# Tweeting about abusive comments and misogyny in South Korea following the suicide of Sulli, a female K-pop star: Social and semantic network analyses

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## Abstract

This study examined the development of the public discussion on *Twitter* about the abusive comments specific to misogynistic discourse after the suicide of Sulli, a female celebrity in South Korea. Both the pattern of social networking between the users and the semantic representations of user responses were analyzed from a social network perspective using a large-scale *Twitter* dataset. A total of 37,101 tweets generated by 25,258 users were collected and analyzed. The findings of the network analysis suggest that hubs and authorities on *Twitter* were closely connected to each other and contributed to promoting the public discussion about abusive comments in response to her death. The results of the semantic network analysis suggested that her death, presumably due in part to continuous hateful comments from trolls, evoked an open discussion about the deeply rooted abusive comments and misogyny that are prevalent in South Korea. Users perceived that sensational news coverage about celebrities and unethical journalistic practices led to abusive comments and her death. The users shared their observations that gendered hate speech contributed to Sulli's bullying. Dominant words that referred to Sulli's sexual harassment show the ways in which haters had bullied her, as well as the criticism of online harassment. The results imply that the issue of online misogyny was closely associated with abusive comments in the public consciousness. This study verified the role of celebrities in increasing awareness about social issues and word-of-mouth dissemination even after a death. This study also offers methodological insights by demonstrating how social network analysis can be used to analyze public discussion using big data.

## Keywords

Celebrity bashing; Misogyny; Twitter; Social media; Social network analysis; Semantic network analysis; South Korea.

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## 1. Introduction

The online communication environment has been applauded for the endless opportunities it provides for individuals to express and share opinions. However, as experience has shown, not all opinions are beneficial to society, much less respectful. In fact, online aggression often occurs through abusive comments and has become a serious social problem worldwide. Abusive comments have been recognized as a problem in South Korea, but decisions by the country's leading news providers (*Naver* and *Kakao*) to eliminate the comments section that accompanies "entertainment" news were made only after the suicide of Sulli (real name Jin-ri Choi), an actress and former member of the famous K-pop idol group f(x).

Sulli, who was 25 years old when she took her own life, was frequently the subject of crude, abusive comments directed toward her personal love life, her choice of style (e.g., wearing shirts without a bra), and even her open support for South Korea's recently revised abortion law. On a TV show that she hosted, "The Night of Hate Comments," where she read abusive comments about herself (like Jimmy Kimmel's "Celebrities Read Mean Tweets"), Sulli reported she had been harassed constantly by continuous crude insults and obnoxious comments. While other, complex factors may have contributed to her death, the emotional effects of abusive online comments are often discussed as the primary reason for her suicide.

In particular, Sulli was harshly ridiculed as a "fake feminist" for her stated opinions on abortion and gender issues that set her up as a target of online gender hate crimes, expressed as sexist slurs and statements of bigotry. Especially when her feminist perspectives were mentioned in online discussions, comments morphed into misogynistic speech in an attempt to silence her feminist opinions. Not surprisingly, numerous studies have found that women worldwide are disproportionately the victims of online aggression (**Backe**; **Lilleston**; **McCleary-Sills**, 2018; **Felmlee**; **Rodis**; **Zhang**, 2020; **Hinduja**; **Patchin**, 2010) and that online misogyny functions to patrol gender borders and reinforce male solidarity online (**Kim**, 2017).

Sulli's suicide, which was suspected of being caused by severe online aggression via abusive comments, has provided opportunities to examine the role of the celebrity in shaping public discussions about abusive comments and specifically misogynistic discourse. This study investigates how public discussions were developed on *Twitter*, major topical trends and themes discussed in the discussion network, and user concerns and responses to online aggression and misogyny through the lenses of social and semantic network analyses.

## 2. Celebrity bashing and online misogyny

For decades, celebrities have been an easy target for gossip and even aggression, with celebrities often being portrayed as foolish (Johansson, 2008). More recently, the trend of bashing celebrities in newspapers has migrated to online communication settings, where not only journalists but also the public have become involved in such behaviors through additional aggressive comments on celebrity news and/or celebrity-related messages written by others (Van-den-Bulck; Claessens; Bels, 2014). Such trends have become so prevalent that scholars refer to them as "celebrity bashing" to identify the specific type of online aggression targeting celebrities that is conducted by journalists and their audience (Ouvrein *et al.*, 2019). Celebrity bashing has become even more frequent as celebrities have started to use social media as a way to communicate and engage with fans and wider audiences.

In online spaces, celebrity victims experience various types of online aggression, ranging from cyberstalking to racist or homophobic attacks, as well as misogynistic attacks (Lawson, 2018; Ouvrein *et al.*, 2019). Especially female celebrities, compared with their male counterparts, experience a form of online sexual harassment that is misogynistic and/or sexist in nature. Misogyny is generally defined as hatred or contempt for women (Moloney; Love, 2018) and, according to Ging and Siapera (2018), in recent decades has morphed into abusive comments posted by commenters. While the content of misogynic speech and behaviors have remained much the same over time, a critical difference has occurred due to migration of sexual harassment to online space, where anonymous commenters in the role of influencers are able to attract other anonymous commenters to join harassment against particular targets. Simply, it has become more toxic, more abundant, and visible to the public at large.

In South Korea, online misogyny is so prevalent that more than 80% of respondents in a survey conducted by the *Korean Women's Development Institute* (**Ahn** *et al.*, 2015) reported having been exposed to misogynistic language and content online. Hatred of women is frequently manifested in derogatory terms, such as *doenjang-nyeo* (soybean paste girl) to stigmatize and condemn young women's focus on materialism (**Song**, 2014) or a related term, *kimchi-nyeo*, which implies that Korean women are selfish, gold digging, and conniving, among other negative characteristics (**Yun**, 2013). In the online environment, misogyny in Korea developed rapidly around the use of specific language that justifies hostility against Korean women and strengthens male solidarity, in general.

For Sulli, celebrity bashing went beyond the scope of verbal attacks against women involving sexist comments, threats of rape, and related images. She was harshly ridiculed as a "fake feminist" for stating her

Hubs and authorities on *Twitter* contributed to promoting public discussions about abusive comments opinions on abortion and gender issues that set her up as a target of online gender hate crimes, expressed as sexist slurs and statements of bigotry. Especially when her feminist perspectives were mentioned in online dis-

# Discussions were made as an individuals' attempts to cope with their negative emotions regarding Sulli's death

cussions, comments morphed into misogynistic speech in attempts to silence her feminist opinions. She even received death threats for speaking out about her feminist ideas. Before her death, she spoke publicly, as she had done on previous occasions, about the suffering she experienced due to abusive comments, leading to depression, a panic disorder, social phobia, and many other psychological and emotional effects, such as feelings of frustration, distress, and a sense of inferiority.

Detrimental consequences of online misogynistic discourse are known to extend beyond the impact of the original assault. Korean gendered hate speech aimed at a particular target has been observed to cause harm in some cases to a broad segment of the female population as expressed online as well as in real life. In the online space, the uniform resource locators (URLs) of female victims are shared with others for the purpose of making public the content of cyber-attacks against them (**Kim**, 2018). Meanwhile, "Isu station assault," known as a fight between two women and four men, began with misogynistic discussions on social media. More than 90% of respondents in a survey conducted by the *Center for Media Research* at *Korea Press Foundation* reported serious concerns that the sentiment of hatred against Korean women might lead to true hate crimes (**Park; Yang**, 2016).

To date, Korea has not yet enacted legislation on hate speech, let alone abusive comments. As a result, portals have terminated their comments sections as a way to eliminate and prevent online abusive comments altogether. In the meantime, Sulli's death has made clear to many in Korean society the presence of online misogyny and its potentially fatal consequences for victims, including the need for government regulations. However, little is known in the Korean context about how the public's misogynistic discourse, including abusive comments, develops in online communication environments. Therefore, this study focused on the public discussions on *Twitter* of how Sulli's death may have influenced greater public awareness about the prevalence of abusive comments and misogyny in South Korea. The empirical findings of those discussions are expected to broaden understanding of misogyny in Korea and how it has proliferated on social media with serious consequences for targets of abusive comments. To investigate these issues, this study developed the following research questions:

RQ1: How did users' reactions to abusive comments after the suicide of South Korean pop (K-pop) star Sulli spread on *Twitter*?

RQ2: What were the salient issues and major themes in the semantic network of users' reactions to the suicide of South Korean pop (K-pop) star Sulli on *Twitter*?

RQ3: What issues were closely associated with "abusive comment" in the semantic network of users' reactions to the suicide of South Korean pop (K-pop) star Sulli on *Twitter*?

RQ4: What issues were closely associated with "misogyny" in the semantic network of users' reactions to the suicide of South Korean pop (K-pop) star Sulli on *Twitter*?

# 3. Methods

## 3.1. Data collection

To explore both social networking patterns and topical trends in a discussion about abusive comments in response to Korean idol Sulli's death on *Twitter*, all tweets written in Korean, including the term "설리" ("Sulli"), were collected from October 14, 2019, when Sulli died, to November 1, 2019. Considering that individuals mostly react to celebrities' death on *Twitter* within two weeks after the death of celebrities (**Park**; **Hoffner**, 2020), this data collection period is appropriate to capture public responses to her death. The tweets were extracted using an application programming interface (API)-based social media analytics tool *NodeXL* (**Smith** *et al.*, 2010). A total of 37,101 tweets generated by 25,258 users were collected. The unique number of tweets was 3,890, including 2,069 tweets (5.57%), 1,272 mentions (3.42%), and 468 replies to others (1.26%). The majority of the tweets were retweets of others' tweets (33,292; 89.73%). This is in line with existing studies' findings, suggesting power-law distributions in *Twitter* information networks (**Jiang** *et al.*, 2015; **Park** *et al.*, 2016). This means that a small portion of users had many connections, and their voices were more likely to be circulated and cited by others via *Twitter*. Institutional review board (IRB) was waived because the IRB office determined that it does not meet the requirements of "human subject research" as described in 45CFR46.

## 3.2. Social network analysis

Social network analysis was conducted to determine the structural characteristics of communication flows and conversational patterns between users in a *Twitter* discussion (**Park**; **Park**; **Chong**, 2020) about abusive comments that was formed in reaction to Sulli's death. Overall network metrics (such as the numbers of nodes, total edges, unique edges, ed-

ges with duplicates, self-loops, connected components, clusters, the average geodesic distance, diameter, reciprocated ties, transitivity, density, and centralization) were computed using *R* and *NodeXL*.

*Twitter* users actively conversed with others about meaning of Sulli's death in the context of Korean society

#### 3.3. Semantic network analysis

To investigate salient issues, major themes, and associations between concepts, we conducted a semantic network analysis of 37,101 tweets. Given the large volume of textual data, a text mining approach is appropriate (**Park**; **Hoffner**, 2020). In the semantic network, a node refers to each word extracted from the corpus, and ties represent the co-occurrence between words (**Doerfel**; **Barnett**, 2006). As a meaning-centered approach, semantic network analysis is useful to reveal salient topics, metaphors, and key themes from large-scale textual data (**Park** *et al.*, 2016). After preprocessing the corpus, we created semantic networks from aggregated tweets by computing the top 161 most frequently used keywords that occurred more than 10 times and a word co-occurrence matrix using Python. Although semantic network analysis determines the structure of texts, we adopted a qualitative approach to further contextualize the semantic representations based on the relationship among the words (**Eddington**, 2020). When we interpreted the meanings of word pairs that frequently appeared in the semantic network, we verified the original test corpus to learn the context in which the words were used throughout the analysis. This mixed approach, combining quantitative and qualitative analyses, enabled us to understand how certain issues, symbols, concepts, and metaphors were intertwined within the texts (**Eddington**, 2020). *Gephi* was used for network measure computation and visualization.

### 4. Results

# 4.1. *Twitter* discussion network of abusive comments

To answer RQ1, we examined users' reactions to abusive comments after news of Sulli's suicide spread on *Twit-ter* from a social network perspective. In the network (Figure 1), node size is proportional to outdegree centrality, and colors range from blue (low) and light green to yellow (high).

The network was composed of multiple layers. Hubs<sup>1</sup> with high outdegree centralities and authorities<sup>2</sup> with high indegree centralities were closely connected to each other in the center. They contributed to facilitating discussions about online harassment in response to the death of the Korean idol Sulli. Few connected or isolated users were observed in the middle, and a number of isolated users who tweeted by themselves with no conversation with others were positioned at the periphery of the network.

The results of the network analysis (Table 1) suggest that a total of 25, 928 users generated 37,101 tweets. A high number of conversations between users in the discussion network were found. About 94.42% of the tweets were either retweets, mentions, or replies to other users' tweets. Only 5.58% users were isolated, found not to have any conversations with other users who responded to Sulli's death. The percentage of edges with duplicates indicates that 8.79% of the interactions occurred between the same users more than once, whereas the percentage of unique edges suggests that 91.21% of interactions observed between users in the discussion network were one-time conversations.

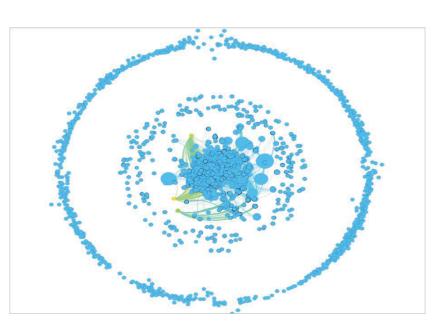


Figure 1. Twitter discussion network of "abusive comment"

Table 1. Structural properties of a Twitter discussion network on online harassment

Network measure	Value
Nodes, n	25,258
Total edges, n	37,101
Unique edges, <i>n</i> (%)	33,839 (91.21%)
Edges with duplicates, n (%)	3,262 (8.79%)
Self-loops, n (%)	2,071 (5.58%)
Connected components, n	997
Clusters, n	284
Average geodesic distance	4.169177
Diameter	12
Reciprocated ties (ratio)	0.000952
Transitivity (ratio)	0.000201
Indegree centralization (maximum theoretical centralization)	0.1635401 (637941306)
Outdegree centralization (maximum theoretical centralization)	0.001050446 (637941306)
Density	5.815739

However, the ratio of reciprocated ties was low. Two-way communication, in which users reply to a user who sent them a message, accounted for approximately 0.10% of interactions. A low level of transitivity (0.02%), which refers to tie formation between two users who share common neighbors, was found (**Batjargal**, 2007). A large number of connected components, 997 components, and 284 clusters were observed in the network.

It is noteworthy that the average geodesic distance measured revealed that only around four steps were necessary to reach any other randomly chosen user in the network. The results of very low indegree centralization (0.163540) and outdegree centralization (0.001050) indices suggests that the *Twitter* discussion around online incivility formed a dispersed network in which message production and reception were not occupied by few nodes.

## 4.2. Discourse about abusive comments and online misogyny

To address RQ2, we examined the topical trends and major themes that emerged in tweets as responses to abusive comments after Sulli's suicide, suspected of being caused by severe online insolence and troll-like comments prevalent in the Korean media. Word frequency analysis of 37,101 tweets identified the top 161 most salient words that occurred more than 10 times. Semantic network analysis was conducted to reveal major topical trends and themes based on a 161 × 161 word co-occurrence matrix in the tweets that contained "Sulli," the celebrity's name. The top 10 most frequently used words were "Sulli" (2,949), "abusive comment" (350), "death" (229), "language" (211), "women" (157), "news" (135), "comment" (134), "iu" (133), her close friend and Korean singer's name, "writing" (122), and "article" (110).

The average density of the semantic network was 0.272, suggesting that 27.2% of the salient words were connected. The average degree was 43.2, which means, on average, that each word had around 43 ties with other words. According to the modularity measure results, four communities were detected based on the Louvain method (**Blondel** *et al.*, 2008). Community 1 was the largest (86.87%), containing mourning and grieving words. Other terms attributed her suicide to uncivil news coverage, comments, and depression, and they also criticized antifeminism in Korea. For instance, a user said, "there is little Korean medium, revealing that Jin-ri was attacked even more severely because she was feminist and she did not hide her identity." Community 2 (7.5%) contains words related to unethical disclosure of a document about her suicide to the public. Community 3 (3.75%) highlights terms that discussed her suicide as an extreme choice resulting from her depression. Community 4 (1.88%) uses words that reminded the public about the sexual harassment she faced on the Internet.

RQ3 asks how Sulli's suicide shaped *Twitter* discussions about abusive comments. An ego network of the term "abusive comment" was generated (Figure 2). An ego network represents its ties with adjacent nodes, directly connected to the "ego," which is the focal node. A node refers to a word, while a node size is proportional to degree, the number of connections each word had to other terms. Nodes are color coded according to community membership (pink, community 1; light green, community 2; orange, community 3; light blue, community 4). A link between words indicates the co-occurrence of terms, and the thickness of the links represents the strength of the link.

In addition to the name "Sulli" (422), the word most strongly associated with "abusive comment" was "night" (65), referring to Sulli's last media appearance on the entertainment program "Night of Hate Comments" in June 2019. The program asked celebrities to read hateful online comments directed at them and to respond to the troll during the show. Sulli confessed that she had been suffering from social phobia and felt empty in her life because of cyberbullying and malicious rumors. The next central words in terms of degree were regarding what users perceived to have attributed to her death. The words "death" (48), "news" (46), "women" (46), "article" (43), "problem" (40), "language" (40), and "writing" (37) were strongly paired with the phrase "abusive comments." The users also shared that Korea's major news portals, Naver and KaKao, had removed comments sections from entertainment news as a result of Sulli's death [e.g., "law" (29), "comment" (24), "entertainment" (21), "abolition" (13), and "motion" (22)].

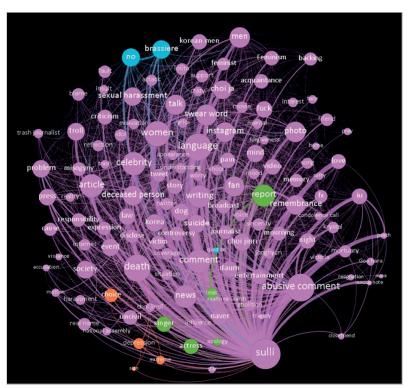


Figure 2. The ego network of "abusive comment"

In addition to criticizing trolls [e.g., "troll (21) and "swear word" (26)], the users also condemned uncivil news coverage prevalent in the Korean media and unethical journalistic practices that focus on sensational entertainment news. The terms "press" (29), "Korea" (19), "society" (16), "trash journalist" (10), "coverage" (9), "cause" (9), and "journalist" (9) emerged in the ego network. Interestingly, users also pointed out ways in which trolls had bullied Sulli. For example, they often mentioned her ex-boyfriend, "Choi Ja" (22), and those who had sexually harassed Sulli by mentioning her romantic relationship with him.

Users contended that, Sulli's *Ins-tagram* photographs, where it seemed she was not wearing a brassiere, were other reasons for sexual attacks against her [e.g., "brassiere" (20) and "Instagram" (16)]. Interestingly, "Hannam" (32), which is slang to condemn males in Korea and "men" (21), often occurred in negative contexts when the

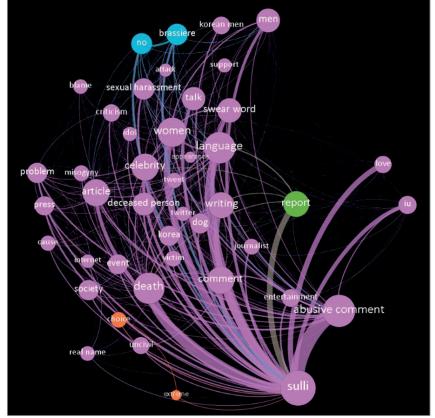


Figure 3. The ego network of "misogyny"

public had online conversations with other genders or expressed their anger toward Korean men for making malicious comments. For instance, "Why are you talking about Sulli? Hannam is a creature that must perish;" "Hannam does not even consider women as human. Although this is wrongdoing of those who created malicious comments, the proportion of males is much higher than females when we see news comments to sensational news coverage about female celebrities."

Lastly, to address RQ4, we analyzed the ego network of the word "misogyny." In the ego network (Figure 3), after the term "Sulli" (27), "women" (17) was the next most central term. The phrase "abusive comment" (13) was highly linked with the term "misogyny." This suggests that users might have considered misogyny as the underlying motive for malicious comments. Furthermore, the terms "death" (9), "cause" (4), and "victim" (3) were connected to the word "misogyny," signifying that users argued that Sulli's death was attributed to hatred against women. Users also discussed that hatred against women is a deeply rooted social issue in Korea ["problem" (6), "Korea" (2), and "society" (2)] and suggested enactment of a real-name verification law that would mandate the disclosure of users' identity when submitting on-line comments [e.g., "real name" (2)]. Other frequently associated words with "misogyny" were terms related to sexist language used on the Internet, such as "language" (13), "swear word" (5), "sexual harassment" (2), and "Internet" (2).

## 5. Discussion and conclusion

The findings of this study suggest that hubs and authorities on *Twitter* were closely connected to each other and contributed to promoting public discussions about abusive comments in response to the death of the Korean celebrity, Sulli. Users actively conversed with others on social media to understand the meaning of Sulli's death in the context of Korean society. Discussions might have been attributed to individuals' attempts to cope with their own negative emotions, such as mourning, grief, and the sadness of suddenly losing their favorite celebrity, as social media offers a platform for fans to post comments on social networks following a celebrity's death.

The results of the semantic network analysis suggest that discussions about the celebrity's death were broadened beyond the level of the individual's issues to greater concerns about the social problem and consequences of misogynistic comments used online to target women, in general. Sulli's death, presumed to have been caused, in part, by ongoing abusive comments, evoked open discussions about the deeply rooted misogyny that is prevalent in modern South Korea (**Omar**, 2019). In addition to abusive comments, users also perceived that sensational news coverage about celebrities and unethical journalistic practices may have also contributed to the proliferation of abusive comments posted both before and after Sulli's death.

It is also noteworthy that the terms "men" and "Korean men" were used in negative contexts. The users shared

The terms "men" and "Korean men" were used in negative contexts

their observations about how misogynistic comments contributed to Sulli's online harassment, in retaliation for Sulli's advocacy in support of feminism. Dominant words that referred to Sulli's sexual harassment demonstrate ways that commenters harassed her, as expressed also by comments in criticism of online harassment, in *Twitter* users observed that misogynistic comments on Sulli were made in retaliation for her advocacy in support of feminism

general. In addition, the analysis of online misogyny in the current study showed an association with abusive comments, in terms of public perception. Comments by *Twitter* users regarded Sulli as a victim of misogyny and gender conflict and recommended necessary Internet policies and laws to prevent future online violence.

This study verified the role that celebrities play in terms of increasing awareness about social issues and spreading word-ofmouth negative criticism, even after a celebrity's death (**Hoffner**, 2020; **Park**; **Hoffner**, 2020). This study offers methodological insights by demonstrating social and semantic network analysis for analyzing public discussions that produce big data. Although the study considered only *Twitter* for public discussions about abusive comments, it should be noted that Koreans also used other social media platforms to express their emotions and responses to Sulli's death. Future studies need to explore different social media platforms to increase generalizability. While computer-assisted text analysis is valuable for exploring users' conceptualizations of social issues (**Doerfel; Barnett**, 2006; **Park**, 2019), in-depth interviews or surveys can help to measure other important variables such as the consequences of users' perceptions. Future studies need to verify causal relations between the exposure to social media posts that challenge online incivility and behavioral intentions to control haters by refraining them from engaging in expressions of abusive comments in online discussions.

## 6. Notes

1. A node that has a high outdegree centrality in a network, indicating that the node generated many posts or talked to other users a lot (**Kleinberg**, 1999).

2. A node that has a high indegree centrality in a network, meaning that the node was mentioned, referred to, or cited by other users a lot (**Kleinberg**, 1999).

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