



Analysis of Laughter Therapy Trend Using Text Network Analysis and Topic Modeling

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Abstract

Purpose: This study aims to understand the trend and central concept of domestic researches on laughter therapy. For the analysis, this study used total 72 theses verified by inputting the keyword 'laughter therapy' from 2007 to 2021. **Research design, data and methodology:** This study performed the development and analysis of keyword co-occurrence network, analyzed the types of researches through topic modeling, and verified the visualized word cloud and sociogram. The keyword data that was cleaned through preprocessing, was analyzed in the method of centrality analysis and topic modeling through the 1-mode matrix conversion process by using the NetMiner (version 4.4) Program. **Results:** The keywords that most appeared for last 14 years were laughter therapy, depression, the elderly, and stress. The five topics analyzed in thesis data from 2007 to 2021 were therapy, cognitive behavior, quality of life, stress, and the elderly. **Conclusions:** This study understood the flow and trend of research topics of domestic laughter therapy for last 14 years, and there should be continuous researches on laughter therapy, which reflects the flow of time in the future.

Keywords : Text Network Analysis, Topic Modeling, Laughter Therapy, Research Trend, Word Cloud

JEL Classification Codes : I21, I29, I31, I39

1. Introduction

1.1. Necessities of Research

Laughter improves a passion for work, raises pride, and also implants an optimistic way of thinking (Jung, 2011). Recently, laughter therapy is widely utilized because it can be performed with many people together through simple training and it does not cost much with no limitations on time and space (Bennett & Lengacher, 2006).

As the physiological effects of laughter, it reduces the level of stress hormones such as cortisol and epinephrine,

increases the level of hormones related to health promotion like endorphin, and also strengthens the immune system by increasing the number of T-lymphocytes through the activation of natural killer cells and Ig A, G, M (Bennett & Lengacher, 2006; Hayashi et al., 2007). Laughter relieves negative psychological responses such as anxiety, stress, and depression. Through the secretion of endorphin, it changes mood, normalizes/maintains respiration, stabilizes blood pressure, relieves pain, and reduces the secretion of stress hormones. Also, this endocrine response prevents diseases and normally maintains blood pressure by strengthening immunity and resistance (Ripoll & Casado, 2010). Moreover, laughter inhibits vasoconstriction by

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reducing the destruction of substance (Nitric Oxide) that extends blood vessels, which reduces blood pressure (Bennett & Lengacher, 2006). Like this, laughter is reported to have positive effects in physiological aspect.

1.2. Objectives of Research

To understand the trend of domestic laughter therapy, this study applied the text network analysis. The concrete objective is to understand the core theme, main semantic structure, and changes in research themes according to time.

First, this study verifies the main keywords of researches on laughter therapy.

Second, this study verifies the degree centrality and betweenness centrality, which is the relation between main keywords of researches on laughter therapy.

Third, this study verifies the flow and trend of research themes of laughter therapy.

2. Study Method

2.1. Research Design

This is a research on the content analysis in the method of network analysis and topic modeling by extracting the keywords of domestic academic researches under the themes related to laughter therapy, as text data.

2.2. Research Procedure

The keyword data that was cleaned through preprocessing, was analyzed in the method of centrality analysis and topic modeling through the 1-mode matrix conversion process by using the NetMiner (version 4.4) Program. In the analysis, proper nouns or bundles of words that would represent a single meaning were set up as designated words.

The purpose of utilizing this analysis method is to tridimensionally and visibly verify the correlation by finding the correlational structure between conceptual elements that are semantic words composing the definition of concept, and then representing it into graph.

If the abstracts of selected theses were written in English, they were all translated and recorded into Korean, in order to extract significant keywords.

After extracting the abstracts and keywords from theses, the keywords were refined based on the criteria as follows.

All the extracted concepts were separated into a single word based on word spacing.

Regarding the adjective words that modified keywords, the words including “~jeok” and “~han” were viewed as a single word by verifying the frequency of use.

In case the meaning was similar or implied, it was all modified into a single word. After that, it was modified into changed words for the analysis of abstract. For example, the laughter treatment was viewed as a part of laughter therapy, so the ‘laughter treatment’ was modified into ‘laughter therapy’.

Targeting the determined 272 words, the total frequency was analyzed.

Regarding the network map, the correlation was visualized into a graph by using the NetMiner Program after converting the co-occurrence frequency matrix(coocc.dbf) file that was extracted through Krtitle of KrKwic Program, into an excel file.

When an isolated node unrelated to other keywords appeared after the network map was completed, the map was created by composing it only with associated words by excluding the isolated node.

3. Result

3.1. Research Publication Status by Year

From 2007 to 2021, total 78 researches related to laughter therapy were published in Korea. Even though it is hard to say that many theses were published, they have been consistently published from 2007 <Table 1><Figure 1. In the finally-analyzed theses, total 330 keywords were presented. The core keywords taking up from the 1st to 30th places for the frequency of appearance in the analyzed theses are as Table 1. The most-appeared keyword was laughter therapy (47 times), which was followed by depression (20 times), the elderly (16 times), and stress (15 times).

Table 1: Research publication status by year

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Presented	6	6	6	8	9	4	7	7	7	5	3	3	3	4	4

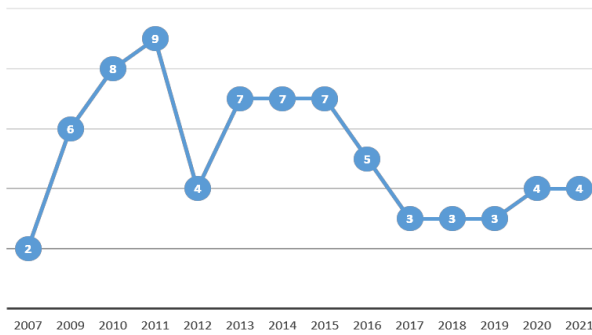


Figure 1: Research publication status by year

3.2. Relation between Main Keywords of Researches on Laughter Therapy

The 30 keywords with huge influences, verified in the Number of papers related to laughter therapy by year results of analyzing the degree centrality of keywords presented in the subject theses, are as <Table 2>. In the analysis of degree centrality for verifying the influence through the number of keywords connected to surrounding, it was verified in the order of stress, depression, and response. The keywords with higher degree centrality compared to the placing of appearance frequency were program, the elderly, and laughter in order. The depression, women, and pain that were located in the upper placing of keyword frequency, showed the low degree centrality compared to their keyword placing<Table 3>.

Table 2: Keyword and Frequency

Rank	Keyword	Frequency
1	Laughter therapy	47
2	Depressed	20
3	Elderly people	16
4	Stress	15
5	Anxiety	6
6	Female	6
7	Laugh	6
8	Pain	6
9	Self-esteem	5
10	Program	5
11	Meta-analysis	4
12	Reaction	4
13	quality of life	4
14	Sleep	4
15	Cortisol	4
16	Breast cancer	3
17	Cognitive behavioral therapy	3
18	Mental health	3
19	Middle age	3
20	Sleep disorder	3
21	Osteoarthritis	2
22	Technological strategy	2
23	Coping	2
24	Literature therapy	2

25	Anger management	2
26	Juvenile delinquent	2
27	Survival analysis	2
28	Life satisfaction	2
29	Child	2
30	Fusion	2

Table 3: Relation between key words

Rank	Keyword	Frequency	Keyword	Degree Centrality
1	Laughter therapy	47	program	0.064
2	Depressed	20	Elderly people	0.058
3	Elderly people	16	laugh	0.054
4	Stress	15	Anxiety	0.047
5	Anxiety	6	Pain	0.042
6	Female	6	Depressed	0.044
7	Laugh	6	Laughter therapy	0.042
8	Pain	6	Reaction	0.041
9	Self-esteem	5	Cognitive behavioral therapy	0.038
10	Program	5	Mental health	0.031
11	Meta-analysis	4	Mental health	0.029
12	Reaction	4	Sleep	0.028
13	quality of life	4	Self-esteem	0.026
14	Sleep	4	Mental health	0.024
15	Cortisol	4	Stress	0.020
16	Breast cancer	3	Cognitive behavioral therapy	0.017
17	Cognitive behavioral therapy	3	Elderly people	0.017
18	Mental health	3	Reaction	0.014
19	Middle age	3	Sleep disorder	0.013
20	Sleep disorder	3	Cortisol	0.013

3.3. Relation between Main Keywords of Researches on Laughter Therapy

Most of the subjects of laughter therapy were women. Even though there were some researches targeting children and adolescents, the subjects were mostly the elderly. The sociogram using the overall topic modeling of this study is as <Figure 1>, and the sociogram that visualizes the relation between main keywords of five topics is as

<Figure 2>. The word cloud of each period based on the occurrence frequency of keywords in the process of topic modeling analysis, is as <Figure 3>.

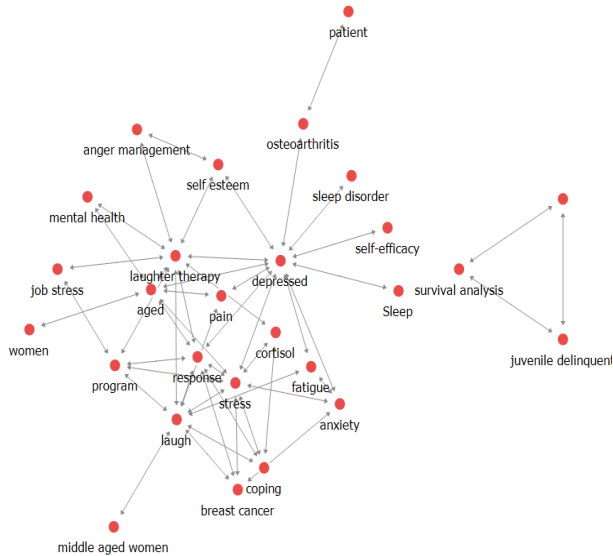


Figure 2: Sociogram using Topic Modeling

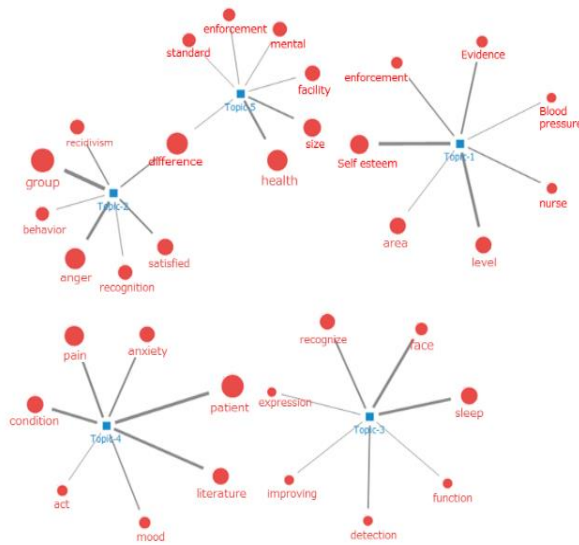


Figure 3: Sociogram visualizing the relationship between major keywords for 5 topics



Figure 4: Word cloud using frequency of occurrence

4. Conclusions

Laughter therapy has many strengths like it does not require special devices and cost, has no limitations on time and place, and can be used through a bit of training (Choi et al., 2010). Since the therapeutic effects of it by reducing stress were widely known, it has been applied to various subjects. The researches targeting the patients (Choi et al., 2010; Han et al., 2011), nurses (Oh et al., 2011), middle-aged women (Cha & Hong, 2013), the elderly in community (Lee et al., 2016), and adolescents (Lee et al., 2015a; Lee et al., 2015b) are reporting the positive effects of laughter therapy on physical/psychological responses by relieving their stresses.

Studies on laughter therapy have been studied in various disciplines such as nursing, social welfare, and medicine, and numerous research results have been reported as the importance of research on symptomatic treatment has emerged. It is the time when it is necessary to analyze the preceding studies on laughter therapy conducted at different points in time for each researcher to understand the trend of research topics, such as which topics have been corely studied and which topics have received attention from researchers over time. In this study, the relationship between “Depressed”, “Elderly people”, “Stress”, and “Anxiety” was shown through laughter therapy, and it is important that these related studies develop in a grounded-theoretical manner as a whole.

The results of this study verified that the researches for verifying the physical and psychological effects of laughter therapy were constantly performed for last 14 years. Based on such results, this study suggests a follow-up research that could support the scientific basis of positive effects of laughter therapy. This study is significant in the aspect of exploring the trend of research themes based on the

scientific basis and also presenting changes following the time flow, by interpreting the results through the text network analysis method that is calculated on the basis of social network analysis index.

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