



Article

Disaster Resilience Differs between Survivors and Victims' Families: A Semantic Network Analysis [†]

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† Convergence of integrated correlation (CONCOR).

Abstract: The main purpose of this study is to clarify the difference in disaster resilience between survivors and victims' families by analyzing the language used in popular literature on disaster cases. The results showed that there were differences in emotions, behaviors, attitudes, role perceptions, etc., between survivors and victims' families in dealing with a disaster. In particular, survivors remember and think about the situation that occurred at the time of the disaster, which creates resilience to the incident, while victims' families attempt to establish resilience to the incident by investigating the facts and government countermeasures. While survivors were focused on building their own resilience, victims' families were more focused on improving government countermeasures to prevent such accidents from recurring. This can be considered as social or national resilience. Based on this comparative analysis, it is necessary to prepare various theoretical foundations for disaster preparedness and resilience, while further elaborating the theory.

Keywords: disaster; resilience; disaster literature; language network analysis; crisis



Citation: Lee, Jae-Eun, Seol-A Kwon, Eugene Song, and Sang Il Ryu. 2022. Disaster Resilience Differs between Survivors and Victims' Families: A Semantic Network Analysis. *Social Sciences* 11: 117. <https://doi.org/10.3390/socsci11030117>

Academic Editor: Nigel Parton

Received: 30 December 2021

Accepted: 4 March 2022

Published: 9 March 2022

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1. Introduction

Disasters disrupt habitual and institutionalized patterns of behavior and produce a social shock that leads to social and personal change. Historical examples show that the problems and weaknesses of a given society and the existing social order change after a disaster, while relevant values and essentials are realized (Solnit 2010). Literary works influence audiences' reactions: children can increase their understanding of various races through multicultural works (Altieri 1993), while didactic literary works help confirm the value and identity of local communities (White 1998).

Most literary works reflect the social aspects of the times. In disaster-ridden areas, disasters naturally appear in literary works. However, although various studies of literary works have been conducted (Clarke 2005; Demers 1993; Razi 2012), there are few systematic studies of literary works related to disasters (Gardner 2014; Liverman and Sherman 2015; Quarantelli 1980), because, when analyzing literary works, researchers lack multiple perspectives or attempts to observe. From a literary perspective on disasters, no concrete research has been conducted on analyzing disaster preparedness or resilience (Iwata-Weickgenannt 2019; Serrano-Muñoz 2019; Han 2020).

On 16 April 2014, the Sewol ferry, carrying a total of 476 persons from Incheon to Jeju Island, sank in the sea near Jindo, leaving 304 passengers either dead or missing. Given that the majority of victims were high-school students, the bereaved parents experienced tremendous shock and pain (Lee et al. 2017). Moreover, factors that added to the stress,

such as the failure to rescue passengers due to poor response, sensational and political media reports, the lack of a search process for missing persons, controversy over the enactment of special laws, and the lifting of the sunken Sewol ferry, hindered the normal mourning process and caused long-lasting psychological difficulties, such as re-experience, anger, depression, and isolation (Lee et al. 2017).

According to a survey on support for victims of the Sewol ferry disaster (2016), 60 out of 145 family members of the victims (41.4%) considered suicide, while 6 attempted suicide. In May 2015, one year after the disaster, a victim's father in his 50s killed himself (Ilbo 2017). Another study reported that 96 of 131 family members of the victims (73%) severed social relations while 87 (67%) quit their jobs (Park 2015). Although four years have passed since the sinking of the Sewol ferry in 2014, the psychological and social pain experienced by the bereaved has been widely reported (Lee et al. 2018a; Woo et al. 2015; Yang et al. 2015).

The present study goes beyond general discussions on the organization (Bajek et al. 2008; Buckland and Rahman 1999; Kirschenbaum 2019), disaster management systems (Abrahams 2001; Alazawi et al. 2011; Careem et al. 2006), and disaster management techniques (Fajardo and Oppous 2010; Jha et al. 2008; Van Oosterom et al. 2006) of disaster research and instead asks, "How much can the experience of an indirect crisis situation through literary works help in a crisis?".

Literary works influence recipients, provoking various reactions. Altieri (1993) claimed that multicultural works can improve children's understanding of various races, while White (1998) asserted that didactic literary works help confirm the value and identity of the community.

In other words, no concrete research has been conducted that centers on human nature in disasters from a literary perspective. Therefore, a new approach is necessary to find, analyze, and theorize the abilities of systems and organizations to flexibly respond to crises.

We have entered an era in which everyday life is a disaster due to severe climate change and the economic crisis (depression) that has been accelerating since 2008. While disasters are ever-present, there is little discussion in popular culture about overcoming them. The main objective of this study is to reveal the development direction of national disaster management in the modern age by promoting pro-social behaviors in society through an analysis of disaster literature.

The main purpose of this study is to clarify the difference in disaster resilience between survivors and victims' families by analyzing the language in popular literature on disaster cases. Through this analysis, this study aims to uncover the development direction of disaster management in the modern state.

2. Theoretical Background

2.1. Survivors' Resilience

Many disaster survivors suffer long-lasting mental health disorders. According to Rodriguez and Kohn (2008), most disaster survivors have mild or strong mental illness, but only a few receive medical treatment. For most disaster survivors, there is a large psychological impact, and the memories of those affected by the disaster persist for a long time (Joseph et al. 1992), particularly for younger survivors.

According to a long-term follow-up study by Green et al. (1994) on children who survived a disaster, post-traumatic stress disorder gradually decreased over the 17 years after the disaster. However, thoughts of suicide and abnormal behaviors, such as self-destruction, were also revealed.

Morgan et al. (2003) found that life-threatening disaster experiences in childhood remained as trauma for as long as 33 years and had a long-term effect on disaster resilience. According to Gleser et al. (1978), in disaster survivors psychological stress and thoughts regarding toward those who did not survive the disaster often lead to a feeling of self-rescue.

Generally, long-term follow-up studies on overcoming PTSD are mainstream in disaster survivor resilience studies (Fernandez et al. 2017; Hamblen et al. 2017; Lowe et al. 2018;

North et al. 2020; Shang et al. 2019). There is a deep connection between disaster survivor resilience and mental health, with differences based on age group (children, adolescents, or adults), but there are also commonalities in long-term mental health and quality of life effects. Therefore, mental health treatment services are a major factor in improving disaster survivors' resilience, with rehabilitation a vital factor in promoting resilience, and the social support system and community experts' support also helpful factors (Laksmi et al. 2020).

2.2. Resilience of the Victim's Family

The family members closest to the victims of a disaster are affected for various reasons, from witnessing the disaster to losing family members. They are harmed in the short or long term, both economically and mentally. However, studies on the necessity of countermeasures for families of disaster victims are insufficient (Dorn et al. 2006).

Kristensen et al. (2010), Lenferink et al. (2017), Boelen et al. (2008), and Huh et al. (2017) found that survivors experience "complex grief" after a disaster, meaning that the loss of a family member is combined with economic loss, unemployment, employment for a living, and a demand for social support to solve the problem.

Davis (2013) has called for a study on negligence, responsibility, and injustice in the problems facing many casualties and survivors of disasters. Bereaved families demand material measures and an apology for the damage caused by the government to overcome the conflict and mental and economic damage that occur through sudden bereavement (Davis and Scraton 1999).

Cao et al. (2013) found a prevalence of 59.5% in family dysfunction among families bereaved by a disaster, including economic difficulties due to old age, divorce or widowhood, direct exposure to the death of children, not having children after a disaster, and creating a poorer family economy.

Despite knowledge of adequate psychosocial support for those facing death, loss, and severe stress in the context of major disasters, it is important to understand what those affected expect from government officials and public leaders. In Jong and Dücker (2019) review of studies on the role of government in helping disaster survivors, they found that survivors expect the government to help them recover from disasters in a fair, compassionate, equal, and reliable way. They expect support with practical needs related to the disaster, and assume that the government will coordinate network partners and break bureaucratic barriers.

3. Materials and Methods

3.1. Materials

In this study, we analyzed two literary works: an essay by the families of disaster victims called *The Day Knocked on Our Window* (Sewol Ferry Disaster Writers Records 2019), which is a record of families of those on the Sewol ferry; and *Spring Will Come Again* (Sewol Ferry Disaster Writers Records 2016), a record of the survivors of the disaster (Sewol ferry survival student: 16 April 2014) (Sewol Ferry Disaster Writers Records 2016, 2019).

Since disaster resilience tracks change after a disaster, *The Day Knocking on Our Window* (Sewol Ferry Disaster Writers Records 2019) is important for giving voice to the victims' families five years after the event, while *Spring Will Come Again* (Sewol Ferry Disaster Writers Records 2016) gives voice to survivors two years after the event. These works were selected because they directly targeted survivors and victims' families (Sewol Ferry Disaster Writers Records 2016, 2019).

We selected these two works for the following reasons. First, it is the first essay written for survivors and their families after a social disaster in Korean society (Sewol Ferry Disaster Writers Records 2016, 2019). Second, the essay is composed based on the interview format of survivors and victims' families and can be used for language network analysis or interview analysis (Kalocsányiová and Shatnawi 2021; Uekusa 2019; Yari et al. 2019). Third, the Sewol ferry disaster is an unprecedented accident that has caused national trauma for a long time in Korean society (Lee et al. 2018b; Kang 2021; Chung et al. 2021;

Lee and Khang 2020). Therefore, it can be a basic data that helps to find the resilience of local communities and countries.

3.2. Method

The text-mining technique's simple keyword frequency analysis is useful for analyzing differences between two texts and for identifying the author's intention, particularly in literary works (Amado et al. 2018; Choi et al. 2021; Sapach 2020). R was used for text mining, while NodeXL and UCINET64 were used for semantic network analysis. First, from the text collected using R, an open-source statistics program, we (1) removed special characters, (2) cut the text into word units, (3) divided each word into words and endings, and (4) extracted only words (nouns) from them. The data were purified in the following order:

The frequency of occurrence words was analyzed, and the weights of the occurrence words were analyzed in a table. Additionally, to analyze the connectivity between words, bigrams were extracted using R, and the number and centrality of the connecting lines were analyzed using NodeXL. A language network chart was created using NodeXL. A convergence of integrated correlation (CONCOR) analysis was conducted to form clusters by determining the similarity of keywords using the UCINET64 program.

3.3. Analysis

The indices used to compare the differences between network structures derived from language network analysis are the number of links (degree) and centrality, which represent the local characteristics of individual nodes (Jang and Choi 2012). Centrality is an index that evaluates the degree of closeness of each node to the center and is classified into closeness centrality, betweenness centrality, and eigenvector centrality (Hur 2010; Son 2002).

First, closeness centrality indicates how close one node is to another, with the distance between two nodes as the core concept. A high closeness centrality means that the word can be easily linked with another word (Son 2002). Betweenness centrality is a numerical value of the mediating role of a node. A word with high betweenness centrality influences the relationship between other words and plays the role of linking (mediating) words within the network (Lee and Hong 2016). Eigenvector centrality is an index for searching for central words in the overall structure of a network (Bonacich 1987). It considers not only the number of linked nodes but also their importance (Han et al. 2015). In this study, we identified the centrality of a word in the network by using eigenvector centrality according to Doerfel and Connaughton (2009).

Furthermore, the CONCOR, a language network analysis technique, is appropriate for identifying the main topic of a text by deriving a cluster formed by similar words (Kang et al. 2018). This analysis method finds the relationship between blocks by conducting a Pearson correlation analysis of matrices between words that appear simultaneously and identifying blocks of similar nodes based on them (Lim and Joung 2019). It analyzes the similarity between nodes by finding nodes at the same position structurally in the linked relationships of nodes (Kang et al. 2018).

CONCOR analysis was conducted to analyze the similar clusters and structures of words with the main meaning by referring to the eigenvector centrality and number of connected nodes. In this analysis, a dendrogram that categorizes input words was generated using a hierarchical cluster analysis method representing the structural equivalence relationship.

4. Discussion

4.1. Keyword Analysis of Literature Works of the Sewol Ferry Disaster

To analyze keywords related to the disaster in two works, 13,685 words were extracted from *Spring Will Come Again*, while 18,897 words were extracted from *The Day Knocked on Our Window*. A total of 100 words were extracted according to their frequency of occurrence and organized as shown in Table 1.

Table 1. Top 100 words in frequency.

Ranking	Survivor			Victim's Family		
	Keyword	Frequency	Percentage	Keyword	Frequency	Percentage
1	Friend	421	3.076361	Dad	435	2.301953
2	Thought	405	2.959445	We (informally)	431	2.280785
3	Person	285	2.082572	Mom	356	1.883897
4	We (formally)	182	1.329923	Thought	350	1.852146
5	That time	171	1.249543	Person	336	1.77806
6	School	163	1.191085	Children	265	1.402339
7	Mom	162	1.183778	That time	163	0.862571
8	Parents	140	1.023018	Friend	158	0.836112
9	Elder brother	132	0.96456	Parents	154	0.814944
10	We (informally)	122	0.891487	Mind	133	0.703815
11	People	112	0.818414	Talk	133	0.703815
12	Mind	103	0.752649	Family	125	0.661481
13	Elder sister	96	0.701498	Story	120	0.635021
14	Really	96	0.701498	Victim's family	113	0.597979
15	Younger brother or sister	93	0.679576	His or her	112	0.592687
16	One	90	0.657654	People	100	0.529185
17	Dad	86	0.628425	Phone	98	0.518601
18	Teacher	82	0.599196	Situation	89	0.470974
19	Something	81	0.591889	Time	87	0.460391
20	Talk	81	0.591889	There	86	0.455099
21	Victim's family	76	0.555353	Sewol ferry	84	0.444515
22	Story	72	0.526123	School	81	0.428639
23	Brother and sister	72	0.526123	Image	80	0.423348
24	Sewol ferry	71	0.518816	Son	80	0.423348
25	Time	67	0.489587	Paengmokhang	79	0.418056
26	Plaintiff	66	0.48228	Someone	78	0.412764
27	There	65	0.474973	Child	76	0.40218
28	Adult	61	0.445744	First	69	0.365137
29	Memory	60	0.438436	Younger brother or sister	68	0.359845
30	Year	58	0.423822	Picture	68	0.359845
31	First	57	0.416514	Because of	67	0.354554
32	Once	55	0.4019	Degree	66	0.349262
33	Because of	52	0.379978	World	62	0.328094
34	Phone	51	0.372671	Jindo	62	0.328094
35	Family	50	0.365364	It	61	0.322803
36	It	50	0.365364	Worry	60	0.317511
37	Degree	50	0.365364	That	60	0.317511
38	Situation	47	0.343442	That day	57	0.301635
39	Someone	46	0.336134	Later	56	0.296343
40	His or her	46	0.336134	Suhyeon	55	0.291051
41	Hospital	45	0.328827	Yeong-i	55	0.291051
42	Worry	43	0.314213	Sorry	54	0.28576
43	Mom and dad	41	0.299598	Said to be	53	0.280468
44	Incident	39	0.284984	Truly	52	0.275176
45	High school	38	0.277676	Year	52	0.275176
46	Sorry	38	0.277676	Rescue	51	0.269884
47	Understanding	38	0.277676	Tear	51	0.269884
48	Mistake	37	0.270369	Truth investigation	51	0.269884
49	One person	37	0.270369	Once	51	0.269884
50	Later	36	0.263062	Confirm	51	0.269884
51	Moment	35	0.255754	During	49	0.2593
52	After	35	0.255754	Start	48	0.254009
53	Student	34	0.248447	Memory	47	0.248717
54	That	33	0.24114	Chaewon	46	0.243425
55	Sound	33	0.24114	President	44	0.232841
56	Complete	33	0.24114	Missing person	44	0.232841
57	That day	32	0.233833	Ansan	44	0.232841
58	Image	32	0.233833	Study	43	0.227549
59	Injury	32	0.233833	Sound	43	0.227549
60	Father	32	0.233833	Company	43	0.227549
61	Emotion	31	0.226525	Soyeon	42	0.222258
62	Speak	31	0.226525	Face	42	0.222258
63	Picture	30	0.219218	Teacher	41	0.216966

Table 1. Cont.

Ranking	Survivor			Victim's Family		
	Keyword	Frequency	Percentage	Keyword	Frequency	Percentage
64	Study	29	0.211911	School trip	41	0.216966
65	Middle school	29	0.211911	Name	41	0.216966
66	Interest	28	0.204604	Government	41	0.216966
67	Fact	28	0.204604	Broadcast	39	0.206382
68	Face	28	0.204604	Special act	39	0.206382
69	Graduation	28	0.204604	Last time	38	0.20109
70	Preparation	28	0.204604	Sea	37	0.195798
71	Jihyeon	28	0.204604	Speak	36	0.190506
72	Classroom	27	0.197296	Dead body	35	0.185215
73	Feeling	27	0.197296	Heart	34	0.179923
74	University	27	0.197296	Beggar	34	0.179923
75	Name	27	0.197296	Next	34	0.179923
76	Cellphone	27	0.197296	Contact	34	0.179923
77	Help	26	0.189989	Gym	34	0.179923
78	Related	25	0.182682	Signature	33	0.174631
79	Life jacket	25	0.182682	Sehui	33	0.174631
80	Itself	25	0.182682	Moment	33	0.174631
81	News	24	0.175374	Cellphone	33	0.174631
82	It was	24	0.175374	Fact	32	0.169339
83	Past	24	0.175374	Survivor	32	0.169339
84	Last time	23	0.168067	Incident	31	0.164047
85	School trip	23	0.168067	Condition	31	0.164047
86	Realize	23	0.168067	Morning	31	0.164047
87	Place	23	0.168067	We (formally)	31	0.164047
88	Floor	22	0.16076	Seunghui	30	0.158755
89	Comfort	22	0.16076	Soul	30	0.158755
90	Jindo	22	0.16076	Text	29	0.153464
91	Activity	22	0.16076	Something	29	0.153464
92	Effort	21	0.153453	Hoseong	29	0.153464
93	Doeon	21	0.153453	Pray	28	0.148172
94	Head	21	0.153453	Evening	28	0.148172
95	Nerve	21	0.153453	The public	27	0.14288
96	Any	21	0.153453	List	27	0.14288
97	Ong-i	21	0.153453	Problem	27	0.14288
98	Strange	21	0.153453	Funeral	27	0.14288
99	Funeral ceremony	21	0.153453	Workplace	27	0.14288
100	Concern	20	0.146145	Day	27	0.14288

Frequently-appearing words are as follows: First, words related to the entities associated with the accident were common. Survivors often mention persons who were with them at the time of the accident, such as *friends, people, us, and teachers*. Victims' families often mention persons related to the victims, such as *fathers, mothers, children, and parents*.

Equally common are expressions regarding the situation. Survivors use expressions associated with the urgent situation at the time, such as *time, phone, situation, hospital, and life jacket*. Victims' families use situational expressions such as *bereaved, phone, situation, Paengmok Port, Sewol ferry, school, company, gym, and workplace*. This indicates that there are differences between survivors and victims' families regarding situations and places.

Thirdly, there are expressions of emotions. Survivors use many such expressions, including *worry, sorry, wrong, anguish, and comfort*, while victims' families express similar but different emotions, such as *worry and tears*.

Fourth are expressions related to resilience. When examining words related to overcoming and recovering from a disaster, survivors use many words to overcome mental wounds, such as *memory, story, help, comfort, and effort*, while victims' families use many policy-related words, such as *fact-finding, president, government, and special law* (Table 1).

In general, resilience refers to the phenomenon of recovering from a physical or mental shock. Resilience in a disaster situation refers to a state in which the victim returns to the state before the disaster occurred. Here, the words *memory and story* are related to counseling, which is often used as a technique for overcoming general PTSD syndrome

(Jung 2019; Mahn et al. 2021; Tanaka et al. 2020). The words help, comfort, and effort can be related to the words of help and effort to return to daily life in a disaster situation (Tyler and Sadiq 2018; Mosby et al. 2021; Meduri 2021). The words president, government, and special law generally refer to words in terms of prevention and recurrence prevention after a disaster, and resilience in disasters is highly related to prevention (Turudić and Vetma 2021; Kansra 2019).

To examine words that appeared simultaneously, a language network analysis was conducted, and the number of connection lines, betweenness centrality, closeness centrality, and eigenvector centrality were checked (Tables 2 and 3). As a result of analyzing the language networks of survivors, the total number of links was 13,705, and the average number of links per word was 6103. Centrality analysis revealed that the averages of betweenness centrality, closeness centrality, and eigenvector centrality were 5046.70, 0.0000728, and 0.000257, respectively. When examining the eigenvector centrality in the literature of victims' families, we was the highest, followed by thought, child(ren), situation, talk, phone, appearance, day, last, Jindo Island, sorry, worry, sea, company, special law, missing person, fact-finding, and truth (Tables 4 and 5).

Table 2. Indices for the analysis results of the language network of survivors.

Items	Frequency	Items	Average
Total number of words	13,685	Betweenness centrality	5046.70
Total number of links	13,705	Closeness centrality	0.0000728
Number of average links per word	6.103	Eigenvector centrality	0.000257

Table 3. Indices for the analysis results of the language network of victims' families.

Items	Frequency	Items	Average
Total number of words	18,897	Betweenness centrality	7702.082
Total number of links	19,501	Closeness centrality	0.000048
Number of average links per word	5.913	Eigenvector centrality	0.000174

Table 4. Eigenvector Centrality Survivor Top 100 Words.

Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality
1	Thought	400	1,104,645.515	0.000118	0.01063	51	Family	51	59,914.564	0.000096	0.00222
2	People	378	1,029,859.390	0.000116	0.00950	52	Incident	68	81,618.508	0.000094	0.00219
3	Friend	232	537,157.487	0.000111	0.00735	53	Brothers and sisters	52	49,138.919	0.000094	0.00218
4	Us	238	567,193.320	0.000112	0.00720	54	Phone	47	65,816.683	0.000095	0.00218
5	The	236	527,976.656	0.000110	0.00697	55	Complete	60	88,218.582	0.000095	0.00218
6	School	217	445,120.438	0.000109	0.00673	56	Feeling	42	31,236.704	0.000095	0.00217
7	Mom	207	407,762.639	0.000109	0.00652	57	Face	47	70,370.538	0.000095	0.00217
8	Friends	170	295,378.340	0.000107	0.00611	58	That day	52	54,800.086	0.000095	0.00214
9	We	191	380,618.644	0.000107	0.00566	59	Name	46	53,341.194	0.000095	0.00210
10	Elder brother	146	242,018.570	0.000106	0.00540	60	Classroom	45	28,928.054	0.000093	0.00209
11	Mind	154	287,488.235	0.000106	0.00533	61	Middle school	43	27,414.104	0.000092	0.00206
12	Real	143	266,545.843	0.000106	0.00531	62	Brother and sister	44	33,588.295	0.000094	0.00205
13	People	163	275,642.784	0.000104	0.00490	63	Cellphone	47	51,889.678	0.000094	0.00203
14	One	132	238,413.176	0.000105	0.00486	64	That	63	64,455.136	0.000094	0.00198
15	Parents	128	228,709.804	0.000104	0.00469	65	Mom and dad	63	69,187.771	0.000093	0.00196
16	Younger brother	134	209,673.459	0.000103	0.00452	66	Jindo	40	34,310.212	0.000093	0.00195
17	Friends	112	155,492.903	0.000103	0.00441	67	Activity	42	37,261.488	0.000093	0.00194
18	Elder sister	122	202,827.013	0.000103	0.00436	68	Study	53	57,727.773	0.000092	0.00194
19	Something	113	175,813.566	0.000103	0.00429	69	Any	41	40,820.355	0.000093	0.00193
20	Time	103	144,265.765	0.000102	0.00409	70	Realize	40	28,270.925	0.000092	0.00192
21	Story	103	137,562.398	0.000101	0.00400	71	Adults	40	27,097.339	0.000094	0.00190
22	Plaintiff	92	132,396.151	0.000102	0.00400	72	Interest	47	51,435.375	0.000093	0.00188
23	Sewol ferry	115	175,225.770	0.000101	0.00392	73	Contact	31	26,361.216	0.000093	0.00180
24	Talk	99	147,325.806	0.000102	0.00388	74	Nerve	41	49,388.464	0.000093	0.00178
25	Victim's family	100	130,260.730	0.000100	0.00374	75	Preparation	41	31,737.770	0.000092	0.00178

Table 4. Cont.

Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality
26	Teacher	87	113,470.289	0.000100	0.00346	76	Last time	41	29,761.708	0.000092	0.00178
27	First	89	96,653.505	0.000099	0.00336	77	Strange	39	51,623.348	0.000092	0.00177
28	Year	81	116,373.244	0.000099	0.00336	78	Condition	37	35,796.086	0.000094	0.00177
29	Because of	90	118,107.348	0.000100	0.00334	79	It was	47	39,822.018	0.000091	0.00176
30	Memory	79	106,399.489	0.000100	0.00333	80	Injury	44	35,469.831	0.000093	0.00174
31	Once	89	109,131.682	0.000099	0.00330	81	School trip	38	36,296.310	0.000091	0.00172
32	Dad	100	129,303.123	0.000099	0.00329	82	Picture	47	46,250.310	0.000092	0.00170
33	There	111	201,575.248	0.000099	0.00326	83	Life	26	27,576.806	0.000093	0.00167
34	Degree	88	127,759.520	0.000099	0.00314	84	Fact	46	51,256.005	0.000092	0.00166
35	After	59	68,941.160	0.000099	0.00301	85	Adult	39	46,614.660	0.000093	0.00165
36	His or her	71	91,482.959	0.000098	0.00288	86	Graduation ceremony	31	23,533.886	0.000092	0.00164
37	Hospital	74	107,261.121	0.000096	0.00278	87	Past	42	35,472.199	0.000091	0.00164
38	Situation	81	132,003.207	0.000097	0.00273	88	News	43	43,015.077	0.000091	0.00161
39	High school	60	57,025.426	0.000096	0.00264	89	Training institute	29	14,602.309	0.000091	0.00161
40	Someone	62	67,257.673	0.000096	0.00258	90	Happiness	27	10,947.092	0.000092	0.00161
41	Moment	56	59,901.655	0.000097	0.00257	91	Place	38	39,710.888	0.000091	0.00159
42	Later	60	79,094.260	0.000097	0.00255	92	Early	32	38,763.066	0.000093	0.00159
43	It	88	128,527.554	0.000095	0.00251	93	Thinking	30	18,682.476	0.000091	0.00157
44	Image	56	66,300.403	0.000096	0.00244	94	Expression	35	29,366.607	0.000091	0.00157
45	Speak	55	60,649.665	0.000095	0.00239	95	Student	32	40,437.744	0.000090	0.00156
46	One person	49	49,525.013	0.000096	0.00236	96	Ansan	34	19,017.343	0.000091	0.00155
47	Sound	51	67,202.184	0.000096	0.00231	97	Just	32	28,157.722	0.000091	0.00154
48	Worry	51	67,565.424	0.000095	0.00227	98	Emotion	47	40,643.165	0.000089	0.00154
49	Parents themselves	55	71,971.115	0.000095	0.00226	99	Relationship	29	24,522.783	0.000093	0.00154
50	Itself	47	51,451.305	0.000095	0.00222	100	Memorial altar	24	9115.588	0.000091	0.00149

Table 5. Eigenvector centrality of victims' family top 100 words.

Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality
1	We (informally)	521	2,400,719.944	0.00008	0.009	51	Changhyeon	88	183,523.925	0.00007	0.002
2	Thought	361	1,327,268.729	0.00008	0.008	52	School trip	65	93,905.695	0.00006	0.002
3	Dad	370	1,448,164.024	0.00008	0.008	53	Younger brother or sister	88	192,818.750	0.00006	0.002
4	Person	433	1,866,307.538	0.00008	0.007	54	Victim's family	89	173,248.118	0.00007	0.002
5	Mom	324	1,163,304.044	0.00007	0.006	55	Once	86	175,876.471	0.00007	0.002
6	That time	251	801,638.116	0.00007	0.006	56	Tear	76	170,248.668	0.00007	0.002
7	Mind	198	552,417.107	0.00007	0.005	57	Name	68	123,609.702	0.00006	0.002
8	Kid	199	594,910.929	0.00007	0.005	58	Ansan	81	179,029.648	0.00007	0.002
9	Children	175	571,990.636	0.00007	0.004	59	During	78	192,331.214	0.00007	0.002
10	One	170	469,513.897	0.00007	0.004	60	Chaewon	72	116,743.082	0.00006	0.002
11	His or her	171	582,865.086	0.00007	0.004	61	Confirm	60	81,204.904	0.00006	0.002
12	Junwoo	177	427,407.627	0.00007	0.004	62	Sorry	54	69,089.140	0.00006	0.002
13	Situation	151	401,032.428	0.00007	0.004	63	Moment	55	81,109.995	0.00006	0.002
14	People	154	429,192.993	0.00007	0.004	64	Father	89	193,064.280	0.00006	0.002
15	Talk	136	329,930.465	0.00007	0.004	65	Year	74	117,156.032	0.00006	0.002
16	Geonwoo	145	317,728.539	0.00007	0.004	66	Worry	63	124,914.913	0.00006	0.002
17	Time	157	449,182.124	0.00007	0.004	67	Nexf	59	130,981.717	0.00006	0.002
18	There	150	473,916.365	0.00007	0.004	68	Mother	77	173,680.136	0.00006	0.002
19	Story	157	477,185.272	0.00007	0.004	69	Families	68	130,205.217	0.00006	0.002
20	Parents	137	369,294.788	0.00007	0.004	70	Gym	51	92,895.466	0.00006	0.002
21	Paengmokhang	123	274,331.162	0.00007	0.004	71	Sea	61	139,750.576	0.00006	0.002
22	Friend	125	309,847.564	0.00007	0.004	72	Soul	57	91,562.486	0.00006	0.002
23	Someone	126	307,432.017	0.00007	0.003	73	Company	68	151,685.193	0.00006	0.002
24	First	120	281,975.913	0.00007	0.003	74	Heart	59	109,827.887	0.00006	0.002
25	School	128	266,509.347	0.00007	0.003	75	Suhyeon	82	181,889.364	0.00006	0.002
26	Phone	121	256,073.554	0.00007	0.003	76	Dead body	58	98,701.195	0.00006	0.002
27	Son	104	203,350.683	0.00007	0.003	77	President	71	137,825.651	0.00006	0.002
28	Truly	87	157,956.464	0.00007	0.003	78	Funeral	47	66,415.348	0.00006	0.002
29	Picture	109	243,843.913	0.00007	0.003	79	Memory	53	104,833.949	0.00006	0.002
30	Image	102	235,379.310	0.00007	0.003	80	Fact	57	64,157.341	0.00006	0.002
31	It	105	246,342.679	0.00007	0.003	81	Hoseong	46	51,871.566	0.00006	0.002
32	Said to be	90	197,001.151	0.00007	0.003	82	Study	51	89,378.651	0.00006	0.002
33	Child	101	232,998.817	0.00007	0.003	83	Speak	62	121,806.352	0.00006	0.002
34	That	103	235,481.874	0.00007	0.003	84	Contact	59	110,601.704	0.00006	0.002
35	Jiseong	106	284,202.188	0.00007	0.003	85	Special act	63	128,530.108	0.00006	0.002
36	Degree	114	303,178.125	0.00007	0.003	86	Beggar	60	106,523.224	0.00006	0.002
37	That day	97	187,892.731	0.00007	0.003	87	Something	54	75,477.998	0.00006	0.002
38	Friends	86	142,484.162	0.00007	0.003	88	Government	64	141,019.566	0.00006	0.002
39	Jindo	100	243,281.145	0.00007	0.003	89	Missing person	50	71,540.447	0.00006	0.002
40	World	96	185,850.422	0.00007	0.003	90	Truth investigation	67	150,491.952	0.00006	0.002
41	Sewol ferry	127	344,333.897	0.00007	0.003	91	Victims' families	60	127,036.393	0.00006	0.002
42	Last time	58	74,031.643	0.00007	0.003	92	Seunghui	51	62,628.482	0.00006	0.002
43	Yeong-i	85	162,308.602	0.00007	0.003	93	When thinking	31	47,871.855	0.00006	0.002

Table 5. Cont.

Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality	Ranking	Keyword	Number of Links	Betweenness Centrality	Closeness Centrality	Eigenvector Centrality
44	Sound	68	126,313.804	0.00007	0.002	94	Alone	37	59,298.141	0.00006	0.002
45	Face	66	152,377.582	0.00007	0.002	95	Cellphone	51	60,209.523	0.00006	0.002
46	Start	88	201,449.709	0.00007	0.002	96	Text	45	55,284.779	0.00006	0.002
47	Miji	90	157,766.463	0.00007	0.002	97	Morning	53	67,706.541	0.00006	0.001
48	Later	88	201,832.585	0.00007	0.002	98	Baby	45	52,655.155	0.00006	0.001
49	Because of	120	307,073.805	0.00007	0.002	99	Broadcast	48	77,768.985	0.00006	0.001
50	Family	90	191,116.122	0.00007	0.002	100	Truth	43	57,479.381	0.00006	0.001

Next, according to the results of the language network analysis of victims' families, the total number of links was 19,501, while the average number of links per word was 5913. Centrality analysis revealed that the averages of betweenness centrality, closeness centrality, and eigenvector centrality were 7702.082, 0.000048, and 0.000174, respectively. Among the words that appeared in the literature of survivors and victims' families, the top 100 words with a high weight based on eigenvector centrality were extracted, and the network of extracted words was examined. As a result of analyzing the eigenvector centrality in the literature of survivors, thought had the highest centrality, followed by people, friends, us, then, friend(s), real, parents, younger siblings, time, story, teacher, worry, that day, etc. (Tables 4 and 5).

First, the centrality of thinking appeared equally high in the literature of survivors and victims' families because the study data were analyzed as replies or contents describing respondents' opinions. Thought is a function of counting and judging objects (Korean dictionary) and is generally used to express one's opinion on a specific object.

In the literature on survivors, friends, brothers, and younger brothers who were victims of the Sewol ferry disaster were connected with words that recalled the time of the incident, such as real, memory, worries, and circumstances. Equally present were words that evoke accompanying persons at the time of the incident, such as friends and teachers, and guardian words such as mom, dad, and parents.

In the literature on victims' families, later, appearance, real, sound, time, and story were directly linked to the situation at the time. Paengmokhang, photo, last, and image were directly linked to words associated with the victim.

Regarding the difference in words between survivors and victims' families, survivors used many words related to the situation and accompanying persons at the time of the incident, while appearing to have a negative connection to the situation and content of the incident and the government's response.

4.2. Classification of Subjects through the Analysis of Similar Word Clusters in Literature on the Sewol Ferry Disaster

As a result of the analysis, a total of four similar word clusters were generated from the literature on survivors and victims' families, and four themes were derived by synthesizing the words in each cluster (Figures 1 and 2).

As a result of conducting a similar word cluster analysis (CONCOR) on the survivors' essay, overall themes were derived for the memory of the victim, family, and accident. First, the first language cluster, consisting of elder sister, parents, that time, etc., and the second language cluster, consisting of first, there (Sewol ferry), and elder brother are related to the survivor's memory of the person he recalled at the time of the accident. In other words, it can be said that it is a word about the memory of the time when the Sewol Ferry sank, and the memories of one's parents, brothers, and sisters there. However, the first word cluster contains the concept of time, while the second word cluster contains the concept of space. Therefore, the two similar word clusters were named 'Recall of temporal accident' and 'Recall of spatial accident', respectively, and the upper theme was named 'Recall of accident'.

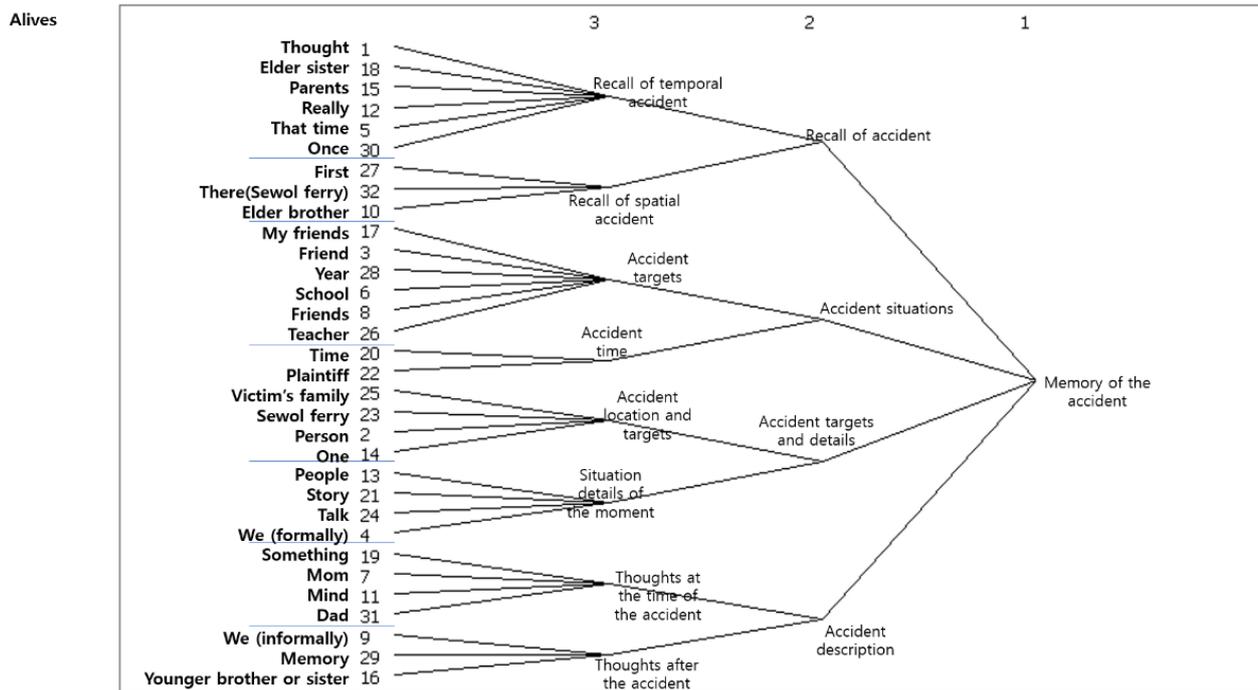


Figure 1. Similar word clusters and meanings of survivors.

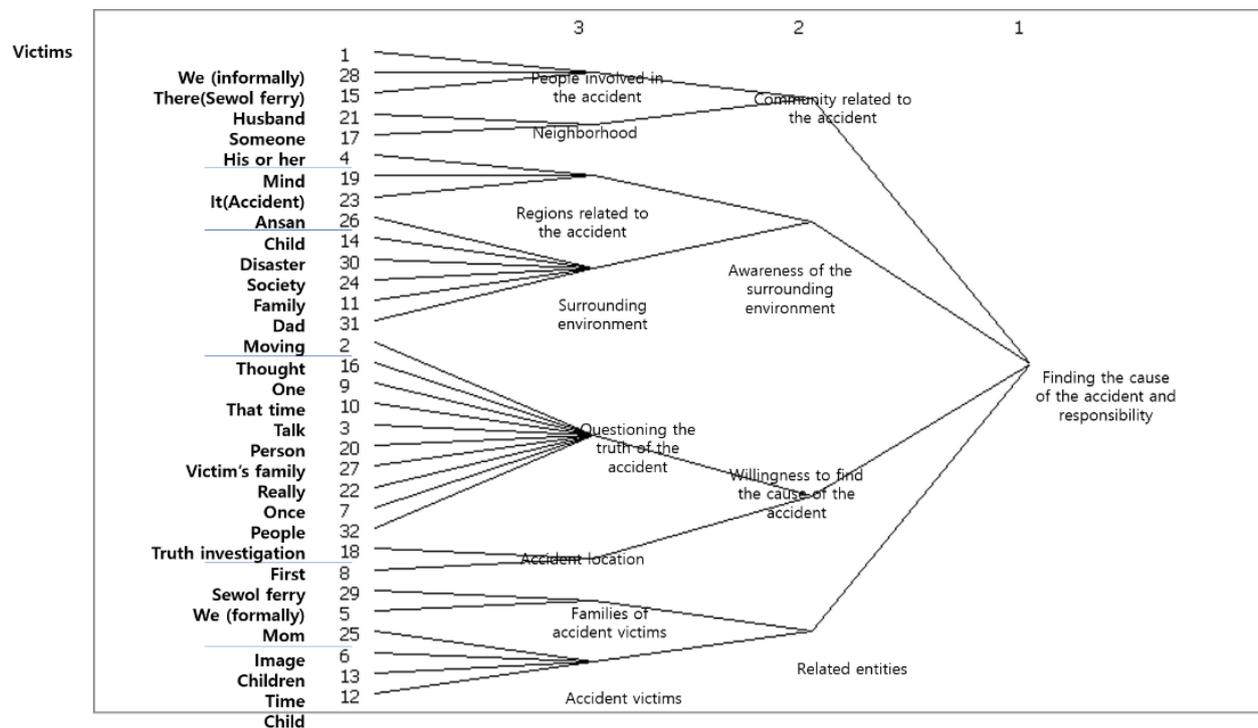


Figure 2. Similar word clusters and the meanings of victims' families.

As the third language cluster—My friends, Friend, Year, School, Friends, and Teacher—consists of words referring to the victim of the accident at the time, and the fourth language cluster—Time and Plaintiff—refers to the time of the accident, the two similar clusters were named ‘Accident targets’ and ‘Accident time’, respectively, and the upper theme was named ‘Accident situations’.

The fifth language cluster—Victim’s family, Sewol ferry, Person, One—is composed of words referring to the victim’s family and the location of the accident, and the sixth

language cluster—People, story, talk, we (formally)—refers to the content of the accident. Thus, the two similar clusters were named ‘Accident location and targets’ and ‘Situation details of the moment’, respectively, and the upper theme was named ‘Accident targets and details’.

The seventh language cluster—something, mom, mind, and dad—is a summary of the thoughts that survivors had at the time of the accident, and it seems that children at the disaster site recalled their thoughts about their parents. The last and eighth language cluster—we (formally), memory, younger brother or sister—are thoughts after the accident, which can be seen as memories at the disaster site and things about the younger brothers who were lost in the disaster situation. These two similar cluster words were named ‘Thoughts at the time of the accident’ and ‘Thoughts after the accident’, and the upper theme was named ‘Accident description’. The second highest theme of the survivor’s essay was named ‘Memory of the accident’.

As a result of conducting a similar word cluster analysis (CONCOR) on the victim’s family essay, the themes of the remaining family, the truth of the accident, finding the truth, and the environment were derived. First, We (informally), There (Sewol ferry), and Husband can be seen as words that include families and places related to an accident. Someone, His, or Her can be seen as words that include indirect neighbors and people related to the accident. The first word cluster contains subjects that are directly related to the accident, and the second word cluster contains subjects that are indirectly related to the accident. Therefore, the two similar word clusters were named ‘People involved in the accident’ and ‘Neighborhood’, respectively, and the upper theme was named the ‘Community related to the accident’.

The third word cluster—Mind, It (Accident), and Ansan—is composed of words that mean areas with high relevance to the accident, and the fourth word cluster—Child, Disaster, Society, Family, Dad, Moving—consists of words related to the surrounding environment associated with the accident. These two similar cluster words were named ‘Regions related to the accident’ and ‘Surrounding environment’, and the upper theme was named ‘Awareness of the surrounding environment’.

The fifth language cluster—Thought, One, That time, Talk, Person, Victim’s family, Really, Once, People, Truth investigation—refers to words related to finding the cause, truth, and responsibility at the time of the accident, and the sixth language cluster—First, Sewol ferry—concerns the place at the time of the accident. These two similar cluster words were named ‘Questioning the truth of the accident’ and ‘Accident location’, and the upper theme was named ‘Willingness to find the cause of the accident’.

The seventh language cluster—We (formally), and Mom—is a language cluster indicating the victim’s family, and the eighth language cluster—Image, Children, Time, Child—is a language cluster indicating the victim and the victim’s family. These two similar cluster words were named ‘Families of accident victims’ and ‘Accident victims’, and the upper theme was named ‘Related entities’. The second highest theme of the victim’s family essay was named ‘Finding the cause of the accident and responsibility’.

4.3. Sub-Conclusions

According to the analysis of the language network results, the major difference between the survivors’ essay and the victims’ family essay is the memory and recollection of the accident. First, according to the survivors’ essay, survivors have memories and recollections focusing on the person at the time of the accident, the circumstances at the time of the accident, and the content of the accident. Second, the victims’ family essay goes deeper into the question of the person at the time of the accident, the family left behind, the cause of the accident, the person responsible for the accident, and the truth about the accident.

Therefore, we believe that in order to strengthen resilience after a disaster, it is necessary to distinguish between the crisis management of the victim of the accident and the victim’s family related to the accident. In the case of the victim of the accident, a way to re-

lieve the trauma of the accident is needed (Massazza et al. 2021; Le Roux and Cobham 2021; Bountress et al. 2020), and in the case of the victim's family, a policy (Lee et al. 2020; Park and Bae 2022; Atkinson and Curnin 2020) is needed to relieve the injustice caused by sacrifice and help the left behind families and communities to lead normal lives.

5. Conclusions

With the Sewol ferry disaster in 2014, problems related to social disasters and corruption became social issues. Studies have been conducted in various fields on the Sewol ferry disaster and social disasters, but no in-depth analysis through literary works has been conducted (Huh et al. 2017; Chae et al. 2018; Kee et al. 2017).

Disaster-related literary works do not have a unified conclusion, and the themes are diverse. Considering this diversity, we can indirectly experience new perspectives on disasters in human society (Baque 2019; Chovanec 2019), and learn how the damage of disasters affects its victims. Such experiences enable an indirect experience of trauma in a disaster situation, thereby leading to the acquisition of a mindset for disaster prevention (Thornber 2021).

In addition, literary analysis can not only predict the cause and damage scale of disasters, but also examine the emotional aspects (social exclusion, disgust). This can be used to tackle complex questions about various types of violence caused by disasters (Bhattacharya 2020; Uyheng 2020). In particular, literary texts depicting real disasters are the most powerful works that explore the lives of disaster victims. This reveals how individuals and disasters have affected their lives (Potts 2018; Mika 2018).

Through a text analysis of disaster literature, this study summarizes the characteristics and significance of survivors' and victims' families' perceptions. The results showed differences in emotions, behaviors, attitudes, role perceptions, etc., as perceived by survivors and victims' families in dealing with a disaster.

First, the group and meaning of the similar words of survivors are as follows. The first theme is the feelings and conditions of survivor' targets. There are two sub-themes: "the person concerned and feelings" and "the subject involved and the situation at the time". This theme is formed of words about thoughts, older sisters, parents, first, brother, there, real, once, and related subjects, thoughts, and feelings. In particular, it is composed of words about victims composed of friends, school, and teachers, and words related to the time of the victim, such as time.

The third subject is the victim and the content, which is composed of two sub-themes: 'the place and object' and 'the content of the situation at the time'. This topic consists of words related to 'place and object of damage', such as the Sewol ferry, people, and survivors, and words such as stories, story, and people as 'the content of the situation at the time'.

The fourth theme was emotion and resilience at the time, and was composed of two sub-themes: 'Emotion' and 'Resilient Emotion'. It is composed of words containing emotions such as mind and something, and meaningful words to remember the situation at the time related to memory and construct resilience through it.

Next, the similar word clusters and meanings of victims' families are as follows. The first is a cluster of 'objects and subjects', composed of two sub-themes, the related object and the related subject, in which words are formed around husband, who, our related person, and the subject. The second is the subject of 'damage situations and emotions', and consists of two sub-themes: 'damage-related areas and emotions' and 'damage situation'. Words are formed for the area where the victims live, such as Ansan, and the change of circumstances according to the damage situation, such as tragedy, the world, and moving.

The third theme is 'request to the government for recovery of the case', which includes two sub-themes: 'feelings and demands of the government' and 'place of damage'. This theme is composed of words that refer to a transparent and truthful case resolution, such as surviving family, real, once, truth finding, and words for the Sewol ferry, the same damage place as the first.

The fourth theme is related to the subject and is composed of two sub-themes: ‘victim’s family’ and ‘victim’. It is composed of words that recall related subjects through their mothers, children, and appearance.

In particular, survivors remember and think about the situation at that time and develop resilience to the incident, while victims’ families attempt to establish resilience to the incident by investigating the facts and government countermeasures.

While survivors focused on building their own resilience, victims’ families were focused more on improving government countermeasures to prevent such accidents from recurring. This can be considered as social or national resilience.

In this study, we analyzed two literary works in which survivors and victims’ families participated to explore the meaning of disaster literary works. However, this study is limited in that it analyzed literary works containing the opinions of only some survivors and victims’ families. Future work should elaborate the results of this study by preparing various theoretical foundations to build disaster preparedness and resilience by analyzing various literary works related to disasters, including essays.

Author Contributions: Conceptualization, S.-A.K., J.-E.L., E.S. and S.I.R.; methodology, S.-A.K. and S.I.R. software, E.S.; validation, J.-E.L. and S.-A.K.; formal analysis, S.-A.K.; investigation, E.S.; resources, S.-A.K.; data curation, S.-A.K. and J.-E.L.; writing—original draft preparation, S.-A.K., S.I.R. and E.S.; writing—review and editing, S.-A.K. and J.-E.L.; visualization, S.-A.K.; supervision, J.-E.L. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2020S1A5B8103910).

Informed Consent Statement: Not applicable.

Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Acknowledgments: We express our gratitude to Changbi for allowing us to analyze the works *The Day Knocked on Our Window* and *Spring Will Come Again*.

Conflicts of Interest: The authors declare no conflict of interest.

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