Semantic network analysis of conflict in Korean society regarding the WHO classification of gaming disorder (disease code 6C51)

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Abstract

Background: In 2018, the World Health Organization (WHO), in its 11th revision of the International Classification of Diseases (ICD-11), classified 'gaming disorder' as a disease. As a result, countries are witnessing conflicts among stakeholders with regard to the introduction of the classification. The objective of this analysis is to identify trends of coverage made by major media outlets in Korea concerning controversy over the introduction of 'gaming disorder' as a disease and, through such an analysis, examine how social perceptions have been formulated in Korea.

Methods: Semantic network analysis was deployed to examine the semantic structure of messages delivered by the media. The analysis was conducted to identify what semantic structure and issues were pursued by the media with regard to the introduction of 'gaming disorder' as a disease in the context of social debates, by looking at the prominent of words in messages delivered by news media, and the interactive structure among these words.

Results: In terms of their prevalence, the main key words in major media reports were 'addiction', 'WHO', 'classification', 'industry', 'code', 'domestic', 'objection', 'gaming industry', 'introduce', 'gaming disorder', and 'Ministry of Culture, Sports and Tourism/MCST'. The structural characteristics of the entire network of media reports were formed around key words such as 'addiction', 'WHO', 'classification', 'objection', 'industry', 'code', 'mental disorder', and 'backlash'. Words with high eigenvector centrality were 'addiction', 'WHO', 'classification', 'industry', 'domestic', 'code', 'objection', 'introduce', 'controversy', and 'Ministry of Culture, Sports and Tourism/MCST'. Following CONCOR analysis, a total of four clusters were formed: Cluster 1 for objection, Cluster 2 for consent, Cluster 3 for expected problems, and Cluster 4 for factors for efforts towards conflict resolution.

Conclusions: This research explored social perceptions in Korea regarding the issue of the WHO introducing gaming disorder as a disease, by identifying trends of the media coverage through a semantic network analysis of the media's asymmetrical data. Through this, despite the inevitable introduction of the system to promote public health, it was shown that there is a sharp conflict between the medical and the game industry and related public organizations in Korea. [*Ethiop. J. Health Dev.* 2020;34(Special issue-3):67-77]

Key words: Gaming disorder, disease code 6C51, conflicts, media reports, semantic network analysis

Background

In 2018, in its 11th revision of the International Classification of Diseases (ICD-11), the World Health Organization registered 'gaming disorder' with a disease code '6C51'. Here it is noted that '6C51' defined gaming disease as exhibiting patterns of behavior of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning, evident for at least 12 months (1). Accordingly, addiction to playing games is now classified as one of the four major addiction diseases, alongside alcoholism, drug addiction and gambling.

As can be seen in the percentage of students not playing computer games in Korea – a mere 23.1% – computer games have become a primary source of entertainment (2), as well as the country's representative industry, with export volumes totaling KRW 59.23 billion in 2017 (3). However, with the recent decision by the WHO, a stark contrast is being witnessed among relevant agencies regarding the introduction of such a classification into the mainstream understanding of game playing in society. In large part, this is because the related literature for including gaming disorder in ICD-11 lacks reliability, and the definition of addiction to activities is skewed towards that of substance abuse. As such, there is not enough consensus on the symptoms and evaluation of the disorder (4). In addition, the Korean gaming industry, which is recording an annual revenue of KRW 14 trillion, is expected to incur economic losses of over KRW 11 trillion over the next three years (5), thereby triggering a backlash from the industry. It is argued that the decision to include gaming disorder in ICD-11 may expand a negative image of gaming, result in stricter regulations of the gaming industry (6), deprive people of the right to enjoy gaming and oppress their rights of expression, as well as result in economic losses (7).

Korea's Ministry of Culture, Sports and Tourism (MCST) and the gaming industry are objecting to the decision on the basis that such a classification does not have a scientific basis and evaluation (8-10), may impede individual rights to enjoy culture and art, and may restrict the growth of the industry.

Meanwhile, others argue that addiction to gaming can have a serious impact on individuals and society, which may include health issues arising from a lack of sleep and physical activity as well as social isolation, failure to fulfill duties, and a lack of maintenance of interpersonal relations. There are also media reports of families facing discord due to gaming addiction; parents neglecting child care duties, i.e. allowing children to pursue playing of games in the home as a substitute for parental care (11); excessive gaming resulting in sudden deaths; and violence in the virtual world being causally linked to violent crimes in the real

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world. The harmful consequences of excessive gaming have emerged as a detrimental social issue in many countries (12). Ultimately, the WHO's classification of gaming disorder as a disease tells us that a public health response at the national level is inevitable to tackle the issue.

Behaviors that cause serious physical and mental pain and disorder, as well as withdrawal symptoms, need to be classified as disease (13). Moreover, granting a disease code to gaming disorder as part of measures to respond to the social issue of addiction to games can enable governments to share information on disease prevention and treatment for comparison and evaluation with one another. In addition, budgets will be allocated for the prevention and treatment of the disease, which will make it more effective to manage public health and related issues going forward (5).

Korean society is currently seeing a tense conflict between those who view gaming as positive for our industry and culture, and those who view it as a threat to an individual's personal health and wellbeing, and pursuit of education. In particular, as the consumption debate about the introduction of gaming disorder as a disease has increased, the Korean government recently established a public-private consultation system in preparation for the official entry of the WHO ICD-11 in 2022 (14). It is unusual for the Korean government to look into matters such as this, which shows that the introduction of gaming disorder as a disease in Korea is a major social issue, as well as a very important matter to the media. How the media covers news articles on the issue plays a critical role in molding perceptions towards gaming disorder as a disease, and of providing an environment conducive to enjoying games and digital content in a healthy and sound manner.

In general, the public depends highly on how the media depicts any new disease, as the public has no prior experience of it, and the issue entails such uncertainty that the public will seek to understand the it based on media reports (15,16). However, as for the media, how to report the matter can create confusion, as accurate definitions of the new disease have not been provided by experts, nor has consensus been reached by stakeholders (17). Against the backdrop of the decision on classifying gaming disorder as a disease, the press has a huge role to play in inducing the public to make informed decisions before the introduction of a more accurate classification of game disorder in society.

The research team utilized the semantic network analysis method to see how social conflicts of registering gaming disorder as a disease have been depicted in the media. Semantic network analysis is a method that interprets phenomena through networks created by expressing the relations among words from texts with links (18). Semantic network analysis uses internet news and social networking service to extract aspects that are hard to analyze using other research methods (19).

Thus, this research analyzed the network of key words shown in headlines of news articles to identify trends

of coverage made by major media outlets in Korea regarding registering gaming disorder as a disease, and through such an analysis, examine how social perceptions of gaming have developed in the nation. It is hoped that this research will help to promote a better understanding of digital games, help a sound gaming culture to take root, and lead to interconnectivity among social issues and health policies. The following research questions were developed.

First, what are the key words, based on their frequency in news articles, regarding registering gaming disorder as a disease? Second, what are the characteristics of the entire network structure of the key words? Third, what are central key words that are the most influential? Fourth, what are the structural characteristics of subgroups hidden in the network?

Research methods
Data collection: In general, the data collected were all news articles reported regarding gaming disorder from January 1, 2018 to June 30, 2019. The data were collected for a year and half, during which time the WHO made public ICD-11, including the definition of gaming disorder in advance (20), and there was intensive news coverage in the nation as the final decision was made on the disease classification of gaming disorder. In addition, during this 18 months, the Korean government discussed the establishment of a public-private consultative group to develop countermeasures in the run up to the domestic introduction of gaming disorder with a disease code (14) and there was noticeable media coverage regarding the matter, combined with the inauguration of the Joint Countermeasure Committee, which was mainly comprised of relevant industry and public organizations and the hosting of numerous policy forums. In other words, a series of trends that occurred during this period helped us to predict that there would be a change in societal perception, including towards digital games being played and used in Korean society. That being said, research on trends of news coverage in the Korean media regarding the introduction of a disease code for gaming disorder and on social perceptions could serve as grounds for grasping general perceptions towards games in Korean society and changes in these perceptions.

The articles were searched on the website of the Korea Press Foundation, BigKinds (www.bigkinds.or.kr), using the search term 'gaming disease'. The BigKinds service provides about 60 million articles that have been issued by 54 Korean press companies, including newspapers and broadcasting companies, from 1990 to the present. The researchers collected a total of 132 media articles and 398 headlines from 10 out of 11 major press companies. The press company Munhwa-Ilbo was excluded from analysis since it had not reported any related articles. The texts on search words 'game' and 'disease' were also excluded from this analysis. Search words that are directly related were excluded because they can have excessive influence in semantic network analysis. Above all, the reason for selecting only the articles of the major press in Korea as the target of data collection is that 91 out of 614

international papers published in 2013-2017 are very interested countries as domestic papers. (21). Typically, Korea is where new games are released, and serves as a platform (22) that dynamically visualizes socio-cultural phenomena related to games more than any other society, along with having vibrant media reactions to such phenomena.

Process of semantic network analysis: In this research, Textom, based on the KrKwic program, was used for vocabulary matrix needed for the semantic network analysis. Next, the relationship between words was then visualized using NetDraw, which is within the UCINET 6 program. The content analysis software program KrKwic fits full-text program for English texts into a Korean language setting (23). KrKwic calculates the frequency of each word within the text, and derives the line of words appearing simultaneously. The detailed procedure of the semantic network analysis conducted is outlined below.

First, after collecting the articles from 10 major press companies with the search word 'gaming disease' on BigKinds, the collected files were loaded on Textom.

Then, the file to calculate the frequency of each word was created. Through this process, the researchers were able to identify which word was the most frequently used in the reported texts. For the second stage, the words and the conjunctions that do not have meaning in themselves were excluded and the derivative words of particular words were set as the same. In the third stage, the key words were extracted from the remaining words. In this research, the 40 top-ranking words in terms of frequency were selected as the key words and the co-occurring line of 'word x word' was created among 40 key words. Next, the line of co-occurring words was used to make a sociogram of the network structure of the words, using NetDraw. Semantic network analysis makes the classification category emerge naturally from data (23). As a result, the content structure of the media reports can be analyzed based on the co-occurrence of words.

To summarize the process, the researchers used Textom to produce the matrix of occurring and co-occurring frequency of key words, and the data acquired from that went through network analysis and visualization through UCINET 6 and NetDraw.
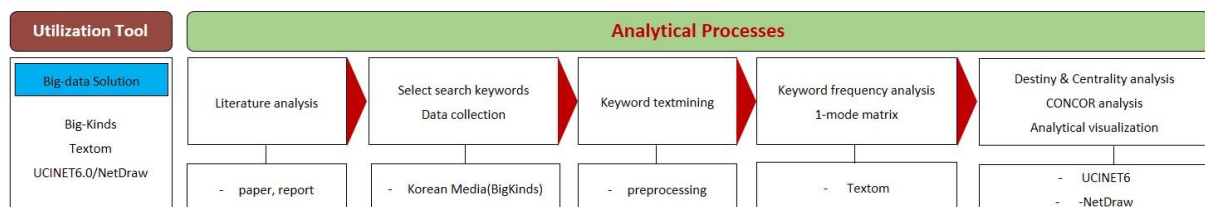
Utilization Tool	Analytical Processes				
Big-data Solution	Literature analysis	Select search keywords Data collection	Keyword textmining	Keyword frequency analysis 1-mode matrix	Destiny & Centrality analysis CONCOR analysis Analytical visualization
Big-Kinds Textom UCINET6.0/NetDraw	- paper, report	- Korean Media(BigKinds)	- preprocessing	- Textom	- UCINET6 - -NetDraw

Figure 1: **Research procedure**

Data integrity: In this research, triangulation and peer consultation were conducted to secure data integrity. First of all, the present researcher used a peer consultation method to prevent the interpretation of the derived results from having an overly narrow perspective. To that end, the researcher consulted a doctor of public health management, two doctors of sports sociology, and an expert in 'big data'. In this way, the objectivity of the research was secured and defects that might appear in the interpretation of the results were minimized.

Research results
Results of key word extraction: In research question 1, the researchers looked at the most frequently appearing key words in the media reports on gaming disorder. The key words from a total of 132 articles were analyzed. Prior to the analysis, words which had the

same meaning but were expressed differently by journalists were squared. For example, when using terms such as the Ministry of Culture, Sports and Tourism, the Ministry of Health and Welfare, and the Joint Action Committee, the terms used in the short form of the same meaning are the same as the official name. The number of key words collected from this process was 432; excluding overlapping words, the total was 398. The most frequently appearing key words in terms of frequency analysis of the text of headlines from January 1, 2018 to June 30, 2019 were 'addiction' (66 times), 'WHO' (36 times), 'classification' (35 times), 'industry' (21 times), 'code' (20 times), 'domestic' (15 times), 'objection' (13 times), 'gaming industry' (11 times), 'introduction' (11 times), 'gaming disorder' (10 times), and 'Ministry of Culture, Sports and Tourism/MCST' (9 times) (see Table 1).

Table 1: **Top 40 key words**

Key word	Freq.	Percentage	Key word	Freq.	Percentage
addiction	66	8.620%	lamentation	5	0.652%
WHO	36	4.699%	cause	5	0.652%
classification	35	4.569%	research	5	0.652%
industry	21	2.741%	rights	4	0.522%
code	20	2.610%	concern	4	0.522%
domestic	15	1.958%	discussion	4	0.522%
objection	13	1.697%	culture	4	0.522%
gaming industry	11	1.436%	issue	4	0.522%
introduction	11	1.436%	constitution	4	0.522%
gaming disorder	10	1.305%	Joint Countermeasure Committee	3	0.391%
Ministry of Culture, Sports and Tourism	9	1.174%	consultative group	3	0.391%
controversy	8	1.044%	launch	3	0.391%
regulation	8	1.044%	violation	3	0.391%
backlash	7	0.913%	stigma	3	0.391%
organization	6	0.783%	response	3	0.391%
mental illness	6	0.783%	government agency	3	0.391%
Ministry of Health and Welfare	6	0.783%	appeal	3	0.391%
scientific basis	6	0.783%	divesture	3	0.391%
diagnostic criteria	5	0.652%	government	3	0.391%
overindulgence	5	0.652%	not	2	0.261%

The 10 top ranking key words are on the role of information sharing of the WHO's decision to classify gaming disorder as a disease, and the objections from relevant agencies and organizations. The most frequently mentioned word, 'addiction', is slightly provocative, to which many relevant agencies have shown sensitive reaction. The press has been imprudent in using the term with no clear criteria. In particular, the word 'addiction', which can cause provocation and bias, was used twice as often as the term 'gaming disorder', which is the term the WHO is officially using to describe this condition today.

Meanwhile, 'industry', 'domestic', 'objection', 'gaming industry', 'introduce', 'Ministry of Culture, Sports and Tourism/MCST' are the key words that show concerns about the negative economic and industrial impact the decision could have on the gaming industry, and the relevant government agency, the MCST, was presented as a primary agency that objects to the decision of the Ministry of Health and Welfare. This stresses the factors for conflict rather than presenting solutions, which shows how the media is skewed towards bringing people's attention to the issue without providing objective information for them to make informed decisions.

Results of entire semantic network analysis: While research question 1 shows the frequency of key words in the headlines of articles on gaming disorder, research question 2 looks at the context in which the key words are used. The most important information here is which criteria we should utilize to select the key words for analysis. It is deemed that, in general, there

is a tendency to select the key words in a way the entire network structure of what is subject to analysis can be seen, rather than follow a particular criterion that would be used in relation to the selection of the key words.

In this research, semantic network analysis was conducted on the top 40 key words, taking into account the frequency of exposure, number of key words, and so on. To this end, the line of co-occurrence among 40 key words was inputted into the NetDraw network visualization tool in UCINET 6 and, as a result, a network was created among key words.

The thickness of the links between nodes in the semantic network expresses the proportion of the frequency of links of the words. This means that the factors represented by the words are relatively more closely linked. Figure 2 is a visualization of the entire network structure of key words.

The characteristics of the semantic network of the text are usually expressed with indicators such as density and the degree of links (24). In particular, Network density is an indicator of how many relationships are between certain words in the network. This is determined by the ratio of the total number of relationships between the connection points and the actual number of relationships. In other words, a higher density (a figure closer to 1) means that each node is densely connected with a high degree of cohesiveness, unity and complexity (25).

Broadly speaking, the density of the semantic network of this research is 0.733; the degree of connection among key words was found to be 1,144 words; and the degree of average links among nodes was 28,600. Overall, the entire network structure was formed around words including 'addiction', 'WHO', 'classification', 'objection', 'industry', 'code', 'mental illness', and 'backlash'. In other words, the headlines of articles on gaming disorder are created based on those key words. Meanwhile, 'Joint Countermeasure Committee', 'overindulgence', 'not', 'cause' and 'stigma' are the key words that are far away from the center of the network, which shows that they appeared only intermittently in the headlines.
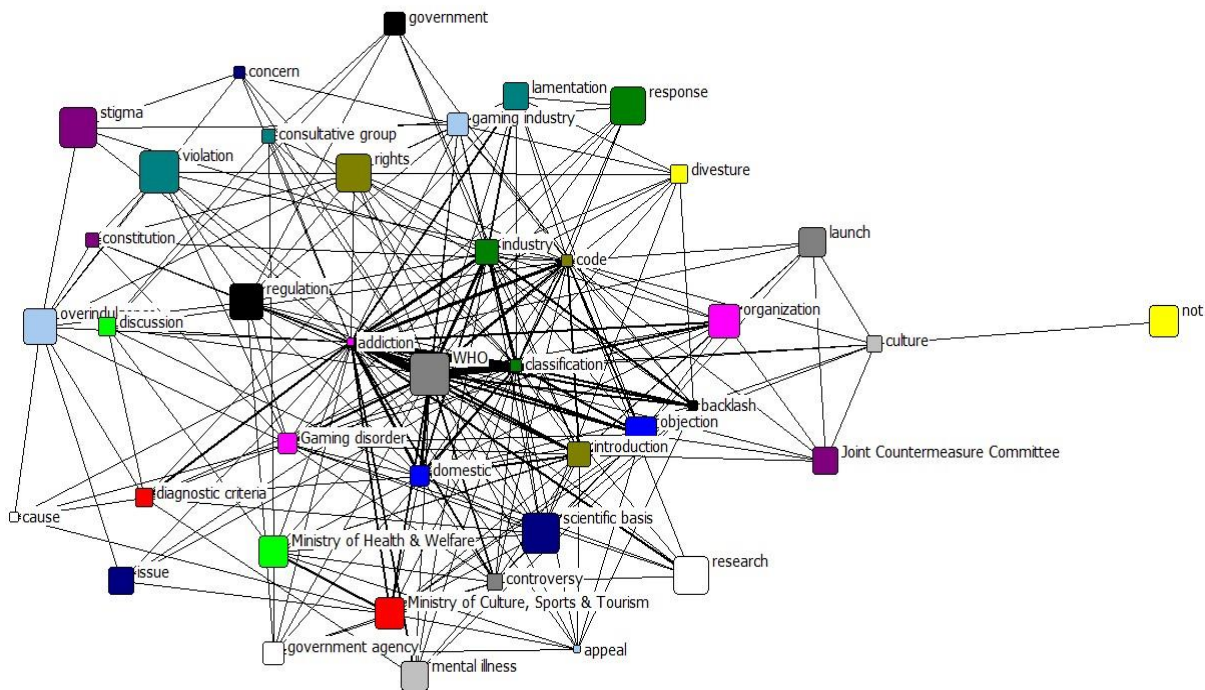

Figure 2: **Entire network**

Results of key word centrality analysis: *In* research question 3, the researchers looked at central key words that have the most influence. The key word centrality analyzed in this research was eigenvector centrality, and the result is as follows. In this context, the most useful indicator in finding the central key words within eigenvector centrality is to give weighted value to the importance of the words connected to particular words within the network. As such, it is noted that a higher eigenvector centrality means more influence (26). The words with high eigenvector centrality are in Table 2 and Figure 3. Upon analysis, high eigenvector centrality was found in the words 'addiction', and 'WHO'. Other than these, words such as 'classification', 'industry', 'domestic', 'code', 'objection', 'introduction', 'controversy', and 'Ministry of Culture, Sports and Tourism/MCST' were found to be high in eigenvector centrality, which is similar to the results of the key word frequency presented above.

Table 2: **Key word eigenvector centrality analysis result**

Rank	Word	Eig. cent.	Rank	Word	Eig. cent.
1	addiction	0.500	21	mental illness	0.051
2	WHO	0.476	22	government agency	0.048
3	classification	0.463	23	response	0.047
4	industry	0.248	24	regulation	0.046
5	domestic	0.205	25	concern	0.038
6	code	0.189	26	rights	0.037
7	objection	0.163	27	divesture	0.035
8	introduction	0.158	28	discussion	0.031
9	controversy	0.120	29	issue	0.031
10	Ministry of Culture, Sports and Tourism	0.117	30	constitution	0.031
11	gaming disorder	0.116	31	overindulgence	0.029
12	backlash	0.116	32	launch	0.028
13	organization	0.104	33	Joint Countermeasure Committee	0.028
14	lamentation	0.080	34	cause	0.027
15	scientific basis	0.073	35	consultative group	0.027
16	research	0.067	36	violation	0.024
17	Ministry of Health and Welfare	0.063	37	culture	0.024
18	objection	0.063	38	stigma	0.021
19	diagnostic criteria	0.054	39	government	0.017
20	gaming industry	0.053	40	not	0.000
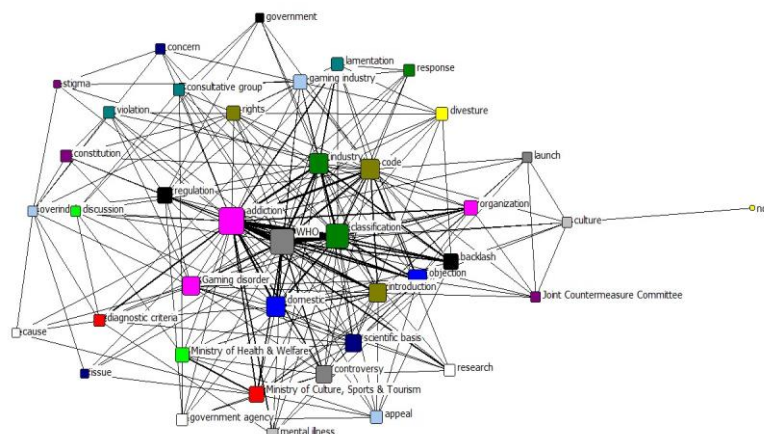
Figure 3: **Eigenvector centrality network**

Results of CONCOR analysis of semantic network:
The network of the 40 top-ranking words is so closely interlinked that an in-depth analysis of the headlines has its limits. Thus, in research question 4, they are classified in several clusters, whose characteristics have been analyzed through CONCOR (CONvergence of iterated CORrelations) analysis. As one of the most generally-used methods in structural equivalence analyses, CONCOR analysis repeatedly carries out correlation analysis among words and identifies groups of similarity at a reasonable level (27). In this context, the words with similar meanings were clustered within the semantic network and the relationship among groups was analyzed. The analysis result was classified in four clusters, as shown in Figure 4.

Cluster 1 showed key words such as 'Ministry of Culture, Sports and Tourism/MCST', 'scientific basis', 'lamentation', 'rights', 'backlash', and 'divesture'. The relationship between these words shows that the media have reported on the objection to the decision to classify gaming disorder as a disease. Cluster 2 includes key words such as 'Ministry of Health and Welfare', 'introduction', 'addiction', and 'code'. The relationship between these words shows that the media reported on the need to protect public health by accepting the WHO's decision. Cluster 3 includes 'concern', 'diagnostic criteria', 'social stigma', and 'violation'. This shows that reports were intended to highlight the conflict regarding the decision to classify gaming disorder as a disease and point out expected problems. Lastly, Cluster 4 was found to have key words such as 'Joint Countermeasure Committee', 'launch', and 'government'. This shows that reports were made on the efforts and the commitment of relevant organizations, including the government, to tackle the issue.

Through the analysis result, the characteristics of the relevant reports on gaming disorder can be divided largely into four, which mostly are intended to inform the public of the current conflict regarding the social issue, and highlight the issue at stake, thereby gathering public attention. Reports that proposed specific measures to resolve the conflict and to help the public make objective, informed decisions were found to be limited.
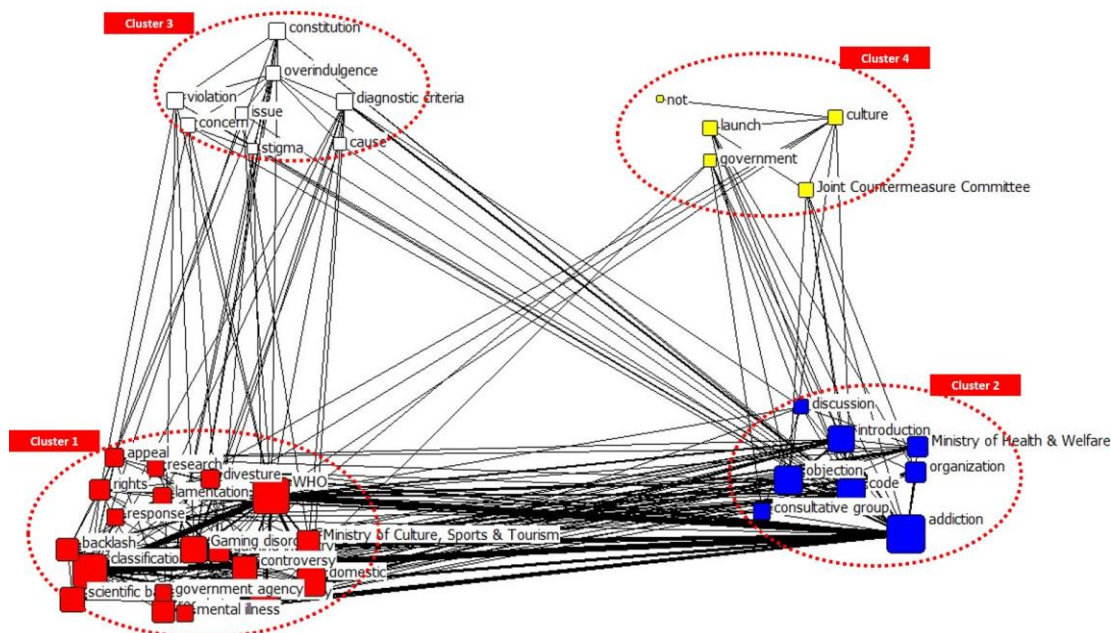

Figure 4. CONCOR network analysis

Discussion and conclusions
This research looked into key words in the headlines of articles through semantic network analysis to see how the media in Korea reports conflicts concerning the introduction of the classification by the WHO of gaming disorder as a disease.

First, upon analyzing the key words in the headlines of articles in major media reports, the word 'addiction' was used the most frequently in the headlines (66 times), and was one of the important key words directly related to the decision by the WHO, followed by 'WHO' (36 times), 'classification' (35 times) and 'code' (20 times). Other key words at the heart of the conflict included 'industry' (21 times), 'objection' (13 times), 'gaming industry' (11 times), and 'Ministry of Culture, Sports and Tourism/MCST' (9 times).

After analyzing the relationship between the key words presented in the headlines, the entire network structure was formed around key words such as 'addiction', 'WHO', 'classification', 'objection', 'industry', 'code', 'mental illness' and 'backlash'. In contrast, words such as 'Joint Countermeasure Committee', 'overindulgence' and 'social stigma' were far away from the heart of the network. In addition, the eigenvector centrality analysis, which is useful in finding the most influential key words in the network, showed that its result was similar to the result of frequency of key words (Result 1).

Studies that performed a meta-analysis on dissertations concerning game overindulgence and addiction published from 2013 to 2017 revealed that the medical and pharmaceutical industries (47.2%) and social science researchers (39.8%) had led the research. The medical and pharmaceutical industries tend to define or specify game overindulgence as a pathological phenomenon, whereas social science research opposes the idea that internet gaming disorder is in the same line with a pathological addiction. In particular, the social scientists pointed out that the criteria to diagnose game overindulgence merely followed the criteria applicable to existing substances and behavioral addiction, excluding any cultural and social backgrounds, highlighting that this is inappropriate to the context of gaming (21). As such, the World Health Organization's decision that game disorder is a disease included in the "addictive behavior disorder" category along with gambling addiction is frequently reported to the media as a major cause of social debate. Meanwhile, according to O'Brien (28), the term 'game addiction' is rarely used in academia, as terms such as addiction, abuse and dependency have been modified into 'disorder' in DSM-5, and in particular, the definition of addiction itself is vague and has not been frequently used. Having said that, the term 'game addiction' was used in news coverage in the Korea media to date without any filtering.

As a result, it is necessary to consider why the key word 'addiction' is important and reported so frequently in this study. This is the result of the media's overly stimulating reporting form, as our society has not agreed on whether to judge game addiction as a pathological problem (29).

On the other hand, according to a study (19) that looked into how the overall effects of computer games and game addiction are contextualized by the media, it was reported that Korean media tends to contextualize games from a more positive perspective compared to its US counterpart. This is due to the pro-industry trends of the media. This research also tells that media reports were made from the perspective of the industry as seen in the preceding research, from key words related to the gaming industry such as 'industry', 'objection', 'gaming industry' and 'Ministry of Culture, Sports and Tourism/MCST' suggested as major results. It also shows that there were many media reports made by organizations who would bear the brunt of this decision, to refute the decision, and express their opposing stance. Contrary to this, some in the medical sector pointed out that the media outlets related to the gaming industry unilaterally reported their opposing arguments with exaggerated and untruthful content against the decision, without the utilization of any filtering (12).

When clustering the subgroups in order to analyze the headlines in depth, the headlines were classified into a total of four clusters. 'Ministry of Culture, Sports and Tourism', 'scientific basis', 'rights' and 'backlash' belonged to Cluster 1, which mostly focused on delivering one side of the conflict, i.e. informing the

public of the objection to the decision. The words in Cluster 2, i.e. 'Ministry of Health and Welfare, 'introduction', 'addiction' and 'code', were mainly found on the other side of the conflict, consenting to the decision. Cluster 3, which contains words such as 'concern', 'diagnostic criteria', 'stigma', and 'violation', focused on expected issues intended to highlight the conflict. Lastly, Cluster 4 had key words such as 'Joint Countermeasure Committee', 'launch', and 'government', which were found in the headlines dealing with efforts to resolve the conflict.

Cluster 1 has a tendency to report opposition to the decision. The key words in this cluster that opposed the decision are 'Ministry of Culture, Sports and Tourism', 'scientific basis', 'rights' and 'backlash.' The media reports regarding the scientific basis, in particular, refer to articles written to refute the legitimacy of the decision. According to preceding research, it is difficult in formulating gaming disorder due to the absence of decisive grounds and lack of objectivity with regards to gaming disorder (4), and it is also irresponsible to include gaming disorder in the disease classification at a time when there has been no proper verification or standardized evaluation of research on the theory, definition and patients (30). This is why the media reports that are the most critical in a response to the decision are also mainly focused on the lack of a scientific basis for the decision.

Cluster 2 tends to report consent to the decision. Media articles in which these words appear argue that official recognition of gaming disorder as a disease is essential to facilitate progress of and access to treatment for mental health, since the introduction of gaming disorder as a disease has been shown in current clinical practices throughout the globe. In particular, prior research also reported that the introduction of gaming disorder as a disease would enhance treatment capabilities and possibly improve the quality of those newly available treatments, through possible changes in the national medical system, as well as research and development to satisfy the need for treatment (31). Likewise, as a basis for the Ministry of Health and Welfare, the responsible governmental department, to express its position and determine the introduction, the WHO's classification of gaming disorder as a disease was reported with the key word 'addiction', one of pathological phenomena as a main text. The results also showed that the Ministry played a leading role in expressing the need for classification of gaming disorder as a disease in its press release, which may help future health outcomes of people currently experiencing this disorder today.

Cluster 3 tends to report expected problems following the WHO's decision to classify gaming disorder as a disease. In particular, key words such as 'stigma', 'diagnostic criteria' and 'violation' were reported, shedding light on concerns over these problems. First of all, according to the research that revealed the structural stigmatization process, people had shown emotional reactions such as prejudice and behavioral reactions regarding discrimination, and had justified their behavior to socially isolate those who were

recognized to suffer from a gaming disorder (32). Such a prejudice could cause adverse impacts on attitudes towards ordinary game users and the gaming industry, as well as in the future (33). Therefore, despite the fact the decision to classify gaming disorder as a disease can be compelling from the public health perspective for health prevention and improvement, it could bring with it issues such as stigma, as is seen in society regarding alcohol addicts, or lead to social isolation.

Furthermore, with respect to 'diagnostic criteria', the absence of consensus on accurate evaluation of diagnostic criteria was pinpointed by citing that the current criteria for the incidence of a gaming disorder were too dependent those used for of substance abuse and gambling (4). As for 'violation', it is possible to disregard the value of game and art culture and violate the basic rights of a cultural life, giving rise to issues such as impeding the development of game culture (34). In other words, problems that could arise following the decision were reported in articles that mainly focused on issues raised by the gaming industry and Ministry of Culture, Sports and Tourism.

Cluster 4 represents effort to resolve conflicts, reported with an intention to emphasize a need for governmental efforts to solve conflicts between health-related medicine and the gaming/IT sectors associated with the cultural industry. Nevertheless, it is significant to note that the media in the USA and Korea, the two major countries in terms of the gaming industry, still tended to report articles centering on the gaming industry, rather than negative coverage regarding harm that could be brought to game players, such as economic costs and risks derived from excessive gaming (35).

Thus, the government should predict a trend of development and use of game technologies, and devise an inclusive and effective plan as soon as possible. Moreover, overregulation could put a burden caused by game overindulgence on adolescents and game companies, so it is necessary to predict expected results in a multi-faceted manner and thoroughly grasp social needs from public opinion in order to contemplate the introduction. On top of that, support for education regarding gaming ethics and literacy should be provided to create a quality game culture, as games have been regarded as a new kind of ailment that is recognized as detrimental to health in this digitized era.

The analysis of gaming disorder through semantic network analysis collectively shows that the characteristics of the reports in Korea on the registration and the introduction of the WHO's classification system of gaming disorder is found in the most frequent positioning of controversial words surrounding different interests in the headlines. In particular, the importance of the issues of shrinking the gaming industry and cultural growth in Korea and protection of public health and education is emphasized in the headlines, in which stimulating and provocative words were used. In addition, there were many cases in which the media associated with the gaming industry reported articles that unilaterally expressed objection to the WHO's decision with some untruthful and

exaggerated contexts, without any filtering. However, there are relatively few media reports intended to propose measures to resolve the conflict.

In this regard, advanced research shows that being skewed to particular facts about the risk to health gives not just people, but also the experts, biased views on this issue (36). In other words, media reports with the frequent use of provocative words, without focusing on providing resolutions, will only exacerbate conflict and give people biased views, which requires the media to report in more prudent and objective ways. In particular, people nowadays pay considerable attention to personal health and lifestyle, and the relevant media reports can have a huge impact on how individuals choose to pursue a healthy lifestyle. As such, the media should go beyond simply delivering facts and report on the cause of the issue, problems and measures in a more profound way, being faithful to its function to promote public good, that is social unity, by helping people take objective views of the conflict.

Just as an excessive intake of the likes of salt and sugar may be harmful for our health, moderate consumption does no harm to health-conscious individuals. Similarly, prudent and proper reporting, rather than exaggeration, will go a long way towards resolving the conflict by protecting people's rights to know information on health.

Limitations of this study
The limitations of this and future research are as follows. First, analysis was limited to a review of the headlines. While the general public tends to focus on the headlines or sub-headlines when encountering news (37), the entire text could have been made subject to analysis for increased accuracy of the analysis.

Next, while this research utilizes the semantic network analysis method, future research will be further improved if interviews of journalists are added, which will enable more profound analysis of the key words and therefore enhance the understanding of the reports on gaming disorder.

Last, the reaction in the Korean society to the WHO's decision is highly strained. The introduction of the WHO's classification system requires a long-term review, and should be decided prudently upon discussion and consensus among experts rather than in the immediate future.

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