# *The speech of male and female leaders*

*Using a text mining method to investigate sex differences in leadership word use*


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## Summary

**Purpose:** The workforce is changing; more women are seen in leadership positions than ever before. Nonetheless they still face the stereotypical image that women are less capable of being leaders than men. Differences in male and female leadership have been found in previous research, stating that male speech is characterized as agentic and female speech as communal. The current study complements those studies by providing a different angle through using a text mining method. The relative frequency of word use is compared to detect differences in the language of male and female leadership.

**Results:** Female leaders use more auxiliary verbs and more words that are related to causation compared to male leaders. Male leaders use more words that are related to family, discrepancy and the perceptual process *hear*. Besides these small differences, no significant differences were found for swear words, tentative speech, personally oriented speech or other categories representing agentic and communal speech.

**Conclusion and recommendation:** Differences in relative frequency of word use are found between male and female leaders, however not as obvious as reported in previous research where male speech is characterized as agentic and female speech as communal. This study does not support this distinction. New conversations should be started considering the position of women in higher leadership functions, since their style of language appears to be similar to those of male leaders. When regarding word use, the stereotypical image that women are less capable of being a leader than men should therefore be reconsidered.



*Keywords*: leadership, gender differences, text mining, word use, agentic, communal

# Introduction

Leadership is a greatly researched but still poorly understood topic in the human sciences. It is described as the process of influencing and facilitating individual and collective efforts to reach shared goals (Yukl, 2012) and is seen as the key to make organisations thrive and prosper (Hogan & Kaiser, 2005). Leaders play an important role in an organisation and its teams since they have the ability to improve the performance and effectivity of teams and eventually the organisation (Yukl, 2008). According to the Motivating Language Theory (MLT) by Sullivan (1988) they can do this by appropriately communicating toward their team. The MLT namely argues that strategic communication of a leader can be directly linked to performance, turnover, absenteeism and job satisfaction (Mayfield & Mayfield, 2009). Word use of a leader can thus affect important employee outcomes. Employees are crucial for a company's success and knowing how to lead them is key.

Leaders have existed as long as mankind and an interesting finding is that in those years more men than women fulfil leadership positions (Eagly, Johannesen-Schmidt, & Van Engen, 2003; Eagly & Karau, 2002; European Foundation for the Improvement of Living & Working Conditions, 2014; Scott & Brown, 2006). Especially in the past, but still in the present day women have been underrepresented. This shows that there is still, to some extent, inequality on the labour market, mostly in the higher functions. There is however an increase in women who enter the labour market due to newer forms of employment such as working part-time and freelancing, which means that the workforce is changing (Junker & Van Dick, 2014). Until recently, leadership positions have mainly been occupied by men, but the amount of female leaders is slowly rising (European Foundation for the Improvement of Living & Working Conditions, 2014).

This underrepresentation of women in leadership functions could create the assumption that women might not be as good leaders as men are, or at least have a different way or a less favoured way of leading (Eagly et al., 2003). The most evident reason for the uneven distribution of leadership occupation is role incongruity. Eagly and Karau (2002) mention in their study that the gender role of women does not cohere to the role of a leader. And even though prejudicial attitudes do not always produce discriminatory behaviour, it can limit the access of women to leadership roles and negatively impact evaluations when they do occupy a leadership role (Eagly, 2007). The contradicting stereotypical images of women and leaders thus create obstacles for women to become successful leaders (Eagly & Karau, 2002).

An important aspect of leadership to investigate is the word use of leaders, since language reveals contextually thick social processes that capture multidimensionality in everyday life (Jones, 2017). It is something that is used and encountered on a daily basis between individuals and contains a large amount of information, for example personal, social or work-related information. A number of studies have been conducted that focus on language differences between men and women in general (Argamon, Koppel, Fine, & Shimoni, 2003; Argamon, Koppel, Pennebaker, & Schler, 2007; Carli,

1990; Newman, Groom, Handelman, & Pennebaker, 2008; Schwartz et al., 2013). It would however be interesting to apply this to leadership, since language is an everyday practice that is observable and thus affects followers directly and can also be studied in an objective way. Examining differences in male and female leader language could help to give insights into the skewed occupation of men and women in leadership positions; it could show whether word use is a possible reason why more men than women are leaders.

Most studies that have investigated word use differences between male and female leaders have relied on perceptual data thus far (Dobbins & Platz, 1986; Eagly et al., 2003; Hunter, Bedell-Avers, & Mumford, 2007; Post, 2015; Wiley & Eskilson, 1985). This means that leaders have been observed and judged by their followers or other participants of the study. The results therefore include personal and subjective interpretation of the situation and are possibly influenced by stereotypes that the observers hold (Hoogeboom & Wilderom, 2015; Shondrick, Dinh, & Lord, 2010; Wexley & Youtz, 1985). Selective attention and selective memory might also cause a follower to observe and remember certain events and actions in a way that is consistent with their beliefs about their leader (Wexley & Youtz, 1985). Results about gender differences in leadership may therefore be different when it is based on observations from followers compared to results of a study that avoids using personal interpretation. It is therefore desirable to conduct research that looks at the topic with a different approach, to add a different angle to the existing collection of studies.

The current study uses a text mining method which enables examination of actual word use of leaders. It is a method that has not been used often, but is an appropriate method that looks at textual data objectively (Kobayashi, Mol, Berkers, Kismihók, & Den Hartog, 2018). A computational approach is applied, which has multiple advantages over analysing text manually (Jones, 2017). It is fast, inexpensive, transparent, systematic, generalizable and reproducible. Also text data can be classified efficiently, data can be retrieved reliably and flexibly, language can be compared across groups, and new insights that may not be noticed by human coders could be discovered. Even though a person is better at interpreting meaning, sarcasm and metaphors, their interpretation and implicit knowledge about the situation could cause bias, whereas computers stay unaffected and objective (Jones, 2017).

Investigating the word use of male and female leaders could give insights into the differences that possibly exist between male and female leaders and into the underrepresentation of female leaders. It could therefore contribute to scientific research. The growing number of women in leadership functions (European Foundation for the Improvement of Living & Working Conditions, 2014) namely asks for more research to be conducted. The current study could contribute to practice as well, by first of all helping leaders to become aware of their leadership practices and to improve those. Secondly, the existing stereotypes that assume that women do not fit the leadership role might be adjusted when more insight is gained on (the positive side of) female leadership, which could reduce obstacles for women who aspire to be leaders and diminish the gender gap in leadership occupation.

The purpose of this study is to compare the word use of male and female leaders, through transcribing and analysing the words spoken by male and female leaders, without interference of personal interpretation. First of all, relevant theories about male and female leadership will be reviewed. The theory includes both general leadership aspects as well as specific language aspects. It focuses on existing stereotypical images about gender within leadership and on differences that were found between male and female leadership in general and in word use. Subsequently, the method of this study is explained, followed by the results of the male-female leadership comparison of word use. Finally a discussion is provided in which results are elaborated on and the study is critically looked upon, covering theoretical and practical implications, limitations and ideas for future research. The discussion ends with a conclusion in which the research question will be answered.

# Theoretical framework

## Assumed differences: the masculinity of leader stereotypes

On the basis of previous studies which examined the general perceptions or stereotypical images about male and female leaders, differences between male and female leaders in general and their word use can be expected (Braun, Stegmann, Hernandez Bark, Junker, & van Dick, 2017; Eagly & Karau, 2002; Junker & van Dick, 2014; Koenig, Eagly, Mitchell, & Ristikari, 2011; Schein, 1973). Multiple studies have been conducted to examine what stereotypical thoughts exist about gender within leadership and they all conclude that men are perceived to fit better to the image of a typical leader than women (Braun et al., 2017; Eagly & Karau, 2002; Junker & van Dick, 2014; Koenig et al., 2011). This is referred to in the literature as the 'think manager-think male' paradigm, first introduced by Schein (1973). A typical leader has been described as being assertive, confident, ambitious and dominant and is more frequently associated with masculinity (Braun et al., 2017). Additionally, women are not only perceived as less fitting to be a leader, they are even associated with the role of an ideal follower – being characterized as being affectionate, gentle and helpful (Braun et al., 2017). This is referred to in the literature as 'think follower-think female'. Braun, Stegmann, Hernandez Bark, Junker and Van Dick (2017) therefore mention that next to the push effect that keeps women from becoming a leader, there is a pull effect towards the follower role. In other words, stereotypical images make women think they are not capable of being good leaders, but that they are better off being a follower.

The 'think manager-think male' paradigm is one paradigm that addresses the cultural masculinity of leader stereotypes. The meta-analysis by Koenig, Eagly, Mitchell and Ristikari (2011) elaborates on two other paradigms: the masculinity-femininity paradigm and the agency-communion paradigm. Both paradigms reason that, based on perceptions, leadership is more positively associated with men than with women. The masculinity-femininity paradigm is a very general paradigm that states that leader roles are perceived as more masculine than feminine. It came into existence when

participants of a study by Shinar in 1975 rated multiple leader roles, such as mayor or university president, as either masculine or feminine (Koenig et al., 2011). Those leader roles were perceived as more masculine than feminine. The agency-communion paradigm goes more into detail compared to the two former paradigms. It was introduced by Powell and Butterfield (1979) and distinguishes between two categories of personal traits: agentic and communal. Agentic traits are assigned to men and contain behaviour like being assertive, forceful, dominant, competitive, aggressive, ambitious, independent and self-confident, while communal traits are assigned to women and contain behaviour like being affectionate, compassionate, warm, gentle, helpful, kind and interpersonally sensitive (Eagly & Karau, 2002; Koenig et al., 2011). More specifically, women are expected to lead with an interpersonally oriented style while men are expected to lead in a task-oriented style (Eagly & Johnson, 1990). Interestingly, according to the paradigm leadership is perceived to require agentic traits, and thus requiring traits that are expected of men. Women are perceived as less fitting to be a leader, because the expectations of what contuse a leader are different than the expectations of women in general. In other words, there is incongruity between the stereotype of women and the perceived demands of leadership (Eagly & Karau, 2002). Interestingly, in general, men seem to assign masculine qualities to leadership more than women do, which implies that men have a stronger stereotypical image of leadership being a manly profession (Eagly & Karau, 2002; Koenig, et al., 2011).

To sum up, men are generally perceived to be more capable of being a leader, while women are less associated with leadership. According to these existing stereotypes, one can assume that there are differences in how men and women communicate in leadership positions. Male leaders are expected to talk in a way that shows dominance and confidence, while female leaders are expected to speak more friendly, gentle and personal.

## Actual differences: research results

The previous chapter gave insights into the stereotypical images that people have of male and female leaders in general. These studies base their results about the role of gender in leadership on what people think of leaders generally, without referring to an actual situation that is being assessed or instead of measuring actual behaviour or word use of the leaders themselves. Looking at specific events in which a leader is present and measuring actual behaviour and word use provides more accurate and reliable information about male and female leadership than general stereotypical thoughts. Therefore in addition to studies that examined stereotypical images of male and female leadership, other studies took a behavioural and communicative approach to look at actual behaviour and word use of leaders. Studies either based their results on objective measures of the researchers or perceptions of raters in a specific situation who assessed certain aspects of male and female leadership.

**General differences in leadership**. Some studies come to the conclusion that there is no difference in leadership style and language displayed by male and female leaders (Bartol & Martin, 1986; Bass, 1981; Dobbins & Platz, 1986; Kanter, 1977; Nieva & Gutek, 1981). These studies are

however quite old. More recent studies do show results that indicate gender differences. First of all, a meta-analysis by Eagly, Johannesen-Schmidt and Van Engen (2003) found small but significant differences between male and female leadership styles. Most of the studies covered in the meta-analysis used the MLQ-measure: the multifactor leadership questionnaire. This questionnaire evaluates three leadership styles, namely transformational, transactional and passive-avoidant leadership (Avolio, Bass, & Jung, 1999). A transformational leader is a leader who transcends own self-interest, articulates a future-oriented vision and motivates followers to contribute to group efforts (Anderson & Sun, 2017). Transactional leadership is less motivational; it is characterized by contingent rewards and management by exception. Clear expectations are set by the leader, along with rewards for meeting those expectations, and the leader only takes corrective action for situations that need guidance (Anderson & Sun, 2017). Thirdly, the passive-avoidant leadership style characterises a leader who avoids decision making but only reacts to problems when they have become serious (Ryan & Tipu, 2013).

The results of the study by Eagly and colleagues (2003) show that women adopt a more transformational leadership style than men, which is a style that seems to positively impact the individual, group and organisational performance, motivation and satisfaction (Bass & Avolio, 1994; Wang, Oh, Courtright, & Colbert, 2011) and is likely to focus on aspects of leadership that predict effectiveness (Eagly et al., 2003). It contains four behavioural dimensions, namely idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. In short this means that a transformational leader provides a vision that is appealing for followers, shows emotional qualities such as strengthening the followers' confidence through verbal communication, supports the followers through mentoring, and motivates followers to approach challenges in new ways (Bednall, Rafferty, Shipton, Sanders, & Jackson, 2018). These four behavioural dimensions show the friendly, helpful side of leadership; qualities that women in general are perceived to have more than men. According to the study by Eagly and colleagues (2003), female leaders thus tend to show these four behaviours more than male leaders do. A possible explanation for this is because of the words they choose to use; the language of a leader could perhaps influence the general leadership practices. The next paragraph elaborates on specific word use differences.

**Language differences**. When focussing more on specific word use instead of leadership styles, differences between men and women seem to occur as well. First of all, according to Eagly and colleagues (2003), women in leadership positions are more likely than men to give rewards to subordinates for appropriate performance; showing compassion and attention to interpersonal relations. This might imply that female leaders communicate positive messages to their followers more likely than male leaders would. Besides, in studies using self-reports from people who did not work in a leadership position, women report that they consider others' viewpoints, focus on interpersonal aspects, and act in an agreeable and communal style more than men admit to showing those characteristics (Lauterbach & Weiner, 1996; Moskowitz, Suh, & Desaulniers, 1994). This is in

accordance to the literature review conducted by Vecchio (2002), who reported that in general women show more emotion and compassion, and focus on interpersonal relations and cooperation while men generally show more competition, self-assertiveness and aggression in their behaviour and language.

Another study which focused more on specific word use differences is conducted by Carli (1990). This study found that when paired with someone from the same sex, women in general were more likely to use intensifiers and verbal reinforcers than men. In mixed-sex dyads no differences were found. An intensifier is an adverb that adds an emphasis and strengthens an expression (Carli, 1990). For example, "She is *very* clever" or "I *really* don't like that". Verbal reinforcing means responding to speech of others by uttering *hmm* or *yeah* to show approval (Thorne & Henley, 1975). A possible explanation for this result is that women tend to show more social and emotional behaviour when they interact with women than with men, while men tend to emphasize task oriented behaviour (Carli, 1989).

This difference in language is also found for language in general, not just when paired with someone from the same sex: feminine speech tends to be personalized and socially-oriented while men centre their speech around objects and things (Jones, 2017). An example of personalized speech is asking how someone else is doing and an example of speech around objects is talking about the profit of a company. The statement is based on findings from multiple studies that compared speech samples of men and women. In general and on average, women use verbs and social, emotional, cognitive and tentative words more often than men, while men use nouns, big words (larger than six letters), anger and swear words more often than women (Argamon et al., 2003; Argamon et al., 2007; Newman et al., 2008; Schwartz et al., 2013). Women will therefore, according to these studies, most likely refrain from talking too confidently through using tentative words like *maybe* and will talk about people and feelings more often than men. This may apply to the language of men and women in a leadership role as well.

However, concerning the latter statement, an interesting and perhaps contradictory finding in the case study by Jones (2017), who analysed interview and debate transcripts of Hillary Clinton, is that Clinton spoke in a more masculine way as she worked her way up from First Lady of the United States of America to senator and secretary of state. Also other politically powerful women were more likely to use a masculine style of communication (Jones, 2017). This would assume that while women in general tend to use feminine, soft and friendly speech, this might change when they take on a leadership role; it most likely turns into more masculine, confident speech. The study focusses on American political leaders however. Generalizing results to leaders on a less powerful and influential level is difficult to do. Eagly and Karau (2002) however support the finding in their role congruity theory, reasoning that the higher the leadership level, the higher the importance of agentic attributes. Female leaders in higher levels of leadership thus need to adapt even more to masculine traits in order to qualify for the job.

Another interesting finding regarding agentic speech among female leaders is that even though women are expected and preferred to speak in a communal way, when they are interacting with other women the female leader is sometimes preferred to speak in a more agentic way (Carli, 1990; Ridgeway, 1982, Wiley & Eskilson, 1985). This is first of all found by Ridgeway (1982), who points out that when female team members are surrounded by a group of men they are more influential when they show communal features, but when they are part of an all-female team they are more influential when being more self-oriented and agentic. Secondly, Wiley and Eskilson (1985) found that a female applicant for a managerial position was liked better by a male student when she would speak tentatively, while female students preferred when she would speak more confidently. A similar result is found by Carli (1990) who concluded that male listeners of an audio tape preferred a female speaker – i.e. perceived her as more likeable and trustworthy – when she would speak tentatively, while female listeners preferred a female speaker when she would speak assertively. These studies show that the word use of a leader might thus vary in different environments and situations. Women should use more communal words among men, while among women they could use more agentic words.

Lastly, an important statement to keep in mind about sex differences in word use is that according to Hannah and Murachver (2007), it is not the choice of words that differs between men and women; it is the frequency in which those words are used that differs. This implies that between men and women there is no difference in words they use, but in how often. Many theories about gender differences namely state that specific use of a certain word category is more or most likely seen in women than in men or vice versa. This does not imply that for example men never give rewards; it only implies that women might do it more often.

## Research question and hypothesis

Previous research has shown that investigating differences between male and female leaders results in interesting findings. The current study continues this type of comparison studies but with the use of text mining. To give more insight into gender differences in leadership language the following explorative question will be answered: *"what are differences in the relative frequency of word use between male and female leaders toward their followers in a large Dutch organisation?"*.

Based on findings from previous studies which have a large focus on the agentic-communal division in style of speech, the following hypothesis is formulated: "*Differences in the relative frequency of word use between male and female leaders exist for words that are characterised as agentic or communal, with a) male leaders using more words that are characterised as agentic (i.e. words that show dominance, confidence, aggression and power) and b) female leaders using more words that are characterised as communal (i.e. words that show friendliness, helpfulness, tentativeness and emotion)."*

# Method

## Respondents

A total of 52 leaders were included in this study, employed at multiple departments and locations of a large Dutch organisation. Regarding the small percentage of women in this organisation 13 participants were female, accounting for 25% of the sample, and 39 participants were male, accounting for the other 75% of the sample. Participation was voluntarily. The participants ranged from 27 to 62 years old ($M$ = 50.6, $SD$ = 7.9) with their leadership experience ranging from just one year to 32 years ($M$ = 12.5, $SD$ = 7.9). Most leaders ($n$ = 18) possessed a Master of Science (MSc) degree or a higher education (HBO) degree ($n$ = 17). Also a large part of the leaders ($n$ = 13) had obtained a vocational (MBO) degree and just one leader obtained his or her PhD. Data about educational level was missing for three participants. When looking at male and female leaders separately, the average age of men was $M$ = 51.9 ($SD$ = 7.7) years old with $M$ = 13.8 ($SD$ = 8.5) years of leadership experience. Women had an average age of $M$ = 47.2 ($SD$ = 7.7) years old and spent $M$ = 8.7 ($SD$ = 4.5) years in a leadership function.

## Research design

A text mining approach was used to analyse video transcripts, which means that words spoken by male and female leaders were extracted from unstructured textual data (Radovanović & Ivanović, 2008). This is referred to as content analysis, an approach where written information is analysed through objective, systematic counting procedures (Neuman, 2014). More specifically, this study used a text mining method called *term frequency representation*, where word count of word categories is calculated (Radovanović & Ivanović, 2008). According to Kobayashi, Mol, Berkers, Kismihók, Den Hartog (2018) and Neuman (2014), text mining is a quantitative approach to the analysis of textual data; data is transformed from qualitative text into quantitative categories and numbers which allows researchers to compare content across many texts. The large amount of words to be analysed would make it too complex when using qualitative methods (Kobayashi et al., 2018). It is a method that is not often used, but an appropriate method to objectively look at textual data (Kobayashi et al., 2018). No subjective interpretation is needed, thereby avoiding any personal or perceptual bias from raters.

Text mining is an inductive method where patterns can be found and conclusions can be drawn (Kobayashi et al., 2018). However, theory can help to supplement it in order to have a clearer focus, which was the case in this study. Based on results from multiple studies mentioned earlier, word use categories that seemed important or relevant were thought about beforehand, which gave the study a clear understanding on what to look for in all the data. These were categories relating to agentic and communal speech which were reoccurring aspects in previous research, for example the word use categories *power*, *certainty* and *swear words* for agentic speech and *assent*, *tentative* and *social processes* for communal speech.

## Procedure

**Videos**. Videos of team meetings where a leader interacts with his or her team members were readily available, since they had been collected for previous research. Before being filmed, the team leaders were informed about the goal of the videos and were promised anonymity. They were given the task to have a normal team meeting, with a team they had been leading for a longer period, and to ignore the three cameras that were placed in the room. Leaders were filmed for only one meeting, meaning that 52 team meetings were filmed and transcribed, corresponding to the number of leaders included in this study. Team size varied from five employees to 28 employees and meetings lasted approximately 45 minutes to two hours.

**Transcripts**. This study examined word use of male and female leaders on the basis of transcripts from team meeting videos. Transcripts are texts that contain the literal words spoken by the individuals that were recorded during team meetings. It is an appropriate instrument to use, since it enables researchers to find patterns and relationships between concepts and count those when needed, in a relatively simple way using for example specific text mining software (Kobayashi et al., 2018).

A protocol that was created for previous research functioned as a guide and provided information about writing the text and the use of symbols. The transcripts started as soon as the leader or a team member started talking about work-related content and ended when the work-related content was no longer the subject of the conversation. Any breaks during the meetings were not included in the transcripts since they would not contain valuable leadership interactions. Those moments were however indicated with the square brackets symbols [ ]. In the transcripts the words of the leader were indicated with a capital L. All followers in the videos were given a visible number. They were therefore indicated in the transcripts with a capital F followed by their number, for example F1.

It was important that every word was written down literally as it was pronounced, also words that indicated hesitation like *eh* or *hmm*, or filler words like *yep* or *uhuh*. Numbers until twenty were written out fully while numbers higher than twenty were written down numerically. Punctuation marks were used consistently. When full sentences or parts of sentences were unable to be heard, the symbols < > were used. The sentence of a person that was interrupted ended with three dots '...' to indicate interruption. Also, when a speaker would not finish a word it was indicated at the end of the word with the dash symbol -, for example *absolutel-*. Restarting a sentence was indicated with a double dash –, for example *I did not – let's talk about it*. A spelling and grammar check was run through the transcripts when it was finished to avoid any mistakes.

**Text mining**. In order to enable the text mining software to analyse the data, the transcripts were first prepared, or *pre-processed*. This is called text data cleaning and enhances the quality of the data (Kobayashi et al., 2018). Comments about non-verbal behaviour were deleted and transcripts were checked again on spelling and consistent use of symbols.

Transcripts were first processed by the software program *R*. It made the texts more comprehensible for digital analysis by adding any missing symbols or removing redundant symbols,

excluding all capital letters, and splitting the speech of the leader and followers. The transcripts then only contained the text of leaders, since text of followers was not relevant for this study. The length of the 52 transcripts ranged from 1,715 to 17,554 words, with an average of *M* = 6,304.33 (*SD* = 3,156.10) words.

The actual analysis of the transcripts was done by the software program Linguistic Inquiry and Word Count 2015 (LIWC), which is elaborated on in the next section. First of all, the Dutch dictionary 2015 was downloaded and installed for analysis in the LIWC program. A text analysis was run on all 52 transcripts at the same time, including all word use categories of LIWC, resulting in an overview of the word use of every participating leader. The word use was represented in percentages; meaning that the LIWC program did not show the amount of words in absolute numbers but in percentages of the total text, ranging from zero to one hundred percent. This text therefore mentions relative frequency.

The output of LIWC was saved as an Excel document, which was then copied into the software program IBM SPSS Statistics 22. An independent t-test was carried out to compare the relative frequencies of word use of male and female leaders. An independent t-test is required, since there are two sample groups which are not related to each other (Allen & Bennett, 2012).

## Instrumentation

**LIWC**. This study uses the text mining software Linguistic Inquiry and Word Count 2015 to analyse the transcripts. It is a program that has the primary goal of calculating the percentage of multiple predefined word categories in texts: how often certain words or categories occur (Tausczik & Pennebaker, 2010). The originally English developed program contains a validated Dutch dictionary, which made it possible to analyse the Dutch transcripts (Zijlstra, Van Meerveld, Van Middendorp, Pennebaker, & Geenen, 2004). LIWC uses classification as the text mining type, where objects are assigned to predefined categories (Kobayashi et al., 2018). The software runs through the full text and labels every word to the category or multiple categories it belongs to (Pennebaker, Boyd, Jordan, & Blackburn, 2015). A total of 74 word use categories are included in the LIWC software. See Appendix A for the full overview of categories with their abbreviations and word use examples. Besides word use categories also word count per transcript and seven general informative variables were included, amongst others the amount of words per sentence and amount of words that are captured by the program, since not every word might be recognized. See Appendix A for all general informative variables.

*Validity*. External validity of word categories within LIWC was measured by an early experiment by Pennebaker and Francis (1996). Students wrote about their experience of going to college, as part of an assignment. Four judges then rated the texts on emotional, cognitive, content and composition dimensions, which were designed to correspond to the LIWC dictionary. A Pearson correlation was measured for the LIWC output and the judges' ratings, which showed a high level of

agreement. The external validity was thereby supported. After multiple revisions of LIWC, it was still judged as valid (Pennebaker et al., 2015; Tausczik & Pennebaker, 2010).

*Reliability*. Internal reliability of transcripts is quite difficult to measure, since people tend to avoid using the same words again in the same paragraph (Pennebaker et al., 2015; Tausczik & Pennebaker, 2010). But since in theory people who use a word that characterises for example sadness should use other sad words in the same text, reliability for word categories in LIWC 2015 has been measured by determining whether a word from a certain category had been used again (Pennebaker et al., 2015; Tausczik & Pennebaker, 2010). Each word was measured as a percentage of the total words of the text and entered as an item in a Cronbach's alpha calculation. The uncorrected alphas underestimated the reliability, so corrected alphas were computed using the Spearman-Brown prediction formula. They gave a more accurate estimation of the internal consistency of word categories, and mostly showed an acceptable Cronbach's alpha of above .7 (see appendix A for the corrected alphas). In general, LIWC contains word categories that are reliable.

The inter-rater reliability was accounted for as well. Three judges independently rated whether each word was appropriate to the word category it was assigned to (Tausczik & Pennebaker, 2010). A word was remained in, deleted from or added to a category when at least two out of three judges agreed. The process was repeated by another group of three judges. The judges' agreement ranged from 93% to 100%, indicating a good inter-rater reliability.

## Results

Before conducting an independent t-test, it was checked whether four criteria of doing a t-test were met. Two criteria had been met already before analysing the data: the scale of measurement is ratio and there is independence between participants (Allen & Bennett, 2012). Scores were normally distributed, either completely or approximately and based on either histograms or the Shapiro-Wilk test. Lastly, a Levene's test for equality of variances was done, to check the final criterion of homogeneity of variance (Allen & Bennett, 2012). This criterion was met for most word categories, however not all. For nine out of 74 categories, the data for *equal variance not assumed* were therefore used.

An independent t-test was able to be used to compare word use between male and female leaders. All 74 categories of LIWC have been included in the analysis. Results show that most word categories do not differ significantly between genders, with $p > .05$. Word use differences with $p < .05$ do occur for seven categories. See Table 1 for an overview of all results.

The most prominent result of this study is that no significant differences have been found for 67 out of 74 word categories. Based on previous studies it would be expected to find differences on word categories relating to agentic and communal words. Word categories that are related to an agentic style of speech and therefore associated with speech of male leaders are *negations*, *anger*,

*certainty*, *achievement*, *power*, *risk*, *work*, *money* and *swear words*. No significant differences were however found for these categories, with $p > .05$. This is contrasting with the expectation that male leaders would use more words related to these categories. Word categories that are related to a communal style of speech and therefore associated with speech of female leaders are *positive emotion*, *negative emotion*, *anxiety*, *sadness*, *social processes*, *tentative*, *feel*, *health*, *affiliation*, *reward*, *leisure*, *home*, *assent*, *non-fluencies* and *fillers*. Also for these categories no significant differences were found, with $p > .05$, which is in contrast to the expectation that female leaders would use more words related to these categories. Word use of male and female leaders thus shows to be quite similar for these word categories.

Besides the main finding that no significant differences between male and female leaders were found in the majority of the word use categories, some differences have however been found. They are however small and could, despite significance, still be attributed to luck. Significant differences between male and female leaders have been found for seven out of the 74 word use categories that were included in LIWC. First of all, female leaders use auxiliary verbs significantly more often ($M$ = 8.60, $SD$ = 0.51) than male leaders do ($M$ = 8.19, $SD$ = 0.64), $t(50) = -2.05$, $p < .05$, two-tailed, 95% CI [-0.80, -0.01]. This means that they use more words like *must*, *do* and *have*. Auxiliary verbs provide information about another verb, such as stating a past or present tense. They are part of the covering category of function words, which are words that do not carry meaning or content but serve to connect words in a sentence. Examples are *has*, *from* or *to*. In the English language they only take up around 0.05% of the vocabulary, but are however 55% of the words people speak (Tausczik & Pennebaker, 2010). Results show that female leaders use more function words ($M$ = 65.77, $SD$ = 1.35) than male leaders ($M$ = 64.17, $SD$ = 1.30), $t(50) = -2.80$, $p < .05$, two-tailed, 95% CI [-2.77, -0.45]. However, because only the subcategory of auxiliary verbs differs significantly, the difference in use of function words is due to that specific subcategory and is therefore not seen as a legitimate result. Besides using more auxiliary verbs, female leaders also use more causations ($M$ = 2.83, $SD$ = 0.55) than male leaders ($M$ = 2.48, $SD$ = 0.43), $t(50) = -2.35$, $p < .05$, two-tailed, 95% CI [-0.65, -0.05]. These are words that state a certain action or cause like *because*, *therefore* or *react*.

In the abovementioned results female leaders used more words related to the corresponding category than men. The following results state categories in which men use more words than women. Male leaders first of all use more family-related words ($M$ = 0.04, $SD$ = 0.03) than female leaders ($M$ = 0.01, $SD$ = 0.03), $t(50) = 2.74$, $p < .01$, two-tailed, 95% CI [0.01, 0.05]. These words refer to *brother* or *cousin* for example. Male leaders also use more words that indicate discrepancy ($M$ = 2.86, $SD$ = 0.45) than female leaders ($M$ = 2.55, $SD$ = 0.37), $t(50) = 2.22$, $p < .05$, two-tailed, 95% CI [0.03, 0.58]. This means that male leaders use more words that recognise any inconsistency or difference, like *problem*, *should* or *expect*. Finally, male leaders use more words that evolve around the perceptual process *hear* ($M$ = 0.75, $SD$ = 0.33) than female leaders ($M$ = 0.59, $SD$ = 0.17), $t(36.22) = 1.66$, $p < .05$, two-tailed, 95% CI [0.01, 0.30]. It refers to words like *said*, *hear* or *spoke*. This category is part of

the larger covering category of perceptual processes, in which male leaders also use more words ($M$ = 1.83, $SD$ = 0.44) than female leaders ($M$ = 1.61, $SD$ = 0.26), $t(36.22) = 1.71$, $p < .05$, two-tailed, 95% CI [0.02, 0.43]. However, since only one subcategory results in a significant difference, it can be stated that the result of the category perceptual processes is due to the result of the subcategory *hear*. The difference in the word category perceptual processes is therefore not seen as a legitimate result and will be dismissed.

Table 1

*Descriptive data* and independent t-test for all word use categories*

| Word category | Male ($n$ = 39) | | Female ($n$ = 13) | | Independent t-test | | |
|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | t-test ($df$ = 50) | Sig** | 95% CI |
| Words > 6 letters | 13.73 | 1.30 | 13.06 | 1.41 | 1.56 | .125 | [-0.19, 1.52] |
| Function | 64.17 | 1.30 | 65.77 | 1.35 | -2.80 | **.007** | [-2.77, -0.45] |
| Total pronoun | 20.62 | 1.49 | 21.34 | 1.59 | -1.49 | .142 | [-1.70, 0.25] |
| Personal pronoun | 8.47 | 0.91 | 8.99 | 1.14 | -1.68 | .099 | [-1.15, 0.10] |
| I | 2.88 | 0.78 | 2.90 | 0.94 | -0.09 | .931 | [-0.55, 0.51] |
| We | 2.42 | 0.64 | 2.51 | 0.61 | -0.46 | .647 | [-0.50, 0.30] |
| You | 2.05 | 0.59 | 2.38 | 0.74 | -1.63 | .109 | [-0.73, 0.08] |
| She/he | 0.80 | 0.29 | 0.84 | 0.43 | -0.31 | .760 | [-0.31, 0.23] |
| They | 0.47 | 0.20 | 0.53 | 0.33 | -0.66 | .521 | [-0.27, 0.14] |
| Impersonal pronoun | 8.63 | 0.80 | 8.45 | 0.86 | 0.69 | .494 | [-0.34, 0.70] |
| Article | 7.04 | 0.65 | 6.98 | 0.86 | 0.251 | .803 | [-0.40, 0.51] |
| Prepositions | 12.26 | 1.08 | 11.92 | 1.42 | 0.89 | .377 | [-0.42, 1.09] |
| Auxiliary verbs | 8.19 | 0.64 | 8.60 | 0.51 | -2.05 | **.045** | [-0.80, -0.01] |
| Common adverbs | 13.39 | 1.26 | 13.92 | 1.55 | -1.24 | .221 | [-1.39, 0.33] |
| Conjunctions | 11.55 | 1.18 | 12.19 | 1.29 | -1.65 | .105 | [-1.42, 0.14] |
| Negations | 1.68 | 0.41 | 1.80 | 0.36 | -0.94 | .351 | [-0.38, 0.14] |
| Verbs | 16.38 | 1.15 | 16.77 | 0.81 | -1.11 | .271 | [-0.08, 0.31] |
| Common adjectives | 7.80 | 0.86 | 7.87 | 0.55 | -0.28 | .784 | [-0.58, 0.44] |
| Comparisons | 4.42 | 0.65 | 4.42 | 0.51 | -0.03 | .975 | [-0.40, 0.39] |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Interrogatives | 2.08 | 0.44 | 2.00 | 0.38 | 0.53 | .601 | [-0.20, 0.34] |
| Numbers | 0.99 | 0.20 | 1.02 | 0.29 | -0.48 | .637 | [-0.17, 0.11] |
| Quantifiers | 2.49 | 0.46 | 2.38 | 0.44 | 0.76 | .449 | [-0.18, 0.40] |
| Affective processes | 2.14 | 0.37 | 2.25 | 0.41 | -0.98 | .330 | [-0.36, 0.12] |
| Positive emotion | 1.62 | 0.35 | 1.72 | 0.43 | -0.81 | .419 | [-0.34, 0.14] |
| Negative emotion | 0.50 | 0.17 | 0.53 | 0.20 | -0.55 | .588 | [-0.15, 0.08] |
| Anxiety | 0.10 | 0.61 | 0.09 | 0.06 | 0.62 | .537 | [-0.03, 0.05] |
| Anger | 0.06 | 0.43 | 0.07 | 0.59 | -0.75 | .458 | [-0.04, 0.02] |
| Sadness | 0.19 | 0.09 | 0.24 | 0.13 | -1.55 | .128 | [-0.12, 0.02] |
| Social processes | 9.29 | 1.05 | 9.49 | 1.07 | -0.58 | .565 | [-0.88, 0.48] |
| Family | 0.04 | 0.03 | 0.01 | 0.03 | 2.74 | **.009** | [0.01, 0.05] |
| Friend | 0.14 | 0.07 | 0.14 | 0.09 | -0.21 | .839 | [-0.55, 0.05] |
| Female | 0.43 | 0.20 | 0.54 | 0.34 | -1.08 | .296 | [-0.32, 0.10] |
| Male | 1.10 | 0.24 | 1.10 | 0.24 | 0.08 | .941 | [-0.15, 0.16] |
| Cognitive processes | 15.32 | 1.36 | 15.55 | 1.25 | -0.54 | .590 | [-1.09, 0.63] |
| Insight | 2.61 | 0.45 | 2.66 | 0.63 | -0.30 | .767 | [-0.37, 0.27] |
| Causation | 2.48 | 0.43 | 2.83 | 0.55 | -2.35 | **.023** | [-0.65, -0.05] |
| Discrepancy | 2.86 | 0.45 | 2.55 | 0.37 | 2.22 | **.031** | [0.03, 0.58] |
| Tentative | 2.49 | 0.42 | 2.39 | 0.43 | 0.77 | .448 | [-0.17, 0.37] |
| Certainty | 1.77 | 0.35 | 1.78 | 0.36 | -0.09 | .932 | [-0.24, 0.22] |
| Differentiation | 4.99 | 0.76 | 5.01 | 0.96 | -0.10 | .923 | [-0.55, 0.50] |
| Perceptual processes | 1.83 | 0.44 | 1.61 | 0.26 | 2.20 | **.034** | [0.02, 0.43] |
| See | 0.86 | 0.25 | 0.86 | 0.21 | 0.11 | .914 | [-0.14, 0.16] |
| Hear | 0.75 | 0.33 | 0.59 | 0.17 | 2.22 | **.032** | [0.01, 0.30] |
| Feel | 0.18 | 0.08 | 0.13 | 0.08 | 1.90 | .063 | [-0.00, 0.10] |
| Biological processes | 0.25 | 0.12 | 0.27 | 0.11 | -0.41 | .682 | [-0.09, 0.06] |
| Body | 0.08 | 0.04 | 0.09 | 0.08 | -0.66 | .520 | [-0.06, 0.03] |
| Health | 0.12 | 0.08 | 0.10 | 0.06 | 0.63 | .530 | [-0.03, 0.66] |
| Sexual | 0.01 | 0.02 | 0.01 | 0.01 | 0.39 | .698 | [-0.01, 0.01] |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ingestion | 0.06 | 0.05 | 0.08 | 0.07 | -0.89 | .385 | [-0.06, 0.03] |
| Drives | 6.04 | 0.82 | 6.03 | 0.78 | 0.04 | .968 | [-0.51, 0.53] |
| Affiliation | 3.10 | 0.65 | 3.14 | 0.68 | -0.21 | .835 | [-0.46, 0.38] |
| Achievement | 1.36 | 0.33 | 1.47 | 0.25 | -0.07 | .292 | [-0.31, 0.10] |
| Power | 1.39 | 0.38 | 1.21 | 0.42 | 1.46 | .152 | [-0.07, 0.43] |
| Reward | 0.86 | 0.23 | 0.87 | 0.10 | -0.31 | .755 | [-0.11, 0.08] |
| Risk | 0.24 | 0.09 | 0.21 | 0.10 | 1.00 | .322 | [-0.03, 0.09] |
| Past | 4.52 | 0.48 | 4.81 | 0.63 | -1.76 | .082 | [-0.63, 0.04] |
| Present | 14.58 | 1.17 | 15.20 | 0.80 | -1.77 | .083 | [-1.32, 0.08] |
| Future | 4.50 | 0.83 | 4.55 | 0.77 | -0.22 | .826 | [-0.58, 0.47] |
| Relativity | 13.73 | 1.18 | 13.93 | 1.40 | -0.52 | .608 | [-1.00, 0.59] |
| Motion | 2.25 | 0.39 | 2.45 | 0.48 | -1.54 | .130 | [-0.47, 0.06] |
| Space | 5.71 | 0.71 | 5.26 | 0.70 | 1.98 | .053 | [-0.01, 0.90] |
| Time | 6.17 | 0.90 | 6.61 | 0.92 | -1.51 | .137 | [-0.02, 0.14] |
| Work | 1.80 | 0.59 | 1.63 | 0.23 | 1.53 | .134 | [-0.06, 0.40] |
| Leisure | 0.33 | 0.19 | 0.33 | 0.14 | 0.01 | .993 | [-0.12, 0.12] |
| Home | 0.09 | 0.08 | 0.95 | 0.10 | -0.01 | .993 | [-0.06, 0.05] |
| Money | 0.28 | 0.14 | 0.21 | 0.10 | 1.73 | .089 | [-0.12, 0.16] |
| Religion | 0.04 | 0.05 | 0.03 | 0.05 | 0.71 | .482 | [-0.02, 0.04] |
| Death | 0.01 | 0.01 | 0.00 | 0.01 | 0.19 | .851 | [-0.01, 0.01] |
| Informal | 11.67 | 2.64 | 11.62 | 1.66 | 0.06 | .953 | [-1.52, 1.62] |
| Swear words | 0.01 | 0.02 | 0.02 | 0.02 | -0.75 | .456 | [-0.02, 0.01] |
| Netspeak | 4.17 | 2.94 | 4.89 | 2.67 | -0.78 | .437 | [-2.57, 1.13] |
| Assent | 2.06 | 0.98 | 2.17 | 0.77 | -0.38 | .706 | [-0.71, 0.49] |
| Nonfluencies | 2.44 | 2.27 | 1.51 | 1.76 | 1.34 | .186 | [-0.46, 2.32] |
| Fillers | 10.88 | 2.47 | 10.80 | 1.58 | 0.11 | .916 | [-1.39, 1.55] |

*Note*. *Descriptive data is represented in percentages. **Bold numbers indicate significance.

## Discussion

The purpose of the current study was to add to the existing theory about gender differences in word use of leaders. A quantitative text mining method was used to investigate word use without interference of personal interpretation. This enhances and provides a different angle to existing theory which is largely based on perceptions of followers or other individuals. The incentive for conducting this study was the finding that more men than women are in leadership positions. This could indicate possible differences in their leadership. The current study focuses on word use of male and female leaders and finds that language of male and female leaders does not differ on the majority of the word categories that were included in this study. Only seven out of the 74 word use categories, later reduced

to five after interpreting the results, did show differences in word use between male and female leaders, however only small. In the following sections these results will first be discussed in detail, followed by the theoretical and practical implications, limitations of the study, ideas for future research and at last a conclusion is given in which the research question is answered.

## Discussion of the results

An interesting finding of the current study is the absence of significant differences in the majority of word use categories: 67 out of 74 word categories did namely not show any difference between male and female leaders. This result is in accordance to the studies by Bartol and Martin (1986), Bass (1981), Dobbins and Platz (1986), Kanter (1977) and Nieva and Gutek (1981) who concluded that male and female leaders do not differ in their leadership style and language. The result is however in stark contrast to the expectation that was formulated based on more recent studies, which is that male leaders would use more words related to an agentic style of speech and female leaders would use more words related to a communal style of speech (Argamon et al., 2003; Argamon et al., 2007; Braun et al., 2017; Eagly & Johnson, 1990; Eagly et al., 2003; Jones, 2017; Koenig et al., 2011; Newman et al., 2008; Schwartz et al., 2013). The current study thus finds that no big differences exist in word use between male and female leaders; their language seems to be quite similar. This is a very interesting finding regarding the expectations and findings from previous studies.

However, besides the main result that no differences occurred for the majority of word categories, some small significant results have been found for five out of 74 word categories. It is interesting to see that they do not correlate to each other. The results of the current study show that significant differences exist for the categories of family-related words, causation, auxiliary verbs, discrepancy and words related to the perceptual process *hear*. These significant differences are clarified in the following section respectively, along with findings from previous research to give a more complete picture of the results.

Previous research showed empirical evidence of how male and female language in general looks, and together with stereotypical images about leadership this creates expectations of what male and female leader language should be like (Argamon et al., 2003; Argamon et al., 2007; Braun et al., 2017; Eagly & Johnson, 1990; Eagly et al., 2003; Jones, 2017; Koenig et al., 2011; Newman et al., 2008; Schwartz et al., 2013). According to long-existing stereotypical images, women are expected to talk in a way that is personal, friendly and gentle, focusing on giving rewards and being agreeable: speech that is characterised as communal. However, this study found no significant differences between male and female leaders in assent (agreeableness) or speaking in a personal way (i.e. using word categories that refer to social processes). Other than one might expect, male leaders even used significantly more words that relate to family than female leaders did. Also for language that encompasses emotion, indicated by the category affective processes, female leaders did not differ significantly from male leaders.

In accordance with the stereotypical thought about tentative speech amongst female leaders, previous research by Argamon and colleagues (2003, 2007), Newman and colleagues (2008) and Schwartz and colleagues (2013) found that female leaders talk more tentatively than men. Tentative speech refers to the addition of tag questions, hedges and disclaimers (Carli, 1990). A tag question is added at the end of a statement to verify it, for example saying "we have a meeting next week, *right*?". A hedge is an adverb that weakens the strength of a statement, like adding "*maybe"* or "*sort of"*. A disclaimer is a sentence that weakens a statement, like "*I don't know but...*" or "*I may be wrong but...*". This is labelled as a powerless form of speech (Wiley & Eskilson, 1985). Results of the current study do however not support the claim that female leaders talk more tentatively than men and they even show that male leaders use more tentative words, non-fluencies and fillers than female leaders, which could indicate tentative speech. This difference is however not significant, so a difference in language cannot be assumed for the category of tentative speech. On the contrary to tentative speech, female leaders actually use significantly more causations than male leaders, which could indicate a form of certainty; something that is generally more expected of men (Eagly & Karau, 2002; Koenig et al., 2011). Words that refer to causations are for example *therefore*, *because* and *influence*. These words state a certain action or result and, to a certain degree, might need a form of confidence to use them: the speaker has to be sure about his or her statement.

Additionally, previous research found that women use more verbs than men (Argamon et al., 2003; Argamon et al., 2007; Newman et al., 2008; Schwartz et al., 2013). The current study does however not support this claim, since no significant differences occurred. Another finding which is related to verb use is however found to be significant, namely the word use category of auxiliary verbs. Female leaders use significantly more of those words than male leaders. This type of verb helps to give more information about a corresponding verb, for example their tense or necessity. There is for example a difference in necessity between the sentences "*he* had to *eat the apple*" or "*he* could *eat the apple*" and a difference in tense between the sentences "*he* has to *go to the doctor*" or "*he* had to *go to the doctor*". Auxiliary verbs are part of the covering category of function words, which are words that do not necessarily contribute to the meaning of a sentence, but rather to the syntax to connect other words in a sentence. To emphasize the results and avoid misconception regarding verb use: only usage of auxiliary verbs differs between male and female leaders, a significant difference in general verb use is not found.

In contrast to women, men are characterised as being dominant, competitive and aggressive according to stereotypical thoughts and previous research (Braun et al., 2017; Koenig et al., 2011), but when looking at word use this study finds that this statement does not apply to leadership. For example results for the word categories certainty, achievement and power do not show significant differences between genders. These categories refer to words such as *must*, *totally*, *control*, *win*, *attack* and *supervision*. Moreover, stereotypical images about men assumed and actual studies that were conducted about male speech found that they would use more anger and swear words than women

(Argamon et al., 2003; Argamon et al., 2007; Newman et al., 2008; Schwartz et al., 2013), but results of the current study prove otherwise. In both word categories, female leaders actually used more of those words than men, but the difference is small and not significant.

However, male leaders use significantly more words related to discrepancy than female leaders. These words that recognise inconsistency or difference like *problem*, *should* or *expect*, could potentially indicate that male leaders show dominance by giving attention to situations that are not according to plan. Addressing a problem or unfavourable situation requires confidence. Extracting a claim about dominance and confidence from this one finding is however not possible, it is mainly a speculation.

The final category where a significant difference is found is for the word category perceptual processes, however only for the subcategory of *hear*. Male leaders seem to use more words that relate to this process than female leaders, with words such as *speak* or *listen*. This is quite specific and may not be perceived as relevant when looking at leadership language differences between genders. It might however indicate a certain social process instead of only a perceptual process in which it is categorized. When using words such as *listen* this could refer to a form of personal contact and understanding; showing you are interacting with others. But since only this category is found to be significant without support from other categories such as social processes, a strong claim cannot be made.

Results thus show that language between male and female leaders differs on five out of 74 word categories. Female leaders use more causation and auxiliary verbs, while men use more family-related words, discrepancy and words related to *hearing*. However, these word categories do not seem to form one coherent style of language; the results do not show a concrete division in male and female leader language. Besides, the results could be perceived as contradictory. Male leaders use more words related to discrepancy compared to female leaders, which could in a way show a form of dominance or confidence when a problem is recognized and talked about; an aspect associated with agentic speech. In addition to that, male leaders use more family-related words, showing a certain kindness and softness, and more words related to hearing, which could potentially mean that he acknowledges the other when he is interacting with someone; showing a personal, friendly side and therefore associated with communal speech. The claim that women speak in a communal way and men speak in an agentic way which has been made based on the stereotypical images and some previous studies (Eagly & Karau, 2002; Koenig et al., 2011; Powell & Butterfield, 1979) can therefore not be fully supported for men and women in leadership positions. Specific language aspects that belong to communal or agentic speech, such as assent and power, are also not found to differ significantly. It seems that besides some specific differences in the relative frequency of word use a similar style of language is used among male and female leaders.

An interesting point of discussion is found regarding the study by Jones (2017). She reasoned that as female leaders ascend in their level of leadership, just like Hillary Clinton went from First Lady

to senator, they would speak in a more masculine way. The current study does not indicate a clear division in male leader and female leader language, apart from some specific differences on several categories. This might imply that the statement from Jones (2017) is correct and female leaders indeed talk more like men in general do. However, since language of women who are not practicing a leadership function or female leaders on different levels is not included in this study, results within female language cannot be compared and no statement can be made about a potential change in word use as the level of leadership ascends.

To conclude this section, the differences in findings between the current study and previous studies are discussed. Previous studies namely point out the clear distinction between agentic male speech and communal female word use (Argamon et al., 2003; Argamon et al., 2007; Eagly et al., 2003; Jones, 2017; Lauterbach & Weiner, 1996; Moskowitz et al., 1994; Newman et al., 2008; Schwartz et al., 2013). In contrast, the current study does not correspond to this finding and additionally finds other word categories that differ between genders. The first and most obvious reason for the contrasting findings is the method that was used in the studies. Many previous studies used perceptions of followers while the current study used text mining, which means that other ways were used for paying attention to words and thus resulted in different findings. Another explanation for the contrasting findings is the difference in participants. The current study included male and female leaders who were relatively similar regarding their experience in leadership and the sector they worked in. Other studies may have included leaders that varied more in their personal and work-related characteristics and worked in sectors that deviate from the one that was used in the current study. This could have influenced the speech of the leaders, since the sector one works in affects the cultural values of an organisation and thus how individuals interact with each other (Sagiv & Schwartz, 2007). This could have resulted in different word use frequencies in the current study compared to previous studies. A final explanation for the contrasting findings is related to the participants of the studies as well. The current study used participants who executed a leadership function, while other studies examining word use included participants who were not necessarily leaders. Word use frequency could therefore differ and result in contrasting conclusions.

## Theoretical and practical implications

The purpose of this study was to contribute to the existing research on differences between male and female leaders, specifically their speech, through an objective and reliable method without interference of personal interpretation. Previous studies about leadership, gender differences in leadership and specifically language differences in leadership mainly used perceptions of followers which could cause the results to be affected by personal beliefs and experiences (Dobbins & Platz, 1986; Eagly, Johannesen-Schmidt, & Van Engen, 2003; Hoogeboom & Wilderom, 2015; Hunter et al., 2007; Post, 2015; Shondrick et al., 2010; Wexley & Youtz, 1985; Wiley & Eskilson, 1985). Many of the previous studies concluded that men and women in general and men and women in leadership

positions differed on several aspects of language. The current study also shows some aspects of language on which male and female leaders differ in their speech during social interaction. However, compared to multiple previous studies the current study found other differences between male leader word use and female leader word use. The current study therefore gives new insights in leadership literature by adding new aspects of language in which male and female leaders differ. Another large contribution of this study to the existing leadership literature is the insight that, apart from some specific differences, male and female leader speech seems to be quite similar. There does not seem to be a clear distinction between male agentic speech and communal female speech.

Besides this theoretical insight, the results of the current study also contribute to practice. The stereotypical thought that men are more suited for leadership than women might need to be subjected to change. This study namely rejects the expectation that male leaders speak in an agentic style and female leaders speak in a communal style. The absence of evidence for a clear agentic-communal division in language between genders, and thus the finding that male and female leader language is quite similar, does not support the claim that men are more suited for leadership positions than women because of their agentic form of speech, which is assumed to be required for leadership (Eagly & Karau, 2002; Koenig et al., 2011; Powell & Butterfield, 1979). The form of speech they adopt could therefore not be a valid reason to choose male candidates over female candidates and as a consequence cause women to be underrepresented in leadership positions. The results of this study could be the start of reducing obstacles for women who aspire to be leaders and diminish the gender gap in leadership occupation.

## Limitations

A strong characteristic of this study was its text mining method which measured actual word use without interference of personal interpretation (Hoogeboom & Wilderom, 2015; Shondrick et al., 2010; Wexley & Youtz, 1985). However, points of improvement were also found during the process of this study. First of all, leadership was observed in multiple departments of a large Dutch organisation and in different locations in the Netherlands which means that all leaders worked in the same sector. According to Sagiv and Schwartz (2007), organisations are nested within industries and the task environment of those industries can influence the cultural values of an organisation. Also, each occupation requires certain personal values that will most likely influence cultural values even more. This means that individuals working in one sector are likely to have a similar working style and perhaps a similar style of language, and could differ in their working style compared to other sectors. Leader word use and interaction with followers might thus differ in different sectors; meaning that research in diverse fields might result in different findings.

Additionally, the leaders in the current study were all on a similar level of leadership. This disabled the possibility to check whether word use changes when leaders ascend or descend in leadership level. Even though the focus of the current study was to solely compare male and female

leader word use, it would have been valuable information to know whether differences occurred at multiple levels of leadership. This was brought to the attention in the study by Jones (2017), who mentioned that female leaders' word use becomes more masculine when ascending in leadership level. The current study did not find results that enable a clear separation of male (agentic) and female (communal) language; including leaders of a lower leadership level might result in a different conclusion.

Thirdly, an aspect that could have made this study stronger is including interactions with followers as an addition to only analysing word use of leaders. Carli (1989, 1990) for example found that women use more intensifiers and verbal reinforcers when they speak to other women than when they speak to men. Also, multiple researchers mentioned that women sometimes prefer a female leader to speak more agentic instead of communal (Carli, 1990; Ridgeway, 1982, Wiley & Eskilson, 1985). These studies show that it is possible that individuals adapt (or should adapt) their speech to the gender of the person they are interacting with. This means that the word use of a leader could be influenced by the composition of the team. Besides, what followers say also determines what a leader will speak about. Followers can thus evoke certain word use of a leader. The current study did however not consider this, therefore missing the context in which words were spoken.

Additionally, it is important to note that only a small number of female leaders were able to be included in this study. The reason for the uneven distribution of male and female participants is the dominance of male leaders in the sector that was used to collect data. Larger sample sizes represent a population more accurately than small sample sizes (VanVoorhis & Morgan, 2007). Sample size should preferably be at least 30 participants per group, since this would lead to about 80% power which is minimally suggested (VanVoorhis & Morgan, 2007). Results of the current study might thus not be as accurate and generalizable as would be with a larger female sample size.

A final limitation of this study, and for all studies using a computational approach, is that the text mining software LIWC does not take into account irony, sarcasm, metaphors et cetera (Jones, 2017). Computer software assigns words to categories based on a pre-defined dictionary containing human-generated codes and cannot process context in which the words are spoken. Whereas a human interpreter categorizes an ambiguous word in the category that fits the context, computer software is only able to assign it to one pre-defined category. This means that some words may belong to a different category than the one it has been placed in. However, since a large amount of words has been analysed it is expected that this would not have a large influence on the findings of the study, but it should still be noted.

## Future research

Multiple studies regarding gender differences in leadership have been conducted in the past. There is however still lots to uncover and aspects of research to improve. The current study for example only included word use of leaders. However, their speech could be affected by individuals

they are interacting with: what followers say and do influences word use of leaders and vice versa. Future research could include leader-follower interaction, to get a clearer picture of leader language. Leader word use can for example be compared for leaders of a team which is already familiar to the leader versus an unfamiliar team, leaders whose teams are judged as effective versus less effective, or include the atmosphere within the team, such as a team which is hostile or informal. This provides more insight into word use of leaders in different circumstances.

When including follower interaction and the environment this would mean that context is taken into account, something that was missing in the current study because of the computational approach. A suggestion for future research is therefore to include the context in which words are spoken. This requires a form of subjective interpretation instead of relying solely on computational software. Including human interpretation should be done carefully, to avoid personal bias.

Another idea for future research is including a cultural aspect. Related to the limitation mentioned earlier that all leaders of the current study worked in the same sector, all leaders were employed in the same country as well. The way in which leaders and employees interact with each other could differ across cultures and countries. An interesting addition to this research could therefore be to compare results across multiple countries.

Finally, the limitations of this study function as suggestions for future research. This includes the recommendation to include leaders from multiple sectors and from multiple levels of leadership. This would provide more insight into leadership language, since the current study only focused on a selection of leaders which were relatively similar. Also, an even distribution of male and female leaders should be accounted for, with a minimum of at least 30 participants per group (VanVoorhis & Morgan, 2007).

## Conclusion

This study aimed to answer the question "w*hat are differences in the relative frequency of word use between male and female leaders toward their followers in a large Dutch organisation?"*. Besides the most prominent finding that the great majority of the 74 word categories did not show significant differences, seven significant differences have been found in male and female leader word use. After interpreting them, they were reduced to five differences since two categories function as a covering category for the actual category that showed a significant difference. This study concludes that female leaders use more auxiliary verbs and words that are related to causation compared to male leaders. Male leaders in this study showed to use more words that are related to family, discrepancy and to the perceptual process *hear*.

Besides the possibly dominant words related to discrepancy used by male leaders, no significant differences were found related to words that characterise agentic and communal speech. This is conflicting with other studies that found that differences in language do reflect aspects of agentic and communal speech, such as swear words and tentative words (Argamon et al., 2003;

Argamon et al., 2007; Newman et al., 2008; Schwartz et al., 2013). Stereotypical images expected men to speak dominantly, confidently and aggressively, while women would use words that are friendly, gentle, tentative and personal (Eagly & Karau, 2002; Koenig et al., 2011). This study does not support the agentic-communal differentiation between male and female leaders, thereby rejecting the hypothesis that was formulated.

Concluding, some small differences have been found in the relative frequency of word use between male and female leaders, but the most prominent finding is that no big differences exist. The results do not show obvious differences that make it possible to distinguish typical male (agentic) and female (communal) speech. Overall, male and female leaders' speech is quite similar.

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# Appendix A

Overview of word categories in LIWC 2015.

| Category | Abbreviation | Example | Corrected alpha |
|---|---|---|---|
| Word count | WC | | |
| **Summary Language Variables** | | | |
| Analytical thinking | Analytic | | |
| Clout | Clout | | |
| Authentic | Authentic | | |
| Emotional tone | Tone | | |
| Words per sentence | WPS | | |
| Words bigger than 6 letters | Sixltr | | |
| Dictionary words (words captured by the program) | Dic | | |
| **Linguistic Dimensions** | | | |
| Total function words | Funct | It, to, no, very | .24 |
| Total pronouns | Pronoun | I, them, itself | .67 |
| Personal pronouns | Ppron | I, them, her | .61 |
| 1st person singular | I | I, me, mine | .81 |
| 1st person plural | We | We, us, our | .82 |
| 2nd person | You | You, your | .70 |
| 3rd person singular | Shehe | She, her, him | .85 |
| 3rd person plural | They | They, their | .78 |
| Impersonal pronouns | Ipron | It, those | .71 |
| Articles | Article | A, the | .23 |
| Prepositions | Prep | To, with, above | .18 |
| Auxiliary verbs | Auxverb | Am, will, have | .54 |
| Common adverbs | Adverb | Very, really | .82 |
| Conjunctions | Conj | And, but | .50 |
| Negations | Negate | No, not, never | .71 |
| **Other grammar** | | | |
| Common verbs | Verb | Eat, come | .23 |
| Common adjectives | Adj | Free, happy | .19 |
| Comparisons | Compare | Greater, best | .35 |
| Interrogatives | Interrog | How, when, what | .57 |
| Numbers | Number | Second, hundred | .83 |
| Quantifiers | Quant | Few, many | .64 |
| **Psychological processes** | | | |
| Affective processes | Affect | Happy, cry | .57 |
| Positive emotion | Posemo | Love, nice, sweet | .64 |
| Negative emotion | Negemo | Hurt, ugly, nasty | .55 |
| Anxiety | Anx | Worried, fear | .73 |
| Anger | Anger | Hate, kill, annoyed | .53 |
| Sadness | Sad | Cry, grief, sad | .70 |
| Social processes | Social | Talk, they, friend | .86 |
| Family | Family | Son, uncle | .88 |
| Friends | Friend | Neighbour, mate | .60 |
| Female references | Female | Girl, mother | .87 |
| Male references | Male | Boy, father | .87 |
| Cognitive processes | Cogproc | Cause, know | .92 |
| Insight | Insight | Think, know | .84 |
| Causation | Cause | Because, effect | .67 |
| Discrepancy | Discrep | Should, would | .76 |

| | | | |
|---|---|---|---|
| Tentative | Tentat | Maybe, perhaps | .83 |
| Certainty | Certain | Always, never | .73 |
| Differentiation | Differ | But, else | .78 |
| Perceptual processes | Percept | Look, feel, see | .55 |
| See | See | View, saw | .84 |
| Hear | Hear | Listen, hearing | .69 |
| Feel | Feel | Feel, touch | .65 |
| Biological processes | Bio | Eat, blood, pain | .71 |
| Body | Body | Foot, hand, spit | .87 |
| Health | Health | Flu, sick, pill | .37 |
| Sexual | Sexual | Love, incest | .78 |
| Ingestion | Ingest | Eat, pasta | .92 |
| Drives | Drives | | .80 |
| Affiliation | Affiliation | Friend, social | .80 |
| Achievement | Achieve | Win, success | .81 |
| Power | Power | Superior, bully | .76 |
| Reward | Reward | Take, prize, benefit | .69 |
| Risk | Risk | Danger, doubt | .68 |
| Time orientations | TimeOrient | | |
| Past focus | Focuspast | Ago, did, talked | .64 |
| Present focus | Focuspresent | Today, is, now | .66 |
| Future focus | Focusfuture | May, will, soon | .68 |
| Relativity | Relative | Area, bend, exit | .86 |
| Motion | Motion | Arrive, car, go | .77 |
| Space | Space | Down, in, thin | .83 |
| Time | Time | End, season | .79 |
| Personal concerns | | | |
| Work | Work | Job, colleague | .93 |
| Leisure | Leisure | Cook, chat, movie | .86 |
| Home | Home | Kitchen, mortgage | .83 |
| Money | Money | Cash, owe | .90 |
| Religion | Relig | Church, altar | .91 |
| Death | Death | Bury, kill | .79 |
| Informal language | Informal | | .84 |
| Swear words | Swear | Fuck, shit | .83 |
| Netspeak | Netspeak | Btw, lol | .82 |
| Assent | Assent | Agree, ok, yes | .39 |
| Nonfluencies | Nonflu | Eh, hmm | .69 |
| Fillers | Filler | You know, I mean | .27 |