A Computational Content Analysis on Representation in Mental Health News Media with Global Perspectives

Ahu Dereli Dursun(✉)

Institute of Social Sciences, Communication Studies, Istanbul Bilgi University, Istanbul, Türkiye
ahu.dereli.dursun@bilgiedu.net, ahudereli@yahoo.com

Abstract. Media representations can provide important symbolic resources in the construction of perception and agendas in diverse domains particularly concerning public health and social awareness. In view of this standpoint, dominant media frames are said to be powerful in defining social problems and shaping public discourses. The majority of the relevant literature demonstrates that representations of people with mental disorder are often negative, individuals being depicted in a passive role. A grammatical analysis of language use in press reveals different perspectives regarding the assignment of a more or less prominent role. The use of active and passive verb voice is one constituent of such analysis. Framing process constitutes another mode of analysis of news media content, which is stated to be dynamic in the concept of communication. Accordingly, this study aims to provide insights into the representation of individuals that experience mental health problems. For this purpose, newspaper stories are analyzed by examining the volume and content of a sample of selected news stories on mental illness in Türkiye for a time period of six years. Six national daily newspapers make up the sample of the study which provides a content analysis on the news media dataset. The analysis results demonstrate statistical findings on the depiction of people with mental disorder. Based on the findings and considering the sensitivity of the issue, it can be noted that more emphasis can be placed on humanizing mental illness by indicating that mental disorder is real, common and possible to be treated. In addition, coverage of other success stories with positive frames can be an alternative way to balance the multitude of news stories that link mental illness with violence or other negative elements.

Keywords: Computational content analysis · News frames · Journalistic news media · Categorical level of representation · Degree of agency · Mental health news · Public discourses · Computational journalism · Computational linguistics · Computational and multi-way frequency analysis · Systematic language description · Grammatical analyses

Supported by organization x.

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2023
O. Gervasi et al. (Eds.): ICCSA 2023 Workshops, LNCS 14104, pp. 105–115, 2023.
https://doi.org/10.1007/978-3-031-37105-9_8

1 Introduction

The news media are known to have an influential role in shaping public attitudes regarding a wide range of issues including health. Mental health and mental disorders are stated to stand worldwide as one of the most stigmatized of all human conditions [1]. This statement is regarded as an alarming one particularly when the challenges experienced by numerous individuals within this particular group of representing themselves are considered [2]. Even though there has been a shift in the recent years towards improved advocacy, more 'voice' being developed and greater social awareness pertaining to people that experience mental health problems as a result of campaigns and initiatives upholding positive mental health messages and challenging some commonly misrepresentations and commonly held myths [2], negative representation of mental illness continues and people with mental illness belong to the groups subject to thoughtless labeling. Negative aspects and assumptions get reinforced continuously as a result of such processes that reveal the insidious and perpetuating nature of stigma [3].

Language is able to construct meanings and maintain the dialogue among participants, allowing them to build up a culture of shared understandings and interpret the world more or less in the same ways. This is because language, in which written words sounds, objects and so forth, operates as a representational system by representing the concepts, feelings and ideas in a culture to other people, and thus, representation through language, which is one of the media, is considered to be central to the processes through which meaning is produced [4]. Frames, as alternative ways of defining issues related to social and political world, are parts of journalistic norms, social movements and political arguments [5]. Despite variations of definitions of news frames on theoretical and empirical dimensions, they are generally viewed as devices for seeing the world in a certain way and making sense of the complicated nature thereof [6]. The frames of meaning, constituting the mainstays of the construction process of social reality, are called cognitive schemas one hand acting as available templates for interpretation of people, facts and events. On the other hand, frames are said to yield a mechanism allowing the storage of realities in our minds so that they can be retrieved when needed. It is this mechanism which contains the reality focusing on a certain frame and excluding the other realities [7]. Considering these elements and mechanisms, frame building and frame setting are included in framing process, which is stated to be dynamic in the concept of communication.

Content analysis, as one of the most significant research techniques in social sciences, acknowledges that society is enacted in texts, talk and other modalities of communication, and hence, without understanding the way language operates in the social world, it will not be possible to understand social phenomena. In that regard, data at stake cannot be treated as physical events, but rather as communications formed and disseminated to be read, seen, interpreted, enacted and reflected on based upon the meanings on the side of the recipients. One aspect that differentiates content analysis from other empirical methods of inquiry is that the communications are interpreted as texts in their social uses. In natural

sciences, in contrast, investigative methods are seldom slanted towards contents, meanings, communications, references and intentions [8].

In social science research, computer-based methods of analysis have been in the upward trend with the advent of common computing facilities, which have made varying types of content such newspaper articles, medical records, answers to open-ended questions possible to be a subject to systematic analysis of textual data. Thereby, the input can be analyzed in terms of frequencies and coded into categories to draw on inferences owing to the opportunity of having such contents of communication available in the form of machine readable texts. While computer-assisted analysis can facilitate with volumes electronic data sets by reducing time burden and eliminating the need for multiple human coders to establish inter-coder reliability, it is still important that human coders be employed for purposes of content analysis due to the fact that they are can pull out latent and/or nuanced meanings in a particular text, which is verified by the study that demonstrated the outcome of human coders being able to evaluate a broader array and to make inferences from latent meanings [9]. Likewise, this point of caution related to the harnessing of computational techniques is also stated by Walter and Ophir who point out that the interpretation of findings still requires a qualitative analysis by experts in the related field of interest even if the computer-assisted approach/method can automatically identify frame elements and packages [10]. Krippendorff also discusses related limitations related to computer applications while he acknowledges the fact that the use of computers has revolutionized the manipulation of texts in ways that are attractive to content analysts who can, thereby, circumvent the burden in manual data handling and eliminate instances of unreliable coding owing to the capability of computers as tools for processing large volumes of textual data [8]. By applying logical or algebraic operations to the internal representations of data, entered as inputs, computers produce new representations [8].

Across this strand, as the growth of news media in the context of rapid technological change has brought about certain novelties in methods, so has computational content analysis proved to be a convenient, robust and reliable tool. Accordingly, computational content analysis has enabled the application of computational methods related to the extraction of content features from digital texts as well as images. Other than the technical affordances, computational content analysis as a method, has lent itself to gaining knowledge on both current and historical social issues through analyzing observations of media messages and communication. Some of the computational content analysis techniques which are most frequently employed within the social sciences are natural language processing (NLP) and computer vision owing to their connection to artificial intelligence (AI) and machine learning. A study in light of these developments with a focus of objective understanding of media content provides a review of representative methodologies and algorithms, tools as well as systems that advance the area of human-centered media understanding by means of machine intelligence to enable detailed and nuanced characterization of media content and to help understand its effect extending from individual experiences to behav-

ioral, cultural and societal inclinations to commercial consequences. The study also puts forth the importance of text mining and natural language processing (NLP) to ensure a nuanced understanding of language use as well as spoken interactions in media to be able to track trends and patterns across different contexts [11]. A another study demonstrates the applicability of a new method concerned with inductive identification and measurement of media frames in complex and large corpora by unsupervised machine learning techniques. Apart from reducing bias and costs of earlier methods, the authors prove the benefit of integrating a novel computational tool with established theoretical perspectives to improve the understanding of social phenomena [10].

In tandem with the developments of computing technologies, content analysis, as a technique with initially journalistic roots, has also evolved into a stock of research methods that have the potential to derive inferences from all sorts of communication data whether they be verbal, pictorial and symbolic. Currently, its growth is said to be exponential, mainly as a result of the computers' widespread uses in different types of text processing [8]. The present study aims at providing a different perspective in news media content analysis around the issue of the representation of individuals that experience mental health problems through grammatical analysis of voice of verbs and the frame of personalization to shed light on some nuances by means of a computational application approach.

2 Material and Methods

2.1 Dynamic Media News Dataset

The newspaper items on the themes of mental health and mental illness, with key words that include mental health, mental distress, mental disorder, mental illness, depression, depressive, bipolar disorder and affective disorder, printed between 2014 and 2019 in six daily newspapers in Türkiye (*Hürriyet*, *Sabah*, *Milliyet*, *Sözcü*, *Cumhuriyet* and *Posta*), which are accessible via electronic means, constitute the dataset handled in this study. The total number of news items amounts to 725 (*Hürriyet* (n = 218), *Sabah* (n = 168), *Milliyet* (n = 158), *Sözcü* (n = 110), *Cumhuriyet* (n = 38) and *Posta* (n = 33)) with Hürriyet having the highest circulation rate (185.655) followed by *Sabah* (179.341), *Sözcü* (153.773) and *Milliyet* (121.754) while *Posta* ranking sixth with a circulation rate of 105.003 [12]. Even though *Cumhuriyet* does not have a high circulation in the country, it is a newspaper whose audience is known to have a high educational level. The focus on the news items in this study is on representation of people with mental disorder and grammatical language analysis of active/passive voice use in their depiction. The dataset belongs to the dissertation thesis entitled "News Media Portrayal of Mental Health and Psychological Problems: An Analysis of Daily Newspapers in Turkey". Table 1 presents the number of news items covered in the aforementioned six newspapers.

Table 1. The number of news items by newspapers.

Name of the newspaper	The total number of news items (N = 725)
Hürriyet	218
Sabah	168
Milliyet	158
Sözcü	110
Cumhuriyet	38
Posta	33

2.2 Methods

Computational and Statistical Dynamic Models with Real-Time Mental Health-Related News

Dynamic processes both deterministic and stochastic can serve as tools to provide answers to different questions. Likewise, dynamic models, as simplified representations of real-world entities, expressed in equations or computer codes aim at mimicking some of the needed features of the system in question while leaving out the inessential ones. The reason why these models are called 'dynamic' is owing to their description of the change system properties show over time. They are useful in the process of model formulation, analysis and deriving conclusions therefrom. formulating models, analyzing them, and drawing conclusions [13]. Such models enable the examination of relationships that cannot be handled based on only experimental methods and projections that would not be possible to make by the extrapolation of data; therefore, their usefulness is evident. In addition to these advantageous points, computational modeling has become another approach set in context that can enable the integration of diverse sources of data to test the probability of working hypotheses and bringing about novel ones, while statistical models are directed towards the proving of null hypothesis. Whereas outputs of statistical models are fed into computational models, outputs from computational models can yield more empirical data collection and further statistical models. In short, this kind of a systems science methodology elicits a set of innovative approaches so that intricate problems in social science, behavioral science and public health research can be addressed [14]. The ultimate goal is to serve a deeper understanding of the problem and its possible solutions.

Figure 1 provides a visual illustration of this complementary approach in the context of mental health news via a Computational frame and news media content analysis.

Accordingly, multi-way frequency analysis is considered to be an appropriate means of analysis in the case when the objective of the research is to determine whether a statistically significant relationship among three or more discrete variables exists. Another point about this kind of frequency analysis is related to its

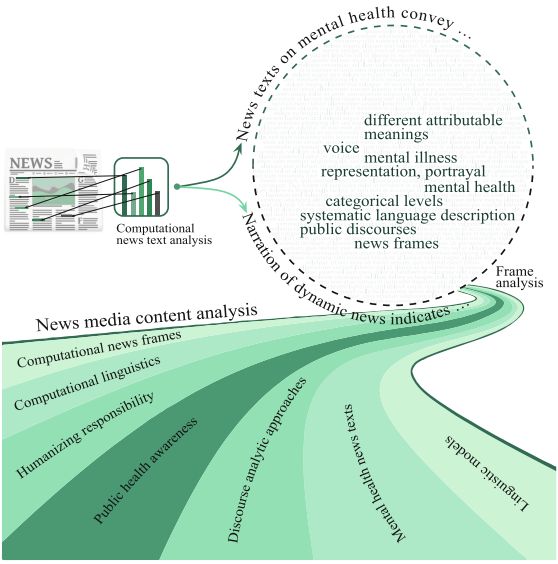

Fig. 1. Computational frame and news media content analysis.

use when all variables are considered variables of interest and none of the variables in the analysis are dependent variables [15]. If the calculated X^2 value is larger than the critical value, given the degrees of freedom and alpha value, statistical significance is stated to exist, and the following equations are employed to calculate the related degrees of freedom:
$(r-1)(s-1)(p-1)$, where
r= number of levels variable X
s= number of levels variable Y
p= number of levels variable Z [15]

The related analyses and depictions were carried out by Matlab [16].

3 Experimental Results and Discussion

Grammatical analysis of language use in media news texts can reveal the perspectives of the newspapers or journalists. Sentence syntax conveys the participants' semantic roles in an event by relational functions such as subject or object or the use of active or passive voice [17]. Consequently, when active voice is used the subject in the sentence has a prominent role, when passive voice is used, the agent is assigned a less prominent role. In addition, the issue of disempowerment also comes to the picture when health experts are conferred grammatical agency through the use of active voice, whereas individuals with mental illness are deprived of this kind of agency by the use of passive voice [18].

The dataset analyzed based on this grammatical device of active and passive forms has revealed that individuals that have mental disorder are represented

by active voice in 524 of the news items and by passive voice in 393 of the news items. Table 2 provides the breakdown of this linguistic aspect by newspapers, while Fig. 2 and Fig. 3 show the histogram depictions by newspapers and over the six-year time period, respectively.

Table 2. The breakdown of this linguistic aspect by newspapers.

Name of the newspaper	The number of news stories with active voice used for the representation of the individual through active voice (N = 393)
Hürriyet	137
Sabah	98
Milliyet	73
Sözcü	50
Cumhuriyet	24
Posta	11

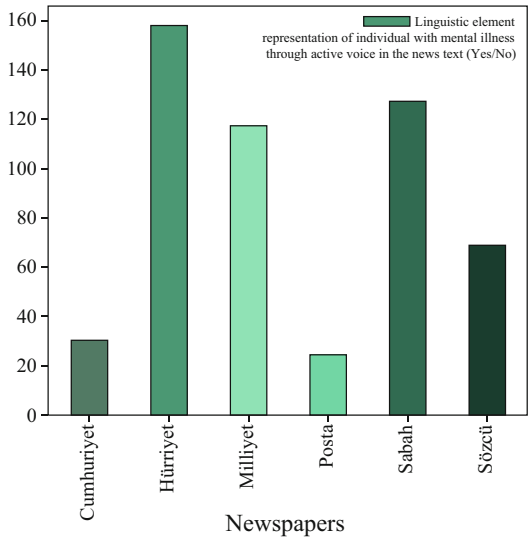

Fig. 2. Histogram depiction of the use of active voice in the representation of individuals in the news items analyzed.

Entman identified five popular ways for framing news stories, which are conflict, human interest/personalization, consequence, morality and responsibility [19]. Based on this point of view, this study provides the human interest/personalization element with the frame of the success story of the people with mental illness in the news items analyzed. Out of the total 725 news items, only 43 (13.79%) of the stories mention a success element, which indicates an insignificant percentage. A very similar percentage of finding was revealed in a study

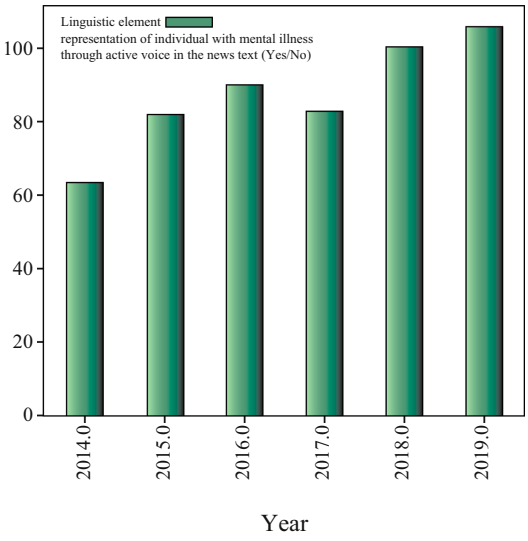

Fig. 3. Histogram depiction of stories with success content.

by [20] which found out that only 14% of the news stories provided a description of treatment or recovery from mental illness.

Table 3 shows the breakdown of the success stories by newspapers and Fig. 1 provides the histogram depiction of the success stories by newspapers analyzed.

Table 3. The breakdown of the success stories by newspapers.

Name of the newspaper	The number of news stories with success content (N = 43)
Hürriyet	17
Sabah	12
Milliyet	9
Sözcü	1
Cumhuriyet	-
Posta	4

Figure 4 provides the histogram depictions of stories with success content in the news items analyzed.

The success stories are mostly on recovery from mental illness, which is a process of change through which the individuals improve their health and well-being, and struggle against the mental disorder, which is a step towards living a self-directed life following the striving of reaching their potential. The subsequent related themes are integration into social life by finding a job, philanthropic acts

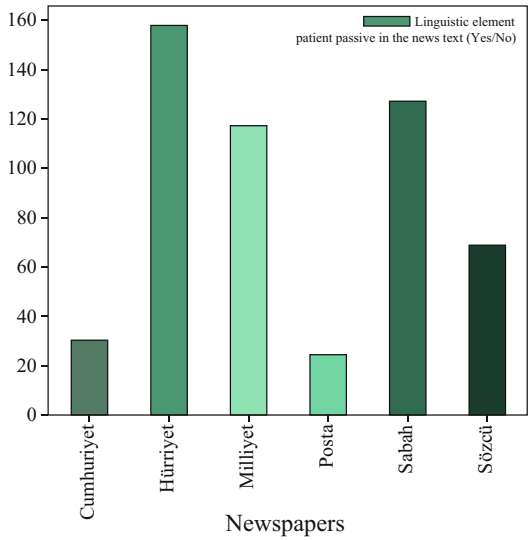

Fig. 4. Histogram depiction of the use of active voice in the representation of individuals in the news items analyzed over the six-year period.

like doing voluntary work, educating others and helping their community (i.e. donation of organs), conforming to socially accepted norms like getting married and engaging in creative activities like producing work of art (handcrafts, acting on stage, making a music album, composing music and writing poems). Compatibly, reporting stories of systemic issues around the topic of mental illness by giving place to the profiles of people with a mental illness who have become a part of their community and leading satisfactory lives with fulfilling relationships corresponds to positive framing with personalization type. Despite making up a relatively smaller proportion of the entire news coverage, an emphasis on the success stories with positive frames through the favorable developments in the lives of those who have mental illness fits within the recommendations of some mental health and media initiatives as well as related councils [21].

4 Conclusion and Future Directions

A subtle change in language may pinpoint a change in perspective as well since language is a critical tool of meaning and interpretation. Grammatical analysis of language use in news media texts reveal the perspectives of the newspapers or journalists. The linguistic aspect of verb voice, namely the use of active or passive constructions, in sentence syntax conveys the participants' semantic roles in an event by relational functions such as subject or object. When individuals with mental health problems are situated in the same news context with the health experts, the issue of disempowerment arises when health experts are conferred grammatical agency through the use of active voice, whereas individuals with

mental illness are deprived of this kind of agency by the use of passive voice. Even though the number of news stories analyzed in this study has shown a higher number in active voice construction compared to passive voice, this level of agency and instrument of grammatical analysis can be paid more attention in terms of reporting and journalistic practices in the future. The second point of analysis, namely framing of news stories, rests on the conceptualization of Entman who identified five popular ways for framing news stories. Among these, human interest/personalization has been selected for the analysis of the dataset. Despite indicating a percentage that is not significant, the inclusion of success stories like recovery from the treatment hints that a diagnosis of mental illness is not forever, and mental illness is treatable with recovery being possible. In a parallel fashion, the coverage of other success stories with positive frames like integration into social life, being an active member of community and maintaining positive relationships, as indicated in the dataset analyzed in this study, can be one alternative way to balance the preponderance of news stories that link mental illness with violence or that include sensational and exaggerated dramatic elements. Such shifts in news content and coverage, with a humanizing global perspective, with the changing face of newspaper representations of those with mental illness, can spark a wealth of movement towards fostering a new culture of positive change, acceptance, reducing misconceptions and prevention of social exclusion, which will benefit broader society in the long run.

References

1. Bloch, S., Singh, B.: Understanding Troubled Minds: A Guide to Mental Illness and its Treatment. Melbourne University Press, Melbourne (1997)
2. Morris, G.: Mental Health Issues And The Media: An Introduction For Health Professionals. Routledge, Abingdon-on-Thames (2006)
3. Wahl, O.: Media Madness: Public Images of Mental Illness. Rutgers University Press, New Brunswick (1995)
4. Hall, S.: The Work of Representation. In Representation: Cultural Representations and Signifying Practices, pp. 13–74. Sage (1997)
5. De Vreese, C.H.: News framing: theory and typology. Inf. Des. J.+ Doc. Des. **13**(1), 51–62 (2005)
6. Balabanova, E.: The Media and Human Rights: The Cosmopolitan Promise. Routledge, Abingdon-on-Thames (2014)
7. Goffman, E.: Frame Analysis: An Essay on the Organization of Experience. Harvard University Press, Cambridge (1974)
8. Krippendorff, K.: Content Analysis: An Introduction to its Methodology, pp. 215–276. Sage publications, Thousand Oaks (2018)
9. Conway, M.: The subjective precision of computers: a methodological comparison with human coding in content analysis. Journalism Mass Commun. Q. **83**(1), 186–200 (2006)
10. Walter, D., Ophir, Y.: News frame analysis: an inductive mixed-method computational approach. Commun. Methods Meas. **13**(4), 248–266 (2019)
11. Somandepalli, K., Guha, T., Martinez, V.R., Kumar, N., Adam, H., Narayanan, S.: Computational media intelligence: human-centered machine analysis of media. Proc. IEEE **109**(5), 891–910 (2021)

12. Gazeteler. https://www.gazeteler.tv/tiraj_raporu.php. Accessed 9 Apr 2022
13. Assets. http://assets.press.princeton.edu/chapters/s8124.pdf. Accessed 5 Mar 2023
14. Mabry, P.L., Hammond, R., Ip, E.H.-S., Huang, T.T.-K.: Computational and statistical models: a comparison for policy modeling of childhood obesity. In: Salerno, J., Yang, S.J., Nau, D., Chai, S.-K. (eds.) SBP 2011. LNCS, vol. 6589, pp. 87–88. Springer, Heidelberg (2011). https://doi.org/10.1007/978-3-642-19656-0_14
15. Tabachnick, B.G., Fidell, L.S.: Using Multivariate Statistics, 6th edn. Pearson, Boston (2012)
16. MATLAB, version 9.12.0 (R2022a): The Math-Works Inc., Natick, Massachusetts (2022)
17. Van Dijk, T. A.: News analysis. Case Studies of International and National News in the Press. New Jersey: Lawrence (1988)
18. Rowe, R., Tilbury, F., Rapley, M., O'Ferrall, I.: About a year before the breakdown i was having symptoms': sadness, pathology and the Australian newspaper media. Soc. Health and Mental Illness **25**, 680–696 (2003)
19. Entman, R.M.: Framing US coverage of international news: contrast in narratives of KAL and Iran AirIncidents. J. Commun. **41**(4), 6–27 (1991)
20. McGinty, E.E., Kennedy-Hendricks, A., Choksy, S., Barry, C.L.: Trends in news media coverage of mental illness in the United States: 19952014. Health Aff. **35**(6), 1121–1129 (2016)
21. TEAM Up.: Style guide: Reporting on mental health. Entertainment (2012)