Value-related texts on disabled sports in Korean news articles

Jiwun Yoon¹, Minkyu Han² and Jae-Hyeon Park¹*

Abstract: This study aims to analyze value-related texts on disabled sports in Korean news articles using the semantic network. The research collected 740 news article titles that featured disabled sports published from January 2010 to December 2015 and available from a database of news articles in Korea. The Krkwic, a computer program for the analysis of Korean text, was used to extract Korean keywords, and 1,961 value-related texts were extracted from the news articles. Texts whose frequency of co-occurrence was five times or higher in the text × text matrix were selected, followed by network analysis to obtain the value-related texts on disabled sports. Degree, between, and eigenvector centralities on the text network were calculated using Netminer 4.0. The three core texts related to the value of disabled sports in Korean news articles were “festival,” “challenge,” and “dream.” These three core texts had associated texts that had positive and negative connotations. Korean news articles assigned disabled sports the value of the celebration of persons with disabilities, the objective to face challenges, and the dream of overcoming disabilities.

Subjects: Asian Media and Communication Studies; Disability Sport; Sport and the Media; Sports Policy; Disability Studies - Sociology; Media, Information & Communication Industries

Keywords: value-related text; disabled sports; keyword network; news media; South Korea

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PUBLIC INTEREST STATEMENT

What value do sports have for persons with disabilities (PWDs)? What do people with no disabilities think about disabled sports? What are the strategies for promoting sports for PWDs? This study began with these questions. In determining the value of disabled sports in Korean society, the study analyzed newspaper articles, which serve an important role in shaping social opinion. The values of “festivals,” “challenges,” and “dreams” are not different from those related to non-disabled sports. Disabled sports are “festivals” for people with disabilities, “challenges” to life, and “dreams” for the future. This study is meaningful because it applies keyword network analysis using social network, a data mining technique, to PWD research. We hope that this highly innovative method could be applied to various other fields.
1. Introduction

Disabled sports in Korea have experienced many changes since the establishment of Korea Sports Association for the Disabled in 2005. Traditionally, disabled sports have only emphasized the health and rehabilitation of persons with disabilities (PWDs) (Hutzler, 1990), but recently, it has been paying significant attention to improving sports performance through competition (Gold & Gold, 2007). The belief that disabled sports cannot only improve PWDs' health but also satisfy their social needs underpins and establishes disabled sports policy as an important national sports policy (Yun, 2017).

In such a context, what kind of value do disabled sports hold in Korea? Value refers to “the degree of importance” of an object of human desire or interest (Cambridge Advanced Learner’s Dictionary & Thesaurus Online’s, n.d.). Values shared in a society are known to have a potential effect on shaping the favored behavior of individuals and goals of the era (Mickwitz, 2003; Rokeach, 2008; Spates, 1983). For instance, the direction of disabled sports policy could be determined depending on the kind of value disabled sports held in a country. In this respect, value-related texts on disabled sports reported in Korean news articles could become an important indicator that confirms the direction of disabled sports in Korea. Rokeach (2008) argued that the individual or social value humans hold is important in understanding human behavior as a topic that captures the attention of various academic disciplines, such as sociology, psychology, political science, philosophy, management, and communications. In particular, the individual or social value formed in a special population, such as PWDs, is regarded as a reflection of how the group they belong to thinks about them.

Collecting data on the value people deem important for special populations has often applied quantitative analysis based on survey methods (Fitzsimmons, Macnab, & Casserly, 1985; Munro, 1985; Schmitt, Schwartz, Steyer, & Schmitt, 1993), content analysis on qualitative data collected from interviews (Jo & Doorenbos, 2009), and controlled social media (Fleischmann, 2013; Fleischmann et al., 2015). Data on special populations collected quantitatively or qualitatively could be used as a basis to understand the characteristics of group and human behavior.

The latest development that is social media has enabled the real-time delivery of information from the media, and articles reported through the media have a huge effect on forming internal public opinions in specific groups and shaping an external view toward particular groups (Pan & Kosicki, 1993; Tomlinson, 2014; Tuchman, 1978). In particular, newspapers that generate real-time news play an important role in shaping public opinion, owing to their credibility. As news articles have a strong function of determining the direction of national policy by shaping public opinion, text analyzes based on news articles could identify types of paradigms and value changes in various fields (Auslander & Gold, 1999; Mickwitz, 2003). For this reason, the text in a news article is an important keyword that constitutes a certain topic in society or the value toward a specific group.

Disability sports have been highly recognized as an area for improving the health and quality of life of PWDs (Sainsbury, 2004). Nonetheless, PWDs’ participation in physical or sports activities remains low in general (Kuippis, 2016). Keywords used in newspaper articles on the subject of disabled sports can be evaluated as a criterion of the values society ascribes to disabled sports. Auslander and Gold (1999) defined negative attitude and social bias toward PWDs, the development of which are attributed to various influences, as factors discouraging their social participation, such as in sports activities. As news articles have an important function in forming public opinions (Elliot & Byrd, 1982; Zola, 1985), this study aims to explore the value that disabled sports seek by analyzing value-related texts on disabled sports in Korean news articles. Specifically, this study analyzes “what values do Korean newspaper articles relate to disabled sports?”

1.1. Semantic network

Semantic network is a representation of semantic relations between various concepts in the form of a network (Doerfel & Barnett, 1999). The network is a method that extracts texts from sentences and then analyzes the meaning from the network based on relations between texts. Recently, the semantic network is suggested as a means to shed light on the meaning and value hidden in relations.
between texts in news articles (Sudhahar, Veltri, & Cristianini, 2015). Semantic network analysis is a process that extracts meaning in scattered text information as a text mining method. To extract meaning from texts, this method extracts keywords using network analysis algorithms and then analyzes the level of importance in the network based on these keywords. The process is different from semantic analysis in qualitative research in that it could analyze relations between keywords using quantitative indicators, such as degree, between, and eigenvector centralities (Krippendorff, 2004).

The semantic network is characterized by its use of a network in creating meaning based on relations between texts. The term “network” refers to a system of connections created by conceptually structuring relations between objects through nodes and links. The object could be a person, group, or item. In the semantic network of this study, the text is a node. A network is what structures relations between objects as mentioned previously, whereas the link is a relation in a network. For example, the proposition “physical activity and health” is connected through a link between the node “physical activity” and node “health.”

If a network of nodes and links is established for various sentences and paragraphs collected from news articles, the network could become highly complex in structure. The semantic network is a method that quantitatively analyzes the meaning from a network made up of nodes and links between texts and then visualizes the analysis results. The strengths of analyzing news articles using the semantic network could be summarized as follows:

First, the semantic network could analyze the meaning of the text used in news articles. The semantic network deconstructs the text from the sentence and recombines it into the sentence. By repeating this process for numerous sentences used in news articles, the network could identify a consistent pattern in the text’s meaning.

Second, the semantic network could assign a common meaning to specific texts used in news article (Paranyushkin, 2011). Texts with the common meaning in news articles could thus be grouped together. For example, the semantic network focuses on the kind of role a specific text plays in its relation to another text, and not only on the frequency of a specific text in news articles. By grouping texts with the common meaning, the network could create a simpler message from the massive amount of news articles.

Third, the semantic network could identify the centrality of the text used in news articles. The text’s centrality is represented as the size of a node with larger influence among other countless nodes in the network. For example, the meaning could be assigned to the size of influence of the text used in news articles. Identifying the one with the biggest influence among other texts used in news articles could be regarded as an important element in analyzing the entire text (Myers & O’Brien, 1998).

Fourth, the semantic network could visually analyze the proximity of texts used in news articles based on the network theory. In other words, it could visually identify and interpret mutual relations between network nodes (Paranyushkin, 2012). The network could also identify main connections between texts and the strength of such connections.

### 2. Materials and methods

#### 2.1. Data

To analyze value-related texts on disabled sports in news articles, this study collected 740 news articles with titles mentioning “disabled sports” from a Korean newspaper database (Naver News Archive) published in print formats beginning in January 2010, when the Naver News Archive service was launched. The study chose to refer to news article titles as they could be used to infer the key point of the article (De Vreese, 2004). News article titles in this study were the ones searched with the keyword “disabled sports.” After removing adverbs and general verbs, this study analyzed 1,961 noun and adjective texts, which contained the value of disabled sports.
2.2. Analysis

To analyze value-related texts on disabled sports in news articles, procedures such as text extraction, text refinement, text × text co-occurrence matrix, text network analysis, and visualization were required as analysis phases. The following are the methods used for each analysis phase in this study:

In the first phase, Naver News Archive, a news search database in Korea, was used. With the keyword “disabled sports,” 2,216 news article titles were initially extracted; the study excluded those that were not directly related to disabled sports and those provided repeatedly by portal websites. This refining process yielded a final number of 740 articles.

In the second phase, using KrKwic, a program designed to extract Korean terms, this study calculated the frequency of words collected from the selected news articles. According to the text extraction method proposed by Park and Leydesdorff (2004), adverbs (e.g. most and much) and general verbs (e.g. be, become, and do) were excluded. In addition, another refinement process removed pronouns and consolidated differently expressed texts with similar referents (e.g. Olympics and Paralympics, national athletes and national players).

In the third phase, 57 words with a frequency of five or more times were selected out of the refined 1,961 texts, and n2’s text × text matrix was calculated. This process calculated the text’s frequency of co-occurrence. All of these selected words were value-related texts subject to human desire or interest.

In the fourth phase, the study analyzed each text’s influence in the network using the network analysis program. Degree centrality (DC), between centrality (BC), and eigenvector centrality (EC) (Freeman, Borgatti, & White, 1991) were used as indicators. DC refers to “how many links a text [has] with other texts” (Krippendorff, 2004); a larger DC means a particular text has a large influence in a set of texts. BC is the value that represents “which text leads links between texts,” whereas EC refers to the degree of link with a large influence text in a set of texts. To apply network analysis based on relations between value-related texts on disabled sports, the 1-modenetwork, which analyzes relations between the same types of nodes, were considered appropriate to use. Netminer 4.0 was used to calculate centrality indices on texts and visualize the network.

3. Results

3.1. Three core value-related texts

Out of 1,961 texts in Korean news articles related to disabled sports, network analysis was performed on 57 core texts whose frequency of co-occurrence was five times or higher in the text × text matrix. Table 1 shows the three core texts’ frequency in terms of single occurrence and co-occurrence among the three core texts. The three core texts were festival (19 times), challenge (17 times), and dream (14 times). These texts could be regarded as the interest and goal pursued with respect to disabled sports according to Korean news articles featuring disabled sports; they are considered to contain the meaning of the value of disabled sports.
3.2. Festival-related texts

Figure 1 and Table 2 illustrate the results of semantic network analysis on texts related to “festival,” one of the most frequently mentioned words in news articles featuring disabled sports. In the news articles with the core text “festival,” festival-related texts were “impossible” (DC = 0.375, BC = 0.026, EC = 0.251), “wall” (DC = 0.313, BC = 0.021, EC = 0.305), “life” (DC = 0.250, BC = 0.008, EC = 0.190), “human victory” (DC = 0.250, BC = 0.007, EC = 0.197), “love” (DC = 0.250, BC = 0.008, EC = 0.220), and “passion” (DC = 0.250, BC = 0.003, EC = 0.185). The correlation of “impossible” and “wall,” whose DC, BC, and EC were high, to “festival” in the news coverage of disabled sports may be considered peculiar. This result could be viewed from the perspective that unlike the meaning of sports festivals for people without disabilities, that for PWDs is interpreted as the activities of players with disabilities facing the impossible and surmounting barriers. Accordingly, disabled sports’ festivals had both texts with negative connotations (e.g. bias, wall, and impossible) and texts with positive connotations (e.g. love, communication, success, and interest). Thus, when news articles on disabled sports mention the value “festival,” they use the positive meaning of disabled sports, such as love, interest,

| Festival-related texts on disabled sports | Degree centrality | Between centrality | Eigenvector centrality |
|------------------------------------------|-------------------|-------------------|------------------------|
| Impossible                               | 0.375             | Impossible        | 0.026                  | 0.305                  |
| Wall                                     | 0.313             | Wall              | 0.021                  | 0.264                  |
| Life                                     | 0.250             | Life              | 0.008                  | 0.251                  |
| Human victory                            | 0.250             | Love              | 0.008                  | 0.227                  |
| Start                                    | 0.250             | Interest          | 0.008                  | 0.220                  |
| Love                                     | 0.250             | Human victory     | 0.007                  | 0.198                  |
| Passion                                  | 0.250             | Start             | 0.007                  | 0.197                  |
passion, and success, along with the negative meaning, such as bias, wall, and impossible. In this regard, the festival-related value of disabled sports could be assigned the meaning of activities aimed at moving beyond the negative, such as bias, wall, and impossible. In the analyzed news articles, festival-related texts had the positive meaning of “communication,” “love,” “interest,” “wish,” and “success,” and the negative meaning of “wall” and “bias” (connected by bold links in Figure 1).

### 3.3. Challenge-related texts

Figure 2 and Table 3 show the results of semantic network analysis on texts related to “challenge” in news articles on disabled sports. Texts with the core text “challenge” in the analyzed news articles included “stage” (DC = 0.286, BC = 0.016, EC = 0.106), “winner” (DC = 0.286, BC = 0.011, EC = 0.245), “beauty” (DC = 0.286, BC = 0.011, EC = 0.585), “wall” (DC = 0.214, BC = 0.000, EC = 0.167), and “star” (DC = 0.214, BC = 0.005, EC = 0.105). As a text related to “challenge,” “stage” showed the largest DC and BC. In other words, “stage” recorded the largest number of links and between connections. News articles seemed to view the meaning of “stage” with respect to “challenge” in disabled sports as a place where PWDs face challenges to demonstrate their best performance, or a platform for their communication with the world. According to the EC results, “beauty” was strongly linked with texts such as “winner,” “hero,” and “wall,” apart from “challenge.” News articles seemed to perceive the value of “challenge” in disabled sports as in concordance with “beauty.” Thus, the challenge-related value in disabled sports could be assigned the meaning of “stage,” “winner,” “beauty,” and “wall.” Challenge-related texts in news articles featuring disabled sports revealed the positive meaning of “beauty,” “sweat,” and “winner” and the negative meaning of “discrimination” and “lowest ranked” (connected by bold links in Figure 2).
3.4. Dream-related texts

Figure 3 and Table 4 demonstrate the results of the semantic network analysis on dream-related texts in news articles on disabled sports. The keywords mentioned with dream in the analyzed news articles included “sports star” (DC = 0.500, BC = 0.068, EC = 0.356), “stage” (DC = 0.250, BC = 0.008, EC = 0.252), “wish” (DC = 0.250, BC = 0.000, EC = 0.247), and “discrimination” (DC = 0.250, BC = 0.008, EC = 0.271). “Sports star” and “discrimination” were used at the same time when dream-related texts were mentioned. In other words, “dream” in disabled sports is about sports players with disabilities competing in the Paralympic Games and dreaming of becoming a sports star; another interpretation is the dream for discrimination-free disabled sports. In this regard, the dream-related value in disabled sports could be assigned the meaning of “sports star,” “stage,” “wish,”

| Degree centrality | Between centrality | Eigenvector centrality |
|-------------------|--------------------|------------------------|
| Stage             | 0.286              | Stage                  | 0.016 |
| Winner            | 0.286              | Winner                 | 0.011 |
| Beauty            | 0.286              | Beauty                 | 0.011 |
| Wall              | 0.214              | Star                   | 0.005 |
| Star              | 0.214              | Lowest ranked          | 0.001 |
| Lowest ranked     | 0.143              | Empathy                | 0.001 |

Table 3. Challenge-related texts on disabled sports
“discrimination,” and “shinning.” In news articles featuring disabled sports, dream-related texts were found to have the positive meaning of “shinning” and the negative meaning of “discrimination” and “bias” (connected by bold links in Figure 3).

4. Discussion
This study was designed to analyze value-related texts on disabled sports in news articles. Tomlinson (2014) argued that as news articles featuring a specific topic shape public opinion by assigning value to that topic, news articles play a strong role in determining the direction of national policy. Accordingly, this study intends to explore the direction pursued by disabled sports by analyzing the three core texts “festival,” “challenge,” and “dream” and their associated texts in news articles on disabled sports. The study calculated degree, between, and eigenvector centralities based on the network analysis method.

The three core texts were the most frequently appearing words in the 740 news articles analyzed. This outcome could be interpreted as the public perception of disabled sports; owing to the social bias against disabilities, the public generally recognizes a disabled sports festival as a place to overcome disabilities (French & Hainsworth, 2001; Schell & Duncan, 1999). Core texts in articles of newspapers or the media are regarded as contributors to the social value that the public holds or a reflection of the social value in the news (Haller et al., 2012). In this respect, Korea turns disabled sports into the values of the PWDs’ festivals, courage to face challenges, and dream; Korean society recognizes disabled sports as a message of joy and hope in the world to people without disabilities. PWDs are disrupted by social and physical factors. This study analyzed the social value of sports for PWDs. These values (“festivals,” “challenges,” and “dreams”) can be a goal for social participation by PWDs.

The analysis results on value-related texts on disabled sports in this study found associated words with positive connotations and those with negative connotations. This finding demonstrates the emphasis given by news articles on texts with positive meaning while overcoming texts with negative meaning, in recognition of their responsibility to establish a positive social perspective toward disabled sports. This could be interpreted as an effort by the media, given its power to express social issues and encourage the public to form a public opinion (Howe, 2008), to pull disabled sports toward a positive direction. In Korean society, a negative perception of PWDs persists. The value of sports participation pursued by PWDs is not different from that by people with no disabilities. This study contributes to the positive recognition of the participation of PWDs in sports.

Meanwhile, the results of this study are different from Schell and Duncan’s cases (1999), which analyzed what commentators of the 2008 Paralympic Games said during their running commentary, highlights of which include descriptions of athletes competing in disabled sports as “victims of misfortune,” as being “no different from their ‘normal’ counterparts,” and as being “not so bad” compared with athletes with no disabilities. In addition, the present study’s results are opposite of those in other studies that found the absolute number of media outlets featuring disabled sports as very small (Wardle, Boyce, & Barron, 2009), which is attributed to the pervasive tendency for negative stereotypes in expressions on PWDs in the media and popular culture (Berger, 2008; Black & Pretes,

| Table 4. Dream-related texts on disabled sports |
|-----------------------------------------------|
| Degree centrality | Between centrality | Eigenvector centrality |
|-------------------|--------------------|-----------------------|
| Sports star       | 0.500              | 0.068                 | 0.356                 |
| Stage             | 0.250              | 0.008                 | 0.271                 |
| Wish              | 0.250              | 0.008                 | 0.252                 |
| Discrimination    | 0.250              | 0.001                 | 0.247                 |
| Gold medal        | 0.250              | 0.001                 | 0.247                 |
| Sweat             | 0.167              | 0.001                 | 0.246                 |
In other words, the value of sports skills assigned to elite athletes without disabilities in sports is not assigned to athletes participating in disabled sports (Fitzgerald, 2012).

As argued by Fitzgerald (2012), the three core texts “festival,” “challenge,” and “dream” for disabled sports in Korean news articles could be understood as having little to do with sports skills and more to do with texts of considerations or support for PWDs; these texts are not related to enjoying disabled sports. Although it cannot be definitively determined whether texts of support for disabled sports are appropriate, follow-up discussion on the direction of media coverage would help shape the appropriate value toward disabled sports, given that disabled sports could be understood differently from the way PWDs view them (Purdue & Howe, 2012).

In conclusion, Korean news articles assigned disabled sports the value of the celebration of PWDs, based on the messaging of “festival,” the objective to face challenges, and the dream of overcoming disabilities. Using the study, when establishing sports policy for PWDs, the aspects to be prioritized have to be considered. When PWDs participate in sports, they can consider setting a sports policy that reflects the value they seek.

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