



Posttraumatic Growth in Essays by Children Affected by the March 11 Earthquake Disaster in Japan -A Text Mining Study-

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Abstract: The purpose of this study was to examine the essays written by children who experienced the Great East Japan Earthquake in order to clarify the characteristics of these essays and explore about the possibilities for posttraumatic growth (PTG) from the five factors in Posttraumatic Growth Inventory by Tedeschi & Calhoun (1996). Totally 161 essays written by school-aged children were extracted for text mining analysis. The average length of the essays was 601.9 characters and there were a total of 6,052 sentences. The total number of content words for all the essays analyzed was 39,415, and 6,465 words were retrieved. We see clearly in the children's essays the spiritual growth of these young people who had undergone such trauma during the Great East Japan Earthquake, including injuries and serious illness, the death of loved ones, and total disruption of their lives. From out of the various tragedies from the disaster, we see PTG clearly revealed.

Keywords: Posttraumatic Growth, Self-Esteem, Disaster, Earthquakes, Tsunami, Nuclear Plants, Positive Psychology

1. Introduction

1.1 The Great East Japan Earthquake and PTG

The Great East Japan Earthquake, which occurred on March 11, 2011, was a mega-earthquake followed by large tsunamis. The disaster was compounded by nuclear meltdowns at the power plants in Fukushima. It goes without saying that this disaster caused tremendous suffering in Japan, but it also shocked the entire world and drew global attention to a variety of issues to global attention. Among them was the issue of widespread radiation leakage from the Fukushima Daiichi Nuclear Power Plant. This leakage forced many to evacuate their homes and the large population of evacuees remains a grave problem. Because the effects of radiation are long-lasting, the physical and emotional trauma caused by them will remain an issue in the coming decades for the people of the Table 1 shows basic data for the elementary school, middle school, and high school students who wrote the essays.

It is the children who are, therefore, the focus of this study. Writings done by children recording their experiences and thoughts on the disaster can serve as a valuable means for understanding their psychological state and situation. This study will examine such writings from the following two perspectives: fundamental

self-esteem that is created by shared experiences and posttraumatic growth.

Posttraumatic growth, children's experiences will be looked at considering Taku's (2010ab; Taku *et al*, 2007) work on posttraumatic growth (PTG) theory in order to explore the way they have experienced emotional growth through trauma. PTG refers to positive psychological change that can be experienced as a result of struggling with highly challenging life circumstances, such as disasters, accidents, suffering from a disease, or the death of a family member or loved one. It is concerned not just with the results of these experiences but the entire process (Tedeschi & Calhoun, 2004; Taku *et al*, 2007; Taku, 2010ab: p.25). PTG "looks at trauma that is not limited by that defined by the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV: PTSD IV), and includes high stress events, such as life-changing and traumatic events. It is less about how the events are experienced from an objective standpoint, but rather how the event was subjectively experienced and how strong was its impact" (Taku, 2010a: p.25).

A crucial characteristic of PTG is to look at the cognitive processes that are directly related to the traumatic experience. It is common to see various types of psychological and physical symptoms immediately following a traumatic event; for example, increasingly dominant intrusive thoughts (which form part of a negative cognitive process) and the inability to stop thinking about what happened. However, through



struggling with this psychological situation, a person can begin to understand or attribute meaning to what happened and his or her thinking will thereby become more positive and constructive. This can result in areas of personal growth which surpass what is seen in the average population. This is an essential characteristic of PTG theory (Taku, 2010a: pp.25–26).

Kondo's (2012) comprehensive model for PTG can be summarized as follows. The first stage in PTG is a stage where one tries to overcome the various inner changes brought about by the outer trauma. This leads to the management of grief, the confirmation of beliefs and goals, and the construction of a new narrative about what happened. From here the person will often be led to a stage of quiet rumination and contemplation. This often occurs in parallel with the self-disclosure in writing and talking about the psychological changes that have occurred due to the trauma itself, as well as one's experiences therein. These changes can be unconscious and intrusive. After this, the person may start to look at the bigger picture beyond his or her own personal experience and perhaps refer to social and cultural PTG models, themes in the society at large, or general principles. This will enable the person to go on to the final stages of PTG (pp.5–6).

At the same time, Kondo (2012) says that the standard PTG model and its stages differ in regard to children: "Like adults, children also reach the same stage of rumination and contemplation about the meaning of what happened, but unlike adults, the caregiver's responsiveness will have a major impact on the process thereafter. Specifically, whether the caregiver (parent) is calm and has a strong relationship with the child and whether the caregiver takes the appropriate measures to deal with the stress and grief." He continues, "This caregiver responsiveness will become a crucial factor later in the child gaining competence and power in overcoming what happened to them. And later, this can affect their power of self-efficacy and ability to form good human relations and their ability have hopes and dreams for the future" (pp.6–7).

With the above in mind, we will examine the children's experiences through their writing to see how their relationships with others have been affected and to try to understand the PTG they experienced as a result.

1.2 Resources of the writings of children about the Great East Japan Earthquake disaster

The following four books served as the main texts used for this study.

1) *March 11 According to Children: Never Forgetting the Great East Japan Earthquake*, by Create Media (Ed.) (2012).

· This book is a collection of essays written by 44 children between the ages of 10 and 19 who were

victims of the disaster. The children's experiences are organized by prefecture (Iwate, Miyagi, Fukushima, and Ibaraki) and appear with photos of the affected areas.

2) *Tsunami: The Complete Essays by Children from the Disaster Areas*, by Ken Mori (2012: Bungeishunju).

· This book is a collection of personal recollections written by children who were victims of the disaster in Miyagi, Iwate, and Fukushima prefectures. The children ranged from preschool age to high school. The essays were compiled by journalist Takeshi Mori, who visited the evacuation shelters to ask children and their parents to contribute essays. Containing more than 80 essays that were written immediately after the disaster between April and May of 2011, some of the children included pictures or contributed hand-written essays.

· The book was created from Mori's publication, *Tsunami: 80 Essays by Children from the Disaster Areas (August Special Issue)* (Bungeishunju). This book contains essays written by children in Fukushima. Mori's 2012 book added essays from children in other prefectures and was compiled a year after the disaster. It included the 30 original essays by the children in Fukushima that appeared in the 2011 book.

3) *Children of the Tsunami: The Unwritten Stories*, by Ken Mori (2011: Bungeishunju).

· This book is a record of 10 families from the book, *Tsunami: 80 Essays by Children from the Disaster Areas* that Mori followed for six months after the essays were originally compiled. The book has overlapping material from his 2012 book, but it includes new essays written by the children.

4) *I Want to Go Home: Children of Fukushima Thinking about Life, Family, and the Future*, by The Fukushima Children's Project for the Future, edited by Minoru Kamata (2012).

· This publication contains essays by children in the Fukushima Prefecture disaster area about their feelings regarding what happened. The children range in age from third graders to high school seniors. In the essays, the children describe their fears about the disaster and their feelings about having to evacuate from their beloved homes in the wake of the nuclear accident.

1.3 Hypothesis

Based on the published literature, we have below tentative hypothesis:

Hypothesis: Relationships with others are cultivated and PTG experienced. PTG can be expected in children if they are able to talk about their experiences with family and other trusted persons.

2. Objectives

The purpose of this study was to examine the essays



written by children who experienced the Great East Japan Earthquake in order to clarify the characteristics of these essays and explore about the possibilities for PTG from the five factors in Posttraumatic Growth Inventory by Tedeschi & Calhoun (1996).

3. Methods

3.1 Texts for analysis

Eighty-five essays were examined from Mori (2012), 4 from Mori (2011) as 6 of the total 10 essays were included in Mori (2012), 44 from Create Media (2012), and 36 from Kamata (2012).

Thus, over 169 essays were reviewed in order to judge whether each was appropriate or not for study. In addition, in order to make comparisons among writers of the same age, the essays were classified by age at the time of writing as follows: lower elementary school students (grades 1-3), upper elementary school students (grades 4-6), junior high school students, and high school students. Their age and their descriptions of things found from their essays is the foundation for this paper.

Eight essays were excluded in total: 6 fell outside the scope of the study because of the writer's age (one was written by a preschooler and five were written by young people who had already graduated from high school) and 2 others whose authors were age 18 and who made no mention of being in school. This left 161 essays written by school-aged children for analysis.

3.2 Methods of analysis

The 161 essays were then turned into texts and were text mined using the text mining software *Text Mining Studio Ver.4.1* (Mathematical System Inc.). The narrative data from the essays was input, line by line and paragraph by paragraph, following the structure of the abovementioned publications. Analysis consisted of basic word count, word frequency, related words (word network), and correspondence analysis. However, this paper focus on the expressions related to PTG

3.3 Ethical considerations

Because the analysis exclusively utilized the content of essays commercially available as published books in the public domain, copyright and related issues did not apply.

4. Results

There were a total of 161 essays. The average length of the essays was 601.9 characters and there were a total of 6052 sentences. The total number of content words for all the essays analyzed was 39,415, and 6,465 words were extracted. The relatively low type-token ratio

(0.164) indicated a tendency for the same words to be repeated in the essays.

Other text mining techniques followed, however, we here concentrate in analyzing children's essays in terms of PTG. We will now consider the results of an analysis of the essays undertaken from the viewpoint of the five main factors of PTG from Tedeschi & Calhoun (1996).

4.1 Factor 1: Relating to Others

The children's writings show a marked understanding of the importance of human relations and connections with others. The word "bond" (*kizuna*) has become used extensively in Japan following the earthquake, and we see it in the writing of the children as well. We analyzed the way the children discussed "family" as well as "strangers" in their essays to identify particular characteristics about their experiences.

4.1.1 Relations with family

Many people lost family members and friends in the earthquake. A boy who lost his grandfather said, "I realized the depth of family ties in the earthquake." A female junior high school student who gave up her portion of food rations so her pregnant mother and brother could eat when food rations were delayed said, "I gave my food to my mom and brother who needed it more."

4.1.2 Relations with strangers

In the essays, there is mention of the way strangers helped one another at the evacuation centers. A junior high school boy described the following: "Drinking water was a problem in the shelter. Despite the fact that the Self-Defense Forces delivered water, there still was not enough. So, we all worked together to collect rain water, which we then carried back to the shelter for everyone." An elementary school boy described the way people would try and protect each other during the aftershocks. The students' essays are full of descriptions of selfless acts of kindness and people helping strangers. An elementary school girl, who was left behind during the tsunami with a grandfather who was unable to evacuate in time, described this instance of her grandfather's rescue efforts: "We found a rope upstairs and tossed it to someone in trouble from the balcony. He tied it around his waist and then climbed up a pole by the house to climb up to our balcony. We gave him clothes and he kept saying "thank you." I thought "I am glad I could help. Working together is so important."

Not only did the people suffer from the earthquake and the tsunami, but this region also saw terrible turmoil in the wake of the nuclear disaster. People in the affected areas were forced to flee and because of radiation many have had to move from location to location. A junior high school student who had to be evacuated from Okuma Town, Fukushima Prefecture, said of the situation at that time, "As we moved from place to place,



I watched as people cried from concern over our safety. I was amazed how strangers seemed to genuinely care for our well-being."

These examples of altruistic behavior toward strangers show that the bonds between people go beyond just immediate family.

4.2 Factor 2: New Possibilities

For children whose lives were drastically changed by the earthquake, the suffering and grief they experienced seemed to generate a feeling of new possibilities and hope.

4.2.1 New hopes and aims born out of the experience of the earthquake

An elementary school boy who lost his father said, "My father was a baseball player and then became a baseball coach. I want to become a baseball player, too, who never loses a game!" Another elementary school female student, who had seen the way people worked together during the crisis, said: "I want to study hard to become a nurse so I can have a job that helps people."

4.2.2 Hopes born from gratitude for the help received and thoughts about reconstruction

A junior high school boy grateful to the volunteers and people who helped them said that "If we ever get to go back to Naraha-cho, I want to give back to all the people who supported us. I think that day will come. I want to live in the present." An upper grade elementary school girl said, "My house is gone and I am not sure where we will go. But for now, I don't want to forget to smile. I want to be positive and work toward rebuilding Ishinomaki. I hope to make a better tomorrow."

These examples clearly show the way new hope was born from the disaster and also how new hopes and aims have emerged from their gratitude to volunteers and thoughts about reconstruction.

4.3 Factor 3: Personal Strength

The earthquake also brought out human strength. The way children, even as they lived in the evacuation centers, began to turn their eyes determinedly to the future can be glimpsed in their words below.

4.3.1 Even in the midst of devastation, the children determinedly looked forward to a better future

A junior high school girl said, "I will never in my lifetime forget what happened. However, if I dwell on it too much, it will hold me back. I can't change the past, but I can work for the future. I can't see what the future will hold, but I want to take one step at a time, walking forward with resolve." These words were from a high school girl's essay, "As the days pass after the earthquake and I don't know what happened to my town, my feelings are indescribable. All I can do is look forward, and I think to myself 'I will never give up!'"

4.3.2 The resolve to live for those whose lives were lost

In the essays, we see a determination to mourn for those who died and to live on their behalf. For example, one high school boy said, "I survived being chased by the tsunami, so I want to live to my very best, being undefeated by anything." An upper elementary school boy said, "Despite having suffered and seen so much sadness in the Great East Japan Earthquake disaster, I still consider it a precious experience. I will never forget this experience the rest of my life. I want to live on behalf of all those who died in the earthquake and the tsunami." A junior high school girl likewise said, "Life is so much more precious to me now, and I want to live fully, not just for myself but for those people who died."

4.3.3 Japanese tendency: Relation and strength

A particular Japanese tendency can be glimpsed in the connection between relating to others and personal strength.

The following could be said to be a point particular to Japanese culture. The children's essays showed a deep connection between factor one, relating to others, and factor three, personal strength. For example, an upper elementary school girl wrote, "The world is watching and they believe in us, so I can't give up. I have to keep trying." Another upper elementary school girl similarly wrote, "People are sending things we need from all over Japan and even from all over the world. There are many people who have traveled here to help us. Now, I carry this strength within me. I feel gratitude and feel strongly that I want to overcome this, never forgetting what happened."

A high school boy movingly wrote how "things like the warm food delivered by the Self Defense Forces; the welfare volunteers and the singing from the chorus groups who visited—all of these things reverberated in the hearts of those who have been traumatized by the disasters. I am also deeply grateful to those who supported us. I think I will still have to continue living in this shelter, but no matter what, I don't want to forget about those many lives lost that day. I want to do everything I can to live fully." Finally, a junior high school girl said, "I am grateful to everyone who supported and helped us and to all the people I met after the disaster. I want to live a long life!"

From these words, we see the way helping and being helped has generated feelings of hope and gratefulness in the children. Indeed, in the midst of this terrible disaster, children can be seen displaying great human strength to "keep living," "to persevere," and "to overcome."

4.4 Factor 4: Spiritual Change

In terms of spiritual transformation, rather than any reference to a specific religion, we can point to what can be described as a sense of awe and wonder of nature.



Even in the harsh conditions that followed this unprecedented mega-earthquake, we see expressions about the beauty of nature or an awareness of life. This can be felt in the children's words below.

4.4.1 Beauty of nature

In the same essay written by a high school student who described the tsunami as "A wave so big as only seen in the movies," he said in wonder of nature, "The stars that night, after the tsunami, were so beautiful. It seemed like the most beautiful night sky I had ever seen. The next morning, I woke up to the sun rise, and it was like the brightness of hope itself." Likewise another high school boy wrote, "As we moved to the third shelter, I looked up at the night sky, and it was the most beautiful sky I ever saw. The moon and stars were so bright in that town without lights." A high school girl also says in wonder, "Because of the tsunami, the people who had fled to a school then had to climb up a mountain. Together we then ended up spending the night in city hall. The starry sky that night was the most beautiful I had ever seen. It was so beautiful I could almost forget what had happened to our town and to me."

4.4.2. Awareness of life

In their essays we also see an awareness of life. This wonder at the miracle of life was born from their experiences and feelings of the disaster. An upper elementary school boy wrote about how "precious being alive is." Similarly, an upper elementary school girl said, "The disaster really made me realize how important 'life' is," and a high school girl said, "I'm grateful for being alive. And, I want to live appreciating each present moment." And, finally from a junior school girl, "I am alive! I can make sounds and move about! I feel joy in my heart that 'I am alive!'"

These examples show us the way the children, through their experiences of the earthquake disaster, were able to feel great wonder at natural phenomena. Not only did they find the earthquake and tsunami to be awesome, they also experienced wonder at the beauty of the night sky and sunrise. This led to a heightened awareness of the miracle of life.

4.5 Factor 5: Appreciation of Life

The earthquake led the children to open their eyes to what they had previously taken for granted in daily life. This led them to feel grateful for ordinary daily life and for being alive.

4.5.1. Gratefulness for an ordinary daily life

An upper elementary school girl said, "I realized from the earthquake how blessed I am for just the ordinary things in life. I hope to make use of these feelings." Another upper elementary school girl echoed these feelings in her essay saying, "Now, just being able to do the ordinary things, like getting three meals a day or taking a bath and having a warm bed to sleep in,

makes me feel grateful." A junior high school girl wrote that, "When I am able to live in an ordinary way again, I want to be grateful for each and every day's blessings."

4.5.2 Gratefulness for one's own life is connected to gratefulness over the connection to others

It was also found that the gratefulness the children felt about being alive was strongly connected to their gratefulness concerning the existence of others. For example, an upper elementary school girl wrote, "Before the earthquake, I lived with my beloved family. I made dinner with my mom. We all ate dinner together. We always had electricity and water from the taps. Those were all just things I took for granted. Now I know these things are precious and are the greatest blessings." A junior high school girl similarly wrote, "Just being able to eat with my beloved family and be able to sleep—these things are blessings." Another junior high school girl echoed these feelings saying, "Everyone in my family is safe. What I took for granted before, I now feel is a miracle."

The children came to have a gratefulness about life through the earthquake as it allowed them to realize what they had taken for granted before was actually a blessing.. They also realized how precious it was to be together with their family and loved ones. This is something for which they became very grateful about. That is, being alive with family is not just an ordinary thing, but rather is the greatest blessing. This generated feelings of gratefulness and also happiness in the children.

4.6 Summary: How PTG was expressed in the children's writings

We see clearly in the children's essays the spiritual growth (Taku 2010) of these young people who had undergone such trauma during the Great East Japan Earthquake, including injuries and serious illness, the death of loved ones, and total disruption of their lives. From out of the various tragedies from the disaster, we also see PTG clearly revealed.

5. Discussion

There is no need to describe here the emotional and physical shock that these children underwent during what was an unprecedented disaster in Japan. What is important to mention from this work is that the children were also able to achieve growth through overcoming the challenges they faced. This occurred alongside adults who made them feel safe. In addition, they expressed positive emotions, such as gratitude for the help they received and for having their basic daily needs met. They also felt new awareness about the preciousness of life itself. This led to positive, deliberate, and constructive thinking.



It could further be suggested that voicing their feelings through the writing of these essays was a deeply meaningful activity for them. All of the essays were written by the children's own volition. Self-disclosure in writing expressing one's inner thoughts to convey to others what happened is an important part of the PTG process. In an environment where they felt safe, the children felt able to open up about their experiences and feelings, and this was an essential factor in their recovery and growth. It can be presumed that this experience will lead to further PTG.

In addition to the above, we suggest that the relationships that developed between the children themselves through their shared experiences helped enable PTG. We speculate that one of the factors that promoted their PTG was sharing time while playing and talking, as well as sharing experiences and emotions. That their friends could share in their understanding about what happened—being children they would more easily understand things in a similar way—must also have been crucial to the children.

As mentioned above, the relationships that these children had with family and friends in what have traditionally been close-knit communities were essential. In the situation where the children had to evacuate from their familiar surroundings and live apart from their friends, family, and own community, this closeness within communities as a whole must have been essential for them to feel safe and be able to build new relationships that they could relate to in the times of duress. Being able to do this resulted in further inner growth. This type of PTG is also seen in other cases of hardship and extreme difficulties, such as in *schizophrenia* (Matsuda, in press) and chronic pain like *fibromyalgia* (Ito, Sueyoshi, & Inoue, in press).

6. Conclusion

Two years have passed since the earthquake. Even now, the nuclear disaster continues to loom. As reconstruction and containment of the radioactivity are not progressing smoothly, there are many children who still are living apart from their family and friends because of this. However, the fact remains, as Mori (2011, p.279) suggested, that even in a situation like this, children's smiles remain at the core of any family. So the positive attitudes and vitality of these children can become the salvation for their families who continue to suffer. Indeed, the whole world can feel renewed hope and learn some valuable lessons from them.

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