A sentence sentiment analysis in political discourse from speeches by Boris Johnson regarding SARS-CoV-2

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The year 2020 was shaped by the virus SARS-CoV-2 and so were political decisions. In this project, we want to illustrate to what degree politicians in the UK dealt with the general mood of people when addressing the public and whether there is an overlap between the emotionality of politicians in charge and the graph of SARS-CoV-2. We chose four of prime minister Boris Johnson's speeches to spot and analyze emotionally loaded sentences, parallelizing them to match positive or negative connotations. Our research questions are:

1) Does emotional content in Boris Johnson speeches about Covid-19 change over time?
2) What does the emotional content in Boris Johnson Covid-19-speeches tell us about his usage of language?

Our following hypotheses result from these questions: The speaker mostly uses negative content in his speeches regarding Covid-19. In addition, there is a correlation between the emotional content and the case numbers of Covid-19.

The *Wheel of Emotions* by Plutchik (2001) and a sentiment analysis by Hoffmann (2018) acted as guidelines for our study. The corpus was compiled from raw text downloaded at parliament.uk. Processing the files was done with Notepad++, so that nothing is contained in the files other than the sentences in the speech and every sentence has a line break. The chosen speeches by Boris Johnson are his two first and two latest, regarding SARS-CoV-2: *Covid19 Strategy* (11.05.20), *Global Britain* (16.06.20), *Winter Plan* (23.11.20) and *Covid19* (06.01.21). A sentence sentiment analysis via the programming language *R* was applied for computing and comparing the sentiment values. The *sentimentr package* (sentiment analysis) is widely used due to its accessibility and ability to recognize sentiment shifters, words that may modify sentiment without carrying it themselves (e.g. *no harmful effect* would be less negative than *harmful effect*). After seeing that *sentimentr* does a fair job on assessing cardinal sentiments *good* and *bad*, those values can be used for further display and analysis. Covid numbers within the speeches time period are taken into account as a second factor.

We were able to display and visualize the individual sentiment numbers in diagrams, which show that the sentiment was constantly positive. After combining the respective positive versus negative values into a ratio, we were also able to calculate a ratio > 1.0, which further proves and emphasizes the overall positive sentiment of Johnson's speeches. To our surprise,

the quotient was almost identical for all speeches, except for the values of the second analyzed speech (*Global Britain*). We took selected sample sentences to help us understand the influence of Plutchik's *Wheel of Emotion* on the computed sentiment values. Regular cases and exceptions were discussed, where the exceptions should be indicators of possible flaws in the *sentimentr* algorithm.

Based on our results we were able to review our hypothesis. We can now falsify that Johnson mostly uses negative expressions in his speeches regarding the virus. However, the relation of negative and positive emotions is constant. Also we can confirm that there is a correlation between the emotional content of Boris Johnson's speeches and the case numbers of SARS-CoV-2 as Johnson seems to react to an increase of daily numbers with more emotional content.

References: • Hoffmann, Thomas (2018). Too many Americans are trapped in fear, violence and poverty': A psychology-informed sentiment analysis of campaign speeches from the 2016 US Presidential Election. Linguistics Vanguard 4(1). URL: https://doi.org/10.1515/ lingvan-2017-0008. • Mohammad, Saif (2011). NRC Word-Emotion Association Lexicon (NRC Emotion Lexicon). Version 0.92. National Research Council Canada (NRC). URL: http://saifmohammad.com/WebPages/lexicons.html. • Plutchik, Robert (2001). The Nature of Emotions. American Scientist 89(4): 344.