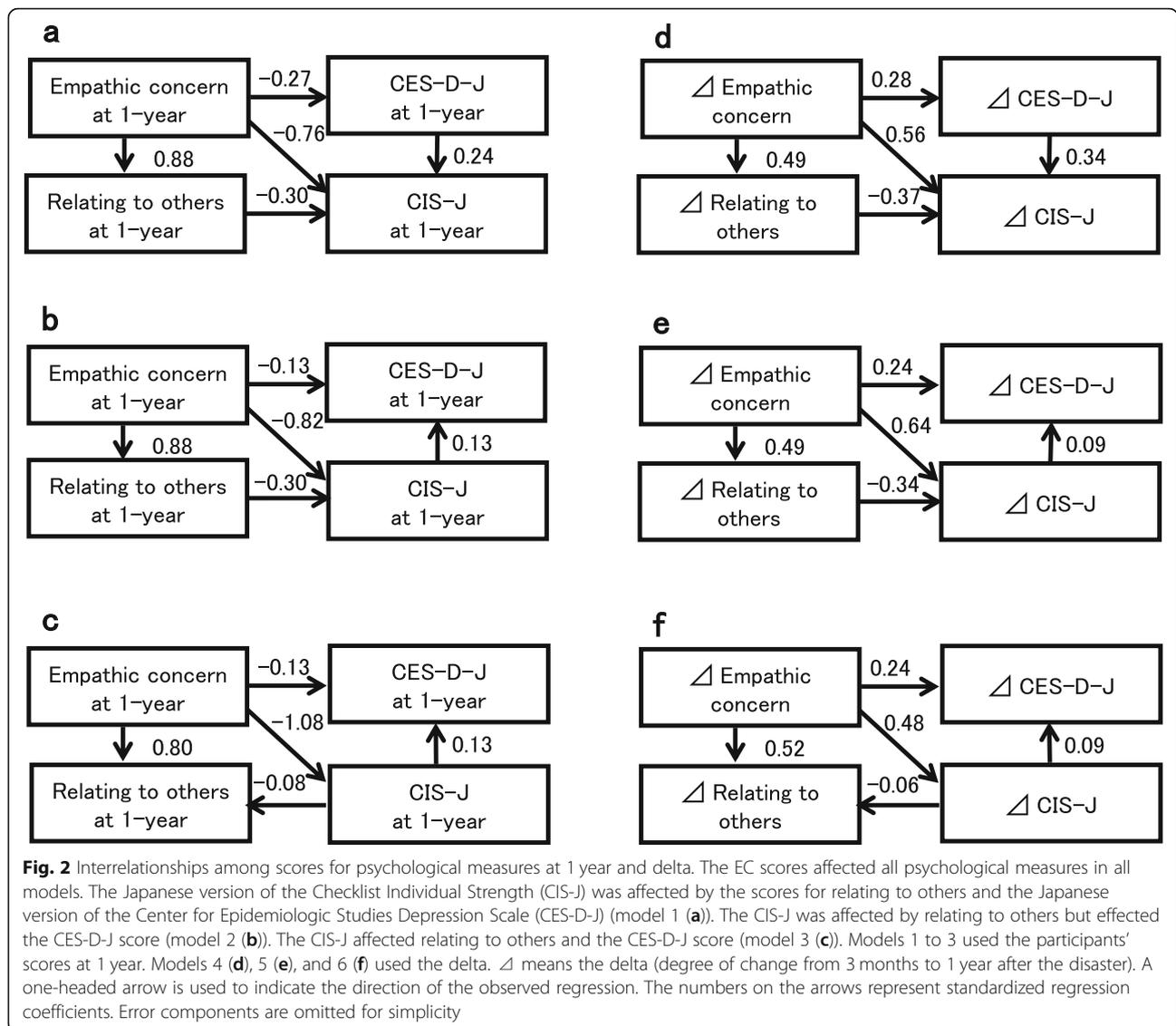
Discussion

To the best of our knowledge, this is the first study to demonstrate that the increasing changes (= delta; changing degrees from 3 months to 1 year) in EC were associated with increasing changes in chronic fatigue. These outcomes are in accordance with our hypothesis 1. The balance of EC seems to be important for stressful situations, as distress and well-being are related to empathy [33], although other-oriented empathy could enhance secondary PTG [51]. Twenty subjects in this study showed chronic fatigue based on the CIS-J total scores (chronic fatigue; more than 76) [52]. Empathy was associated with distress and anxiety in the young generation at the extreme empathy level [11, 33]. Furthermore, EC

Table 2 Correlations among the CIS-J, empathic concern, relating to others, and CES-D-J scores (3-month/1-year) (N = 49)

| Scores | CIS-J | Empathic concern | Relating to others |
|--------------------|------------------|------------------|--------------------|
| Empathic concern | -0.142/- 0.340* | - | - |
| Relating to others | - 0.279/- 0.295* | 0.550**/0.506** | - |
| CES-D-J | 0.687**/0.208 | -0.040/- 0.123 | -0.045/- 0.074 |

CES-D-J Japanese version of the Center for Epidemiologic Studies Depression Scale, CIS-J Japanese version of the Checklist Individual Strength questionnaire
 * P < 0.05, ** P < 0.01



is basically a one-way emotion similar to altruism (the personality trait that leads people to care about and help others) [29]. The EC from 3 months to 1 year in this study increased in discordance with compassion fatigue because compassion fatigue is defined as the reduced capacity in being empathic [25, 26, 53]. However, we should be alert to inhabitants with increasing EC and chronic fatigue in the disillusionment phase, although they do not become compassion fatigue. An increasing number of studies have examined empathy-based stress, i.e., not only compassion fatigue but also secondary traumatic stress and vicarious traumatization [54]. In fact, after the Great East Japan earthquake, the psychological stress caused symptoms similar to those of the PTSD at subclinical and preclinical levels in inhabitants [55].

Regarding the positive effect of EC, the subjects with more EC have less chronic fatigue as resilience based on

the result that there was a significant negative association between chronic fatigue and EC at 1 year. Empathic mutual relationships are basic components for promoting resilience in traumatic events [19]. EC moderated depression and general distress as resilience and has been related to well-being [32, 33]. In fact, cognitive and affective empathy may interact to protect against burnout in general practice [7], and resilience can be enhanced by increasing the empathy of medical residents [2]. Interpersonal flexibility, which has been described as an ability to adjust behaviour, seems to be central to a healthy personality for psychological adjustment and environmental pressure [56].

We should explain the results regarding hypothesis 2, i.e., increasing changes (intra-personal change) in relating to others can decrease the changes in chronic fatigue unlike EC. Relating to others was associated with adaptive and prosocial affective responses [57, 58]. PTG, e.g.,

relating to others, is defined as a positive psychological change, representing the result of a struggle with major life or traumatic events [30], including self-perceptions and perceptions regarding mutual relationships, to grow to a healthy level [58]. Interestingly, decreased communication was related to a greater degree of probable PTSD, depression, and distress in local workers at 20–22 months after this disaster [59]. Accordingly, it is natural that the changes in relating to others were salutogenic.

Finally, we should note a limitation of this study. Because higher intelligence may contribute to higher developmental resilience [60], these results might be limited to a well-educated young generation. The sample size (49 participants) is considered small for an epidemiological study. Further investigations using larger and more diverse samples are needed to generalize and confirm our results.

Conclusions

We demonstrated that the effects of EC regarding the degrees at 1 year and changes (= delta; changing degrees from 3 months to 1 year) in chronic fatigue were distinct and that the decreasing changes in EC from the acute phase to the disillusionment phase may represent salutogenic active suppression to protect against increasing chronic fatigue. Relapsing/remitting, delayed dysfunction, and chronic dysfunction trajectories can be found as negative outcomes in the aftermath of a disaster [61, 62]. We should pay careful attention to the people with increasing EC and increasing chronic fatigue in the disillusionment phase after a disaster. Furthermore, a greater degree of the PTG was positively related to the degrees of confusion, anger, sadness, guilt, and anxiety in medical university student volunteers at 8 years after this earthquake [63].

Abbreviations

1 year: 1 year after the disaster; 3 months: 3 months after the disaster; CES-D-J: Japanese version of the Center for Epidemiologic Studies Depression Scale; CIS-J: Japanese version of the Checklist Individual Strength; delta: degree of change from 3 months to 1 year; EC: Empathic concern; IRI-J: Japanese version of the Interpersonal Reactivity Index; M.I.N.I.: Mini International Neuropsychiatric Interview; PTG: Posttraumatic growth; PTGI-J: Japanese version of the Post-traumatic Growth Inventory; PTSD: Posttraumatic stress disorder

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Authors' contributions

All authors substantially contributed to the concept, designed the study, interpreted the data, discussed the results, and commented on the paper. All authors except AS2 and RK contributed to data acquisition. SN managed the literature search, performed the statistical analysis, and wrote the first draft of the manuscript. All authors have been involved in revising it critically for important intellectual content. MS, AS1, and RK coordinated the study. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Written informed consent was obtained from each subject in accordance with the Declaration of Helsinki (1991). This study was approved by the Ethics Committee of Tohoku University.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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