Syntactic Alignment in Power Relations

Anonymous ACL submission

Abstract

Communication accommodation is a phenomenon in social interactions in which people adjust their language to that of their interlocutor. For example, when high power individuals interact with people in low power positions, the language of the interaction tends to follow the language of the high power individuals. While previous studies have mostly focused on the word level features of language during this process, in this paper we show that not only people in low power mirror word usage of people in high power, but they also adjust their syntactic structures to high power people.

1 Introduction

Language is an important tool that captures various underlying psychological states of human behavior and social interactions. Semantic analysis has received extensive attention over the years and majority of the studies have focused on the role of semantics, and more specifically word-usage, in exploring psychological states (Pennebaker and Stone, 2003; Dehghani et al., 2014; Graham et al., 2009; Dehghani et al., 2016; Mehl et al., 2012; Maass et al., 2006; Dehghani et al., 2013). At the same time, several studies have shown that syntactic features also carry vital information about individuals’ and groups’ characteristics (Bresnan and Hay, 2008; Vigliocco and Franck, 1999; Jahr, 1992; Gawda, 2010; Boghrati et al., 2017b).

In the past decade, the development of various automatic tools for measuring syntactic features and capturing syntactic similarity (Lu, 2010; Kyle and Crossley, 2015; Graesser et al., 2004; Kyle, 2016; Niederhoffer and Pennebaker, 2002; Ireland and Pennebaker, 2010) has paved the way for researchers to explore a wider variety of novel and existing psychological questions by focusing not only on word usage but also on syntactic features. A recent example of these tools is Conversation level Syntax Similarity Metric (CASSIM; Boghrati et al., 2017a) which measures the syntactic similarity between two documents based on their sentences’ constituency parse tree similarity.

Employing CASSIM, Boghrati et al. (2017a) studied Communication Accommodation Theory (CAT; Giles, 2008) and the interactive alignment model (Pickering and Garrod, 2004) in social media which target the effects of language on people’s behavior. These and other related theories propose that people adjust features of their communication dynamics, such as vocal patterns and gestures, while interacting with others in order to maximize or minimize their social differences (Shepard et al., 2001). While most of the studies on communication accommodation have been focused on word usage, Boghrati et al. (2017a) demonstrated the presence of syntactic alignment in social media.

A component of communication accommodation is research on power and dominance relations. Previous research has identified a range of linguistic markers which indicate whether a speaker is speaking to a superior or to a subordinate (Kacewicz et al., 2013). For example, research shows that people who are in low power positions tend to adapt their language to the language of their superiors (Danescu-Niculescu-Mizil et al., 2012). However, this work has focused only on word-level patterns. Building off of the results of capturing syntactic alignment in social media, we aim to investigate the relationship between syntactic features and power dynamics.

In the current study, our goal is to employ a tool for measuring syntactic features and examine whether syntactic alignment can indicate if a
2 Method

In this section, we explain our approach to measure syntactic structures of conversations. Notably, our goal is to assess a syntactic similarity score for conversations between two people. These scores will help us to determine whether syntactic alignment can be a marker of power and dominance.

To measure syntactic similarity scores, we used ConversAtion level Syntax SImilarity Metric (CASSIM; Boghrati et al., 2017a). CASSIM relies on edit distance difference of constituency parse trees. First, it generates parse trees for the sentences in each document. Next, it calculates the edit distance between each two sentences’ constituency parse trees and matches the most syntactically similar sentences using Hungarian algorithm. Finally, it provides a score between 0 and 1 where higher numbers indicate higher similarity between two documents. For more details see Boghrati et al. (2017a).

Generally, CASSIM calculates a syntactic similarity score for two given documents. In our analyses, we used two corpora which includes conversations among people who are in different power positions. We employed CASSIM to compare each two pair of consecutive turns in a conversation between two persons.

3 Studies

In this section, we describe the two analyses which we conducted to explore the relationship between syntactic alignment and power dynamics. We used two corpora: US Supreme Court dialogues and Wikipedia conversations (Danescu-Niculescu-Mizil et al., 2012). These two corpora are particularly suitable for our goal because they include conversations among people who are in different power positions and communicate to achieve a desirable outcome.

As noted earlier, Communication Accommodation Theory (Giles, 2008) suggests that people in low power adjust their language to people in higher power position. In other words, the language used by people in a communication is likely to reflect the language of the person in the higher power role (West and Turner, 2013).

The main hypothesis behind our analyses is drawn upon the mentioned theories. We are primarily interested in examining the following hypothesis:

- People in low power tend to accommodate their syntactic structures toward people in high power while people in high power generally do not converge toward people in low power.

To investigate the above hypothesis, we conducted two analyses, using two different corpora. For each analysis, we first introduce the corpus, then describe the process, and finally report and discuss the results.

3.1 U.S. Supreme Court Study

For the first analysis, we used the U.S. Supreme Court dialogue corpus introduced by Danescu-Niculescu-Mizil et al. (2012). We applied CASSIM on the conversations happening among the justices and lawyers. Then, we tested our hypothesis using independent t-tests. In the following, we first describe the dataset and analysis and then report the results.

3.1.1 Data

The U.S. Supreme Court corpus includes oral arguments among justices and lawyers. During a case, lawyers have thirty minutes to defend their party. The justices, often includes nine individuals, may interrupt lawyers to ask questions or clarifications which leads to an interaction between the lawyers and the justices. The final decision is made by the majority votes of the justices.

The oral arguments includes 204 cases with total of 50,389 verbal exchanges among 11 justices and 311 lawyers. For more details on the corpus see Danescu-Niculescu-Mizil et al. (2012).

3.1.2 Analysis

To explore the relationship between power and language alignment, we reframed the hypothesis stated earlier for the Supreme Court corpus:
• Lawyers coordinate more toward justices than justices toward lawyers.
• Lawyers coordinate more toward Chief justices than Associate justices who are in lower power position compare to Chief justices.
• Lawyers coordinate more toward justices who eventually voted against them (i.e. whom they are more dependent on) than justices who voted for them.

3.1.3 Results

We used CASSIM to compare the syntactic similarity between each two pair of consecutive turns in a conversation between a lawyer and a justice. We then labeled the turns where a lawyer speaks to a justice as low-to-high and the turns where a justice speaks to a lawyer as high-to-low. Applying a t-test with CASSIM score as dependent variable and comparison type (corresponding to low-to-high or high-to-low) as independent variable demonstrated that lawyers adjust their syntactic structure more toward justices than to lawyers $t(48012) = 7.69, p < 0.001, d[95\% CI] = 0.07[0.05, 0.09]$.

Further, we examined whether lawyers coordinate more toward the Chief justice or the Associate justices. Because Chief justices are in higher power position compare to Associate justices, we hypothesized that language alignment between lawyers and Chief justices is stronger than lawyers and Associate justices. Similar to the previous hypothesis, we used CASSIM to compare lawyers syntax usage toward Chief justices and toward Associate justices. Applying a t-test with comparison type (Chief-justices or Associate-justices) as independent variable demonstrated that lawyers adjust their syntactic structure toward Chief justices more than to Associate justices $t(3048.9) = 7.71, p < 0.001, d[95\% CI] = 0.16[0.12, 0.2]$.

Finally, we tested the effect of dependence on syntactic alignment. We used CASSIM to compare syntactic usage of lawyers to justices who voted against them and to justices who voted for them. We hypothesized that lawyers coordinate more toward justices who voted against them because they need to convince them and are therefore more dependent on them (Emerson, 1962). Similarly, applying a t-test with comparison type (opposite-side or same-side) as independent variable and CASSIM scores as dependent variable posited that lawyers tend to use more similar syntactic structure to justices who voted for the opposite side compare to justices who voted for their side $t(20329) = 3.35, p < 0.001, d[95\% CI] = 0.04[0.02, 0.07]$.

3.1.4 Discussion

In this study we examined the relationship between power and syntactic structures in the U.S. Supreme Court oral arguments among lawyers and justices. We used CASSIM to measure syntactic alignment in the arguments. Our results showed that lawyers, who are in lower power position, adapt their syntactic structures toward justices more than vice versa. Also, lawyers tend to use syntactically more similar language to Chief justices compare to Associate justices.

Finally, we showed the effect of an interaction between dependency, power difference and syntactic alignment. The need for convincing another person creates a form of dependency (Emerson, 1962), therefore we showed that lawyers align their syntactic structures more toward justices who eventually voted against them compare to justices who eventually voted for them.

3.2 Wikipedia Study

In the second analysis, we used a Wikipedia corpus introduced by Danescu-Niculescu-Mizil et al. (2012). We then applied CASSIM on the conversations among editors to compare their syntactic structures and to examine the hypothesis stated earlier. In the following subsections, we first describe the corpus, then explain the analysis, and finally report and discuss the results.

3.2.1 Data

The Wikipedia corpus consists of interactions among editors about changes on articles. Generally, these interactions are collaborative discussions in order to achieve a common goal. Some Wikipedia editors have administrative role which gives them access to technical features and therefore higher status compare to the non-administrative editors.

This corpus includes 240,436 conversational exchanges among editors with known status (i.e. administrative role or non-administrative role) on the talk pages. For more details see Danescu-Niculescu-Mizil et al. (2012).
3.2.2 Analysis

In this analysis, we directly examined the hypothesis stated in Section 3. Administrative editors represent people in high power and non-administrative editors represent people in low power. Notably we are interested in testing the following statement:

- Editors with non-administrative role adapt their syntactic structures to editors with administrative role more than vice versa.

3.2.3 Results

We used CASSIM to compare syntactic structures used by administrative editors and non-administrative editors in a conversation exchange. We then labeled the conversation exchanges as admin-to-nonadmin when an editor with administrative role writes to an editor with non-administrative role and nonadmin-to-admin when an editor with non-administrative role writes to an editor with administrative role. Applying a t-test with comparison type (admin-to-nonadmin or nonadmin-to-admin) as independent variable and CASSIM scores as dependent variable demonstrated that editors with non-administrative role align their syntax usage more toward editors with administrative role compared to administrative editors to non-administrative editors \( t(6678) = 2.59, p < 0.001, d[95\% CI] = 0.02[0, 0.03] \).

3.2.4 Discussion

In the second study, we used conversations among editors of Wikipedia to explore the relationship between power dynamics and syntactic alignment. Wikipedia editors who have administrative access are in higher power position compared to editors who do not. While, results of a study by Danescu-Niculescu-Mizil et al. (2012) showed that users coordinate toward administrative editors more than non-administrative editors and also that administrative editors coordinate toward users more than non-administrative editors do, in our study we only focused on the interactions between administrative editors and non-administrative editors. Our analysis showed that editors with non-administrative role adjust their syntax toward editors with administrative role more than administrative editors do toward non-administrative editors. The results support our hypothesis that low power people adapt their syntactic structures toward high power people more than vice versa.

4 Conclusion

The two analyses in this study provided evidence for the relationship between power status and syntactic alignment. Our results demonstrate that people in low power accommodate their syntactic structure toward people in high power more than high power people do toward low power people. Notably, in the first analysis, we showed that lawyers (low-power) coordinate toward justices (high-power) more than vice versa. The effect also held in our second analysis where we compared syntactic alignment of non-administrative editors (low-power) to administrative editors (high-power).

Generally, our results support our hypothesis that the relationship between language alignment and power is not limited to word-level features. The same effect may be found in the syntax usage of people in different power positions, i.e., low power people align their syntactic structure toward high power people more than vice versa. In the future, we aim to study these syntactic structures in more details and explore what category of syntax is more common among these two groups. Also, which syntactic structures are more likely to be mirrored by people in lower power positions.

5 Acknowledgment

This research was supported in part by NSF IBSS Grant #1520031.

References


