Research Journal of Language and Literary Studies
Volume 3, Issue 2, 2023, p 1-29

A Short Text Multidimensional Analysis of Pakistani X Trolls in English

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Abstract

Trolling is a pervasive phenomenon world over which came into being with the spread of social media. Many countries in the West were the frontliners in facing trolling; hence, in order to grapple with it, their academics came to the forefront to investigate its language. However, language is situated and contextual; thus, the understanding of the phenomenon of trolling through the lens of west cannot encompass the regional differences of this phenomenon. Therefore, in order to understand the phenomenon of trolling in Pakistan, this study explores the lexico-grammatical variation of Pakistani trolling on X. For this purpose, a corpus of 2,317 trolling posts is developed. A Short Text Multidimensional Approach formulated by Clarke (2017, 2018, 2019, 2020) is used. After the initial tagging of data by Multidimensional Analysis Twitter Tagger (MDATT), the data is further subjected to multiple correspondence analysis (MCA) in R Studio software. The results obtained in the form of dimensions are then further interpreted. The findings reveal that Pakistani trolling has one major dimension i.e. interactive vs informational which exists in other genres and registers as well. However, the trolls with an informational communicative function also use linguistic features of nouns and adjectives from Urdu which are

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used to name-call or insult people. The study will prove to be significant not only for the general understanding of the phenomenon of trolling in Pakistan, but also for advancing further research on trolling in Pakistan from different perspectives.

Keywords: Online trolling, Twitter, Pakistan, Multidimensional Analysis, Multiple Correspondence Analysis

1 Introduction

Since the rise of social media there has been a boom in its use all over the world as a new form of socialization. However, it is only recently that it has become a rage in developing countries like Pakistan. Statistics reveal that the use of social media in Pakistan has increased almost nine times in the last ten years as 71.7 million users of social media were reported in January 2023 (Kemp, 2023) whereas only 8 million in 2013 (Kemp, 2013). As this media grows and there are more number of users, the chances of exploiting these spaces increase. Hence, it is important to protect these spaces from the evils that harm its sanctity. One such evil is trolling that is a problem all over the world.

Trolling is defined as an act of "posting inflammatory messages directly to other users to provoke an equally reactionary response" (Duncombe, 2019, p. 409). It is prevalent across all the platforms of social media such as Facebook and Instagram; however, studies show it is most widespread on X previously Twitter (Case & King, 2017; Case & King, 2018; Case et al., 2019; Fearn, 2017). X launched as Twitter and was developed as a microblogging site where users could post about the daily happenings within 280 characters (previously 140 characters). These posts were previously called tweets. After the takeover of Twitter by Elon Musk in 2022, he renamed this platform as X and the tweets are now simply called posts. He even extended the character limit to 25,000 in a single post but only for the subscribers using its monthly subscription service. However, in recent years this platform lost its essence to bullies who thought it was fun to bring their inner sadists out and troll people.

Twitter trolling has been investigated from a variety of perspectives from sentiment analysis of trolling tweets (Iqbal et al., 2020a; Iqbal et al., 2020b) to investigating collective trolling and systematic trolling by exploring hashtags (Kirkwood et l., 2019; Stewart et al., 2018; Synnott et al., 2017), to comparing trolling on Twitter with trolling on other social media platforms in order to examine the effect of social media affordances on trolling (Morrissey & Yell, 2016), to investigating tweets forensically (Bishop, 2014c), and examining trolling tweets at a functional linguistic level (Clarke, 2019, 2020). However, it is important to mention that almost all of these studies have been conducted on trolling tweets from Euro-American users of Twitter or on general trolling tweets. Hence, it becomes difficult to generalize the findings of these studies to an online population belonging to a specific socio-cultural context.

There has been a sharp rise in trolling in Pakistan, and with this comes the calls for initiating a discussion around this notorious act (see for example, Iftikhar, 2022; Siddiqi, 2020). The academics have started investigating the phenomenon of trolling in Pakistan; however, they have focussed on a certain kind of troll particularly political troll (Li et al., 2023; Younus et al., 2014) or a certain group of society (in particular women) facing trolling (Hussain et al., 2022; Siddiqua et al., 2023). None of the studies investigated trolling in general in Pakistan and neither at the microlinguistic level. In this context, the present study investigates the general Pakistani trolls on X (previously Twitter) by examining its language at lexico-grammatical level in order to establish what linguistic repertoires Pakistani trolls employ and what communicative functions do they perform. For this purpose short text multidimensional analysis is used in order to cater to the short length of posts (previously tweets). This study will be crucial in understanding the discourse of trolling in Pakistan.

2 Review of the Relevant Literature

Trolling is a vogue term these days. With the proliferation of the use of social media, the use of this term boomed to no end, and in order to

sensationalize, the mass media portrayed trolls as a reflection of "a darker, sinister and transgressive side of cyberspace" (Bishop, 2014a, p. 7). However different academics showed that trolling is much more than that. Bishop (2013, 2014a, 2014b), for example, differentiated between Classical trolling as understood in 1990s and Anonymous trolling, the one popularized by media. He called classical trolling as the one which was carried out for the consensual entertainment of the community in order to foster bonds between them. Contrarily, anonymous trolling was carried out at the cost of someone from outside that community for the sick satisfaction of the troll or others who encouraged it. However, this differentiation was theoretical in nature and much influenced by the media theory.

In order to understand trolls based on the actual data rather than theories, Hardarker (2010, 2013) carried out a couple of studies. She investigated online discussions about the perceptions of trolling on the social media platform of Usenet[4] and found out that the users of Usenet described trolls to be using different strategies such as digression, antipathy, aggression, endangerment, (hypo)criticism and shock. Hardaker (2013) then defined trolling as the intentional use of "impoliteness/aggression, deception and/or manipulation" (p. 79) to create an environment that is conducive to initiate a conflict mostly for the sake of amusement. Taking forward, Hopkinson (2013) proposed that the users definition may vary with the subjects under discussion. With a different data set then Hardaker, he pointed out that users in his corpus defined troll as an out-group intruding into in-group discussions.

Several scholars censored this content-driven method of defining trolls (e.g. Hardaker, 2010). In an attempt to understand trolling from the horse's mouth, Cook (2021) and Cook et al. (2018) conducted semi-structured interviews with self-proclaimed trolls who identified that there are various types of trolling: thrill-seeking trolling, attack trolling and interaction-seeking trolling. Sanfilippo et al. (2018); however, made the

[4] https://www.usenet.com/

methodology more inclusive and asked the interviewees of their study to reflect on their role as a troll, observer or victim to define trolling. The conclusive findings revealed that there were two types of trolling, the negative one reflective of media portrayal, and the light-hearted one. Similarly Cruz et al. (2018) also included both the participants and observers of trolling in her study and showed that trolling can have both pro-social and anti-social impact depending on the discussion. Likewise, March and Marrington (2019) through questionnaire responses of trolls and victims established that some participants defined trolling as bullying or insulting behaviour to provoke an emotion of anger from the victims. Contrarily, others defined it to be more fun provoking entertainment. However, it was found that those who defined it to be fun were either the perpetrators or both the victims and trolls at some point, reflecting their own sadistic nature.

In a move away from the perceptions of trolling and in order to understand the phenomenon of trolling more minutely and at a structural level, Clarke (2017, 2018, 2019) investigated the actual language of trolls who were accused to be trolls by others. She chose a multidimensional analysis in order to understand the linguistic repertoire of trolling. The findings revealed that for trolling there were two major dimensions of functional linguistic variation (2019) i.e. interactive vs non-interactive and challenging vs non-challenging. The first dimension showed that some could be interactive or informational in nature. The second dimension revealed that trolling could be overtly antagonistic and oppositional or covert through provocative content. It was also found that there was no binary distinction between trolling tweets based on these opposite functions. In fact, the corpus displayed a continuous range of variation which indicated that no single troll is black or white, rather each troll employs a number of strategies.

After reviewing all of these studies that tried to understand the phenomenon of trolling, it has become clear that trolling is not limited to the demon status it has achieved with all the negative connotations. Rather it can be both anti-social as well as pro-social, and all the

different forms of trolling fall on this cline. Moreover, the lack of uniformity in the idea of trolling and the strategies used by trolls makes it clear that there is a variation in the language of trolls and that this variation is possibly a result of the influence of the context in which it occurs. The reason is that trolling like other human communication is contextual in nature (Herring, 2004; Phillips, 2021; Whelan, 2013). It has been established that a number of contextual factors such as age, gender and culture influence the phenomenon of trolling (See for example, Fichman & Sanfilippo, 2015; March & Marrington, 2019; Ortiz, 2020; Phillips, 2011; Sanfilippo et al., 2018; Shachaf & Hara, 2010). However, a lack of diversity in the studies carried out from the perspective of culture has made it difficult to understand trolling across a wide array of cultures as cultural norms of politeness differ from culture to culture. Hence, a localized understanding is of paramount importance.

Amid the dearth of studies exploring the influence of culture on trolling, the icing on the cake is the fact that most of these studies, already few in number, are from the perspective of North-American online communities (De Seta, 2013); therefore, trolling behaviours are "raced as white" (Phillips, 2015, p. 42). For example, in one such study Phillips (2012) established that trolls from United States employ a number of behavioural and discourse strategies such as emotional exploitation and sensationalism reflective of their corporate media and display white privilege and masculine domination which are prevalent in their culture.

In recent years, an interest in understanding trolling at a local level has been observed (see for example, Cook, 2021; De Seta, 2013). However, their number is a drop in an ocean in a country like Pakistan where the use of social media has still not reached its zenith, where the code of conduct for using social media has still not been established, trolling is considered fun and a right, and no laws have brought this act under its jurisdiction. Even these studies are conducted from a particular perspective and have not yet helped us to understand trolling holistically. For example, the studies by Hussain et al. (2022) and Siddiqua et al. (2023) were carried out from a feminist perspective and showed that

women journalists in Pakistan were targeted by the exploitation of conservative cultural values and they were shamed, and religiously and morally policed. Li et al. (2023) studied trolling from the perspective of politics and found out that political journalists faced abuse and were bombarded with culturally sensitive expressions. They also showed that while men were targeted for their apparent lack of professionalism, females received gender-targeted abuse. However, as mentioned previously these researches are very few in number in order to understand the phenomenon of trolling in Pakistan and their scope is also limited. Therefore, in order to understand the language of trolling holistically, and at a minute linguistic level, this study will undertake the multidimensional analysis of Twitter trolling in Pakistan in order to understand its linguistic variation. Following research questions are addressed in this study:

- What are the most dominant co-occurring linguistic features in each dimension of Pakistani trolling tweets?
- What is the functional interpretation of each dimension constituting Pakistani trolling tweets?

This study is significant not only for the general understanding of the language of trolling in Pakistan but also useful for establishing trolling as an online register in Pakistan. It will help future researchers to explore different types of trolling in Pakistan as well.

3 Research Methodology

This study employed short text multidimensional analysis (Clarke, 2017, 2018, 2019, 2020) in order to investigate the patterns of linguistic variation in Pakistani X trolling. This section will further detail on the process of data collection, tagging and short text multidimensional analysis used in this study.

3.1 Data Collection

In order to make the corpus thorough and inclusive, the data for this study was collected through three approaches. As per Clarke (2018, 2019, 2020) one of the approaches to identify trolls is by using certain offensive linguistics markers as search terms. These markers may include

hashtags, words for name-calling and curse words. A list of these linguistic markers is given in appendix 1. One of the weaknesses of this approach is that since offensive linguistic markers are not always used to troll (for example, they can be used as a jest among friends); therefore, all the collected posts were manually sifted to identify trolls.

The second approach to collect trolling data is to collect posts from self-identifying trolls i.e. people who declare themselves as trolls. It is a sub-culture of trolls (Phillips, 2015), hence the use of this approach made the data more inclusive. For the present study, posts from an account that called themselves as an "ethical troll" were collected. For ethical considerations their account details are kept hidden. Each post from their account was again carefully looked at to only shortlist posts of actual trolling.

The last and most reliable approach to collecting data of trolls is by collecting posts that are accused to be trolls by others. As it depends on the perception of others; therefore, it disburdens the author of any personal bias. For the present study, the word "troll" was used to shortlist posts that were potentially accusing others to be a troll. The posts that it was in reply to were then collected and sifted carefully to identify the data of trolling as not all the posts that are accused of being a troll are in actual a troll.

This data was collected through a Twitter API account that helped narrow down the data from Pakistan. The Twitter API key was used to collect data using the package rtweet in RStudio software.

3.2 Tagging

After carefully scrutinizing the data manually that was collected through the three approaches, 2,317 trolling posts were shortlisted. This corpus of Pakistani trolling tweets was then tagged using Clarke's (2019, 2020) Multidimensional Analysis Twitter Tagger (MDATT) based on Gimpel et al. (2011), Owoputi et al. (2012) and Owoputi et al. (2013) twitter tagger output. It tagged the corpus as per MDA feature set and CMC-specific features. As online communication also contains non-standard spellings and grammar; therefore, MDATT was used instead of simple

MDA tagger as it also caters to the non-standard forms. Since MDATT tagger is not available on web, the corpus was tagged upon request by Clarke (2019, 2020). The tagged corpus was then further analysed using short text multidimensional analysis.

3.3 Short Text Multidimensional Analysis

This study employed Clarke's (2017, 2018, 2019, 2020) modified version of multidimensional analysis suitable for short texts instead of standard MDA proposed by Biber (1988). The first reason behind using this method is that the corpus collected from X falls under online discourse which has non-standard spellings and grammar. The MDA tagger does not tag these non-standard forms; therefore, Clarke developed MDATT which not only tags features as per MDA but also features particular to computer-mediated communication (CMC) and X (formerly Twitter). The second reason for choosing short text multidimensional analysis is that since the posts (previously tweets) collected from X are shorter in length comprising of 17 words at average (Clarke, 2019, 2020), the standard MDA which measures relative frequencies of features cannot give appropriate results for the posts of this length as relative frequencies become accurate only at around 500 words (Passonneau et al., 2014). Contrarily, individual posts from X seldom exceed 40 words (Clarke, 2020). Therefore, short text multidimensional analysis was used that employs multiple correspondence analysis (MCA) instead of factor analysis. MCA works with categorical data i.e. the presence or absence of features rather than continuous data i.e. relative frequencies (as is used for factor analysis). This information of presence and absence of features was then recorded in the form of a table, a binary data matrix of posts (tweets) and lexico-grammatical features, with posts on the vertical axis and lexico-grammatical features on the horizontal axis. This matrix was then subjected to MCA in RStudio software using FactoMineR package (Husson et al. 2020).

The function of MCA is "to identify patterns in a table of individuals (i.e. posts) and categorical variables (i.e. the grammatical features)" (Clarke,

2019, p. 67). On the basis of these patterns, MCA reduces the grammatical features into dimensions, and assigns each category of grammatical feature (e.g. present or absent) as well as each post a positive or negative coordinate and a value indicating their contribution to a particular dimension. Coordinates of the categories of grammatical features are reflective of the extent of their proximity. When coordinates of grammatical features categories are closer on a dimension, it is indicative of their co-occurrence in tweets. Contrarily, when the coordinates of grammatical features categories are poles apart and the distance between them is large, it is indicative of their rarity of co-occurrence in posts. In a similar manner, the distance between the coordinates of individual posts help establish "the dissimilarities in their linguistic composition with respect to the major pattern of variation that the dimension represents" (Clarke, 2020, p. 169). Shorter distance indicates posts share common categories of grammatical features. Similar to Biber's standard MDA (1988), the linguistic/grammatical features with positive coordinates and a strong contribution to the positive side of the dimension were interpreted separately from the features with negative coordinates and a strong contribution to the negative side of the dimension. This was repeated for all the dimensions until no more dimensions were readily interpretable (see section 4).

As mentioned previously, MCA also assigns a contribution value to each category of linguistic feature and each post. This value is important for interpretation. According to Le Roux and Rouanet (2010) categories of linguistic features contributing above average should only be interpreted as they are representative of the major patterns of variation. Contribution value for each dimension is positive and collectively equal 100. Therefore, average was calculated using 100/K where K is equal to total number of categories of linguistic features. Hence, only those categories of features were interpreted for each dimension which have a contribution value higher than the average.

It is pertinent to mention that MCA does not control the effect of length of the posts as MDA does by measuring relative frequencies of features

across texts of various lengths. This means that the longer a post, the more linguistic features it will contain. Therefore, in order to identify if the length of posts influence the dimension patterns, the length of posts was added in the matrix in the form of word tokens as a linguistic feature. However, while running MCA in RStudio software, it was defined as a quantitative supplementary variable. This variable was then correlated with the coordinates of each dimension. If there was a strong correlation, it meant the length of posts did influence the dimension patterns; as a result, it was barred from further interpretation.

Finally, in order to interpret the patterns functionally, individual tweets with high positive or negative coordinate and contribution values were observed to examine co-occurring features in their context. This helped to trace down the underlying communicative functions brought about by the co-occurring grammatical features in a dimension.

4 Results and Discussion

In order to find the major dimensions of linguistic variation in the data of Pakistani twitter trolling, 2,317 tweets of Pakistani trolls were subjected to multiple correspondence analysis (MCA) using short text multidimensional analysis. The data was analyzed for the presence or absence of 61 linguistic features that occurred in more than 5% of the trolling tweets. After subjecting the data to MCA, 61 dimensions were returned; however, not all were interpretable. In order to determine how many dimensions to interpret, the eigenvalues of all the 61 dimensions were made into a bar plot (see Figure 1). The plot showed a continuous decrease; however, the first two dimensions stood out.

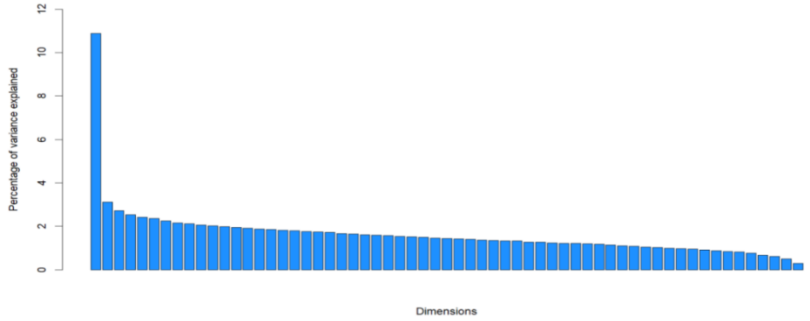


Figure 1: Barplot of the percentage of variance explained for the dimensions

In order to further confirm the results of eigenvalues variance graph, modified rates of eigenvalues were also calculated. The modified rates of eigenvalues for the first ten dimensions are given in Table 1. It also shows that the first two dimensions have the highest modified rates of eigenvalue and contribute to more than 94% variance; therefore, in this study first two dimensions were interpreted.

Table 1: Modified rates of eigenvalues for the first ten dimensions

Dimension	**Modified rates of eigenvalues**
1	92.48
2	2.36
3	1.24
4	0.87
5	0.66
6	0.56
7	0.41
8	0.29
9	0.19
10	0.16

For each of the first two dimensions only those features were interpreted which contributed above the average i.e. 100/(61 linguistic features × 2 categories)= 100/122=0.82. For each dimension, features and most strongly associated tweets associated with the positive side were interpreted separately from those of the negative side. If a feature is present on one side of the dimension and absent on its opposite side, then only present features are mentioned.

4.1 Dimension 1: Length

Dimension 1 is demarcated by the presence of features on the positive coordinate and absence of features on the negative coordinate as is shown in Table 2. The variables characterizing the positive coordinate are the presence of 39 features whereas those for negative coordinate are

the absence of 13 features. This suggests that Dimension 1 contrasts long and short tweets. The tweets on the positive coordinate are longer tweets, thus the presence of more features; whereas those on the negative coordinate are shorter tweets, hence the absence of features.

Table 2: The linguistic features contributing above the average contribution on Dimension 1

Dim	**Coord**	**Features**
1	+	**Present Features (coordinate, contribution)**
		Amplifier (0.86, 0.832), Analytic negation (0.993, 2.548), Attributive adjectives (0.363, 1.002), Auxiliary DO (1.191, 1.695), Coordinating conjunctions (0.666, 2.1), Contrastive conjunctions (1.065, 1.267), Complementation (1.377, 1.638), Contracted forms (1.122, 1.251), Definite article (0.635, 1.583), Demonstrative determiner (0.702, 0.895), Quantifying determiner (0.991, 1.135), First person pronoun (0.946, 2.551), Indefinite article (0.656, 1.486), Infinitive (0.989, 2.11), IT (1.102, 1.381), Possibility modals (1, 1.071), Predicative modals (0.879, 1.176), Nominalization (0.636, 0.91), Object pronoun (1.08, 1.431), General adverbs (0.688, 2.134), Other subordinator (0.863, 1.876), General verbs (0.484, 2.145), passives (1.168, 1.612), Past tense verb (0.774, 2.526), Perfect aspect (0.979, 1.039), Possession (0.809, 2.533), Predicative adjectives (0.932, 1.497), Prepositions (0.321, 1.033), Progressive (0.967, 1.18), Pro-verb DO (1.191, 1.014), Private verbs (1.063, 1.981), Public verbs (0.895, 1.784), Relatives (1.149, 0.995), Third person singular verb (0.602, 1.999), Stative forms (0.628, 2.131), Subject pronoun (0.998, 3.668), Third person personal pronoun (0.933, 3.109),

	WH-word (0.82, 1.46)
-	**Absent Features (coordinate, contribution)**
	Attributive adjectives (-0.371, 1.024), Coordinating conjunctions (-0.305, 0.961), Full stop (-0.366, 1.251), General adverbs (-0.294, 0.912), General nouns (-0.937, 1.45), General verbs (-0.753, 3.337), Past tense verb (-0.301, 0.982), Possession (-0.28, 0.877), Prepositions (-0.634, 2.036), Third person singular verb (-0.348, 1.157), Stative forms (-0.352, 1.195), Subject pronoun (-0.323, 1.188), Third person personal pronoun (-0.29, 0.967)

This pattern of contrast in the length of tweets becomes visible when tweets most strongly contributing to the either side of dimension are observed. Table 3 shows that the top two tweets that contribute the most to the positive side of dimension have an average tweet length of 53 tokens. In contrast, the top two tweets that contribute the most to the negative side of dimension 1 have an average tweet length of 1 token, only a URL.

Table 3: Examples of most strongly contributing trolling tweets on positive and negative coordinates of Dimension 1

Positive Coordinate		
No.	**Tweet**	**No. of Tokens**
1	Lol what about my language has irked you so much? The fact that I didn’t respond in English? And who the hell are you to show me the mirror? Your own identity & personal achievement is being born to a PPP politician who himself probably gets insulted by a 32 yr old boy king lol.	57

	https://t.co/vSqRgsmxLk https://t.co/z3e1vWe4TL	
2	@HamidMirPAK @ImranKhanPTI @guardian either hamid mir is genuinely incapable to mentally comprehend his stance is the same or he is being a chutiya which he is usually accused of being, so i don't know which one is it? any hamid mir fan here can you	49
Negative coordinate		
3	@KhaNuBya https://t.co/tPUcesXq3J	01
4	@burirogm @BakhtawarBZ http://t.co/l9qfqJRqI5	01

In order to further verify that Dimension 1 was influenced by the length of tweets, the coordinates of each tweet were correlated with each tweets length. The results showed that there was a significant strong positive correlation between Dimension 1 and the tweets length (r=0.85). Figure 2 also shows this correlation as the coordinates of tweets rise with the increase in text length. The reason for this strong correlation is that this study does not take into account relative frequencies of linguistic features which controls the influence of text length. In fact, it only considers the presence or absence of features i.e. their raw frequencies. Hence, the longer the tweet, the more linguistics features it will carry. Therefore, length of the texts have a tendency to influence the dimensions. As length of the tweets effect Dimension 1, so it is excluded from further interpretation.

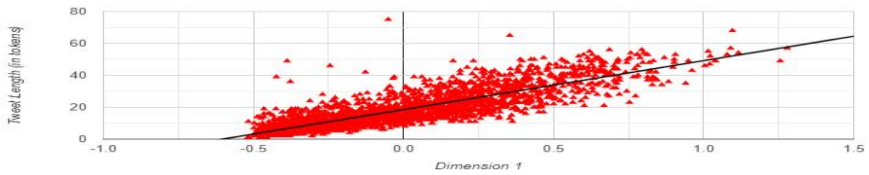


Figure 2: Fitted line plot of coordinates of tweets on Dimension 1 and tweet length in word tokens

4.2 Dimension 2: Interactive vs Informational

Table 4: The linguistic features contributing above the average contribution on Dimension 2

Dim	Coord	Features
2	+	**Present Features (coordinate, contribution)**
		Analytic negation (1.015, 9.31), Auxiliary DO (1.783, 13.275), First person pronoun (0.666, 4.415), Imperatives (0.913, 4.239), Possibility modals (0.495, 0.916), Phrasal verbs (0.516, 0.906), General interjections (0.525, 1.848), Private verbs (0.744, 3.388), Public verbs (0.458, 1.631), Second person pronoun (0.33, 1.793), Stance verbs (0.641, 1.326), Subject pronoun (0.479, 2.955)
		Absent Features (coordinate, contribution)
		General nouns (0.587, 1.986)
	-	**Present Features (coordinate, contribution)**
		Attributive adjective (-0.241, 1.544), Definite article (-0.459, 2.894), Foreign words (-0.285, 1.359), Gerund (-0.566, 0.989), Numeral determiners (-0.554, 0.997), Passives (-0.778, 2.5), Past tense verb (-0.271, 1.078), Perfect aspect (-0.754, 2.157), Prepositions (-0.194, 1.314), Proper noun (-0.181, 1.181), Relatives (-0.803, 1.696), Third person singular verb (-0.365, 2.57), Stative forms (-0.231, 1.012), Time adverbials (-0.434, 0.876)

Dimension 2 opposes the tweets that are interactive and informational (Table 5). As shown in table 4 the features associated with the positive side of dimension 2 include *first* and *second person pronouns* which mark the conversational style (Biber et al., 2007) and a "highly interactive discourse" (Biber, 1988, p. 105). Similarly, *subject pronouns* used in the tweets are also a key feature of conversational style (Biber et al., 2007). Subject pronouns, specifically first person pronouns are used to articulate the personal stance of the author (Clarke, 2019) (e.g. *I won't DM*). Second person pronouns are used to address the audience and interact with them (e.g. *so If you're curious, you may like to find it on mine/yours TL*). *Analytic negation* is also a characteristic feature of the conversational style (Biber, 1988; Biber et al., 2007) and marks a fragmented text. Together with *auxiliary do*, they are used to deny a statement or an action, especially one mentioned before (Ard, 1982), thus indicative of an interaction (e.g. *I don't need any apology* acknowledges that there was an apology statement; *don't try to cross ur limits* acknowledges that the action of crossing the limits was performed). Another striking feature on the positive side of dimension 2 is the presence of *imperatives*. They are also common in interactions and conversations (Biber et al., 2007). They are used to direct the addressee to do something (e.g. *Think before u say something*). A variety of verb types, including *private verbs*, *stance verbs* and *public verbs*, are also used to express speech and thoughts to the addressee from the point of view of the author. Private verbs and stance verbs are used to overtly express personal thoughts, feelings, attitudes and value judgments (e.g. *I don't need any apology*). Contrarily, public verbs are used to report on speech (e.g. *All I said is that the language with words…*). There are also some informal features such as *phrasal verbs* and *general interjections* that add to the conversational and interactional style as opposed to the informational style owing to their colloquial nature. Lastly, the presence of *possibility modals* reflect the uncertainty of information (e.g. *you may like to find it on mine/yours TL*) which is one of the characteristic features of interactional style (Biber, 1988). It is important to mention

that the only feature above average that is absent from the positive side of dimension 2 is *general nouns* which clearly indicates that the positive side of dimension 2 has tweets that are highly interactional in nature as opposed to informational in style.

Table 5: Examples of most strongly contributing trolling tweets on positive and negative coordinates of Dimension 2

Positive coordinate	
No.	**Tweet**
1	@sheikhsaira24 @Fani2558 @asmashirazi I don't need any apology. I won't DM, so If you're curious, you may like to find it on mine/yours TL. I won't DM. All I said is that the language with words like ""ہیرا منڈی"" is acceptable+worth tweeting for yo
2	Think before u say something and don’t try to cross ur limits!!! https://t.co/w8I8139OeY
Negative coordinate	
3	@SaleemKhanSafi There is one thing more, which is very expensive to get, and very cheap in Pakistan, and that is Bikao Journalists like saleem safi, hamid mir and a long list. The money paid them should be recovered immediately and should be donated
4	@NaeemBukhariPTI Neutral begairet is the main character of this regime change Allah's wrath b upon #Bajwa, his family & all allies who r involved in destroying #Pakistan & its economy #نامنظور_حکومت_امپورٹڈ#BajwaTraitor

On the negative side of Dimension 2 there are *proper nouns* and *noun modifiers* indicative of an informational style of text (Biber, 1988). Proper nouns are the referents in these texts which means that a lot of

trolling is directed to particular individuals (e.g. *Allah's wrath b upon #Bajwa, his family & all allies*). Several noun modifiers such as *attributive adjectives* (e.g. *neutral begairat*), *definite article* (e.g. *the money*) and *numeral determiners* (e.g. *one thing*) which act as pre-modifiers as well as *prepositions* (e.g. *and that is Bikao Journalists like saleem safi, hamid mir and a long list*) are used to modify the nouns, thus packing additional information about the nouns in a very concise and integrated manner (Biber, 1988). *Relative clauses* are also used to expand nominal information (Biber, 1988); however in a comparatively more elaborate manner (e.g. *all allies who r involved in destroying #Pakistan & its economy* where the underlined clause is the expansion of the noun 'allies'). An interesting feature that emerged particular to Pakistani trolling tweets is the use of foreign words. *Foreign words* are the native language words used by Pakistani trolls in their native language Urdu. Almost all of the foreign words on the negative side of Dimension 2 are either nouns or attributive adjectives that are used to name-call or hurl insults on the referents (e.g. *and that is Bikao Journalists like saleem safi, hamid mir and a long list*, where 'bikao' here is used as an attributive adjective and is a local term for venal and corrupt person, it is often used as an insult). In addition, *gerunds* which are verbal nouns also have a nominal function (Biber, 1988). A number of verb forms such as *past tense* along with *perfect aspect* and *passives* are also associated with informational texts (Biber, 1988) and are used to report past events (e.g. *The money paid them should be recovered immediately*). *Third person singular verb* is also sometimes used in informational style. In trolling tweets, it is used to give information in a matter of fact manner (e.g. *@NaeemBukhariPTI Neutral begairet is the main character of this regime change*). *Stative forms* are also indicative of an informational style since they exclude the possibility of the presence of an active verb (Biber, 1988) (E.g. *There is one thing more, which is very expensive to get*). Lastly, *time adverbials* which indicate the time of an event are also the most dominant adverbials in informational style (Biber et al., 2007).

Overall, dimension 2 opposes two styles of communication i.e. conversational and informationally dense style. It shows that on twitter Pakistani trolls engage in two kinds of trolling. There is one on one trolling that is more interactive in nature with the person being trolled, targeted towards a smaller audience and sometimes even a single person; and one on many that aims to generally broadcast to a wider audience (Yaqub et al., 2017). This dimension is the most frequently occurring dimension in the texts of all kinds and genres. For example, Shakir (2020) found the same dimension in the online registers of Pakistani English. Friginal et al. (2017) observed this dimension in Facebook and Twitter posts. Likewise, Titak and Roberson (2013) in their study on limited registers of web and Biber and Egbert (2016, 2018) in their corpus of searchable web containing the full range of registers on the web also found this dimension. Lastly, Clarke also (2017, 2018, 2019, 2020) found this dimension in twitter trolling. This study also confirms the presence of this dimension which means that it could be a universal dimension (Biber, 2014).

5 Conclusion

This study has attempted to uncover the patterns of linguistic variation in Pakistani trolling posts on X. Since language is contextual and culture has a huge role in shaping the use of language, it was important to understand the language of growing phenomenon of trolling in Pakistan. It did so in the light of two research questions. Firstly, it tried to find out the co-occurring linguistic features in the dimensions, and secondly interpreted those in the light of examples from the corpus to unravel their underlying communicative function. By applying MDA for short texts, the first two dimensions were interpreted and discussed since they displayed most visible patterns of linguistic variation.

Similar to Clarke (2019, 2020), the first dimension was uninterpretable as it displayed the effect of text length on the presence or absence of linguistic features. The longer the text, the more linguistic features it contained. Hence, this dimension was eliminated from further interpretation. The second dimension termed *interactive vs*

informational; however, was not only interpretable but also reflective of all the major MDA studies carried out in the past. This dimension had the co-occurrence of linguistic features that characterize conversational style or interaction on the one coordinate, whereas the co-occurrence of nominal features characteristic of informational texts on the other coordinate. This study also then supports the claim by Biber (2014) that this could be a universal dimension that exists even in the regional varieties. This dimension even corroborated with Clarke's (2019, 2020) dimension in general Twitter trolling. However, one distinct feature that emerged in Pakistani X trolling was the use of Urdu words as a result of code mixing. These Urdu words were heavily used in the trolling posts carrying informational communicative function, either as nouns or attributive adjectives to name-call or insult the referent. Name-calling is a strategy that is mostly used to verbally abuse people (Nendauni & Sadiki, 2019) and is heavily exploited in political discourse (Nendauni et al., 2022). A closer look at the corpus of this study showed that even though the data was collected randomly through three different strategies, most of the trolling was political in nature; hence, name-calling was used to abuse and troll people. The findings of this study could be a stepping stone for anyone aiming to understand the language of trolling in Pakistan. A more extensive data of trolling from different platforms of social media can further help to understand its language thoroughly.

Acknowledgments

We would like to thank Dr. Isobelle Clarke who helped us tag the data through her software MDATT, and very kindly responded to all our queries.

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Appendix 1

Following is the list of linguistic markers to collect Pakistani trolls from X:

Troll	Mullahs	Fuck off
Bitch	Khusra	Selective
Lanat	Roast	Hypocrite
Drama Queen	Sick	Elite
Patwari	Desi	Babu
Youthia	Burger	Libtard
WTF	Bark	Cancel
Hamid Mir	Cynthia ritchie	#Neutrals
#Khalilurrehmanqamar	#AtifMian	#Bajwa
#muftiqavi	#PakistanUnderFascism	#GeneralBajwa
#Marvisarmed	#Article62	#CoronaTigerForce
#DamFund	#BilawalMaafiMango	#PinkiPeerni
#MadinaKiRiyasat	#PakistansLiesDeceitDeception	#FarahGogi
#Bhikaari	#KoiSharmHotiHaiKoiHayaHotiHai	#BajwaHasToGo
#KarachiRain	#AhsanIqbal	#overseasPakistanis
#BajwaSoldTheNation	#BajwaTraitor	#importedgovernment
#MiftahIsmail	#patwari	#byelection2022
#Chorni	#ImportedGovtNotAccepted	#Neutrals
#لوٹوں_کو_گھسیٹو	#ابلیس_کا_روپ_ڈیزل	#بروکر_ڈاکو_زرداری
#لوٹا_کریسی_نامنظو	#کراچی_الیکشن_کراؤ_بھاگونہیں	#تھوڑی_سی_منی_لانڈرنگ
#ام_حریم	#پنکی_کو_انگوٹھی_دو_کام_لو	#بکواسی_فتنہ_عمران
#امپورٹڈ_حکومت_نامنظور	#مجبور_عوام_عیاش_حکمران	#ٹکر_کے_لوگ_ملے
#شیطان_صافی	#احسن_اقبال_چور_ہے	#بلاول_جواب_دو
	#اوپن_والیم_10	