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Grammatical Footprint of Socially Unacceptable Facebook Comments

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Abstract

This study investigates the morphosyntactic characteristics of Facebook comments in order to identify those that prominently feature in socially unacceptable discourse (SUD) online with a specific focus on violent vs. offensive comments. By analyzing the frequency and keyness of the observed features, we learned that grammatical differences between socially acceptable and unacceptable comments do exist, but are subtle. Furthermore, we found that differences amplify with the severity of SUD, meaning that the language of violent comments differs more from socially acceptable comments than the offensive ones. Finally, our analysis shows that offensive comments include descriptive and dialogic language, while in the violent comments the focus is on actions and generalizations.

1. Introduction

Although socially unacceptable discourse (SUD) is not a new phenomenon, it has become much more prominent with the development of social media platforms. In this paper, we use SUD to refer to communication practices that are "abusive, insulting, intimidating, harassing, and/or incite to violence, hatred, or discrimination« (Erjavec and Kovačič, 2012). Online SUD is especially worrisome due to its wide reach, which is why the last decade has seen growing work in the field of natural language processing (NLP) focusing on the development of tools for automatic detection of SUD (for an overview see Fortuna and Nunes, 2018) but also in psychology, psychiatry, law, criminology and communication studies (Waqas et al., 2019) which shows the complexity of the phenomenon. Furthermore, study outcomes are usually difficult to generalize, since SUD is extensively influenced by many factors, such as the communicative context, the identity of the author, the target of the comment, etc. (Schmidt and Wiegand, 2017). In addition, since SUD is realized through language, its full description should be based on findings from multiple languages. However, until now the majority of the work has been performed on English data, with other languages coming into focus only recently (Corazza et al., 2020). This paper represents an attempt to contribute to the understanding of Slovene SUD by analyzing morphosyntactic properties of SUD and identifying grammatical features that are characteristic of SUD.

This paper is structured as follows: Section 2 reviews related work; Section 3 outlines the study design; Section 4 describes the dataset used; Sections 5 and 6 present and discuss the results; and Section 7 concludes the paper with final thoughts and directions for future work.

2. Related work

In this paper, we follow the reasoning of Hopper (1987) and Scheibman (2002) who state that grammatical structure to a certain extent depends on the discourse which is shaped by social interactions and the speaker's point of view. Lakey (2016), for example, showed that distancing behavior related to fear reflects on the morphosyntactic level through distancing markers such as the use of genitive instead of accusative for direct objects in simple fear constructions. Moreover, the author (ibid.: 132) claims that "it is likely that other emotions have bodily or behavioral reflections in the morphology and syntax of languages". Therefore, we can expect SUD to exhibit characteristic grammatical features in relation to socially acceptable discourse (henceforth referred to as non-SUD). We base this assumption on findings from our previous study (Pahor de Maiti et al., 2020) which showed that nonstandard linguistic features of SUD often manifest through nonstandard syntactical constructions (e.g., infinitives in place of finite verb forms). In this analysis, we focus on the morphosyntactic level as the first step towards a comprehensive linguistic description of SUD.

Several computer linguistics studies have already shown that grammatical features, such as tense and aspect markers, conjunctions, PoS distribution, etc. can help improve the performance of SUD-classifiers (cf., Clarke and Grieve, 2017; Vidgen and Yasseri, 2019; Zhang et al., 2018). However, grammatical feature selection has usually not been theoretically underpinned from the linguistic point of view. Nonetheless, certain researchers (e.g., Alorainy et al., 2019; Burnap and Williams, 2016) ground their feature selection in the conceptual framework of othering (Jensen, 2011) which defines actions that are focused on creating the in-group and the out-group (e.g., in language use: a pronounced use of the pronoun pair *us/them*).

Furthermore, linguistic studies of various text genres have shown a correlation between grammar and discourse. Werner (2019), for example, showed that hip hop discourse

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manifests through specific grammatical structures (e.g., copula absence, multiple negatives). By analyzing key morphosyntactic features of presidents' speeches, Fidler and Cvrček (2019) found that differences in word class distribution is indicative of a speakers' representation of reality (e.g., noun-heavy discourse de-emphasizes the agent of the action), while morphosyntactic features point to differences in speakers' style (e.g., a finite verb form as opposed to the nominalized phrase suggests explicit reference and allows/encourages feedback; grammatical case indicates different participants roles). Grammatical specificities in different text genres have also been found in Slovene texts. Logar and Erjavec (2018) showed that academic Slovene is characterized by common nouns, adjectives and abbreviations. Zwitter Vitez and Fišer (2015) showed that spoken and online texts contain more pronouns, particles and interjections than traditional written texts, but that there are fewer verbs and conjunctions in online texts with respect to spoken text. In contrast to these studies which compared different genres, ours is more fine-grained in that we are comparing different types of comments within a single text genre, therefore expecting to identify subtler differences.

3. The dataset

The dataset used in this paper is extracted from the Slovene part of the FRENK corpus[1] which contains comments on Facebook posts published by the three most popular Slovene news media according to the Alexa service: 24ur.com, SiOL.net, and Nova24TV. The corpus contains comments posted from 2010 to 2017 on the topics of migrants and the LGBTQ+ community which were manually annotated for the type of SUD according to the project-specific annotation schema (e.g., classifying comments into those that express violent actions, contain offensive language, etc.) and its target (e.g., migrants, LGBTQ, commenter, etc.) (Ljubešić et al., 2019). The corpus has also been tagged with morphosyntactic descriptions and lemmatized with the CLASSLA-StanfordNLP tagger (Ljubešić and Dobrovoljc, 2019).

Based on the SUD type, the comments were compiled into three subcorpora in the noSketch Engine concordancer (Kilgarriff et al., 2014) available at CLARIN.SI[2]:

- **NON-SUD**: comments without any elements of SUD (e.g., *Jaz sem navedel dejstva... kaj pa vidva? /I stated the facts... what about you two?/*[3]);
- **OFFENSIVE**: comments that contain SUD in the form of obscene and abusive content, but without incitement to violent acts (e.g., *Ja res si primitiven,dokazano,po tvojem besednjaku /You really are primitive,it's a fact,proven by your vocabulary/*); and
- **VIOLENT**: comments that contain SUD in the form of threating or violent content inciting to physical violence (e.g., *Metk v celo vsakemu /Bullet to the forehead for each one of them/*).

Table 1 shows the structure of our dataset and the size of the subcorpora. First, we can observe that the share of SUD (i.e. the VIOLENT and OFFENSIVE subcorpora) is roughly the same (52.09%) as the share of the NON-SUD subcorpus. Second, the VIOLENT subcorpus is approximately 10 times smaller than the other two subcorpora. This is not surprising since the amount of violent comments on social media is generally low (below 7 %; estimations, however, vary across studies (Berglind et al., 2019; Vidgen and Yasseri, 2019), but to a certain extent this could also be influenced by the Facebook removal policy[4] of hateful content prior to our harvesting. Next, we can see an uneven distribution between the two topics (i.e., migrants and LGBTQ) in all subcorpora, but the largest difference is in the VIOLENT subcorpus. This might be due to the fact that at the time of data collection, news reports on migration issues were more divisive than on LGBTQ+. The final observation concerns the difference in comment length. The median for comment length for the studied subcorpora is 11 tokens for NON-SUD, 20 tokens for OFFENSIVE and 11 tokens for VIOLENT, which shows that offensive comments are longer than the violent and the acceptable ones. Performing the Kruskal-Wallis statistical non-parametric test over the length of the comments of the three subcorpora shows that the OFFENSIVE comments are statistically significantly longer than the comments in the remaining two subcorpora with a p-value < 0.001. This indicates that offensive comments could be more descriptive.

		VIOLENT	%	OFFENSIVE	%	NON-SUD	%	TOTAL	%
MIGRANTS	# of comments	381	4.09	2,945	31.64	2,624	28.19	5,950	63.93
	# of tokens	6,848	2.77	96,807	39.17	48,862	19.77	15,2517	61.72
LGBTQ	# of comments	88	0.95	1,434	15.41	1,835	19.72	3,357	36.07
	# of tokens	1,941	0.79	48,612	19.67	44,060	17.83	94,613	38.28
TOTAL	# of comments	469	5.04	4,379	47.05	4,459	47.91	9,307	100.00
	# of tokens	8,789	3.56	145,419	58.84	92,922	37.60	247,130	100.00

Table 1: Dataset structure

4. Study design

In this study, we analyze the data for the three subcorpora separately, and then jointly compare the VIOLENT and OFFENSIVE subcorpora (SUD) against the NON-SUD subcorpus. To this end, we use well-established corpus analysis techniques that are built into the noSketch Engine concordancer, namely frequency and keyword lists (generated for MSD tags) for quantitative analysis, and concordances and collocation candidates (McEnery and Hardie, 2011) for qualitative analysis. For comparative purposes, we observe the data on the scale which delineates the increasing severity of SUD: non-SUD → offensive → violent.

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[1] Due to the limitations of the Facebook Terms of Service, the FRENK corpus cannot be made publicly available.
[2] http://clarin.si/noske/

[3] All examples in this paper are taken from our dataset which is in Slovene. The translations were made by the authors.
[4] https://www.facebook.com/communitystandards/hate_speech

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The quantitative part of the analysis includes obtaining data regarding frequency and keyness of grammatical tags which is extracted both for the part-of-speech (henceforth PoS) and fine-grained morphosyntactic (henceforth MSD) level. Due to the considerable difference in the size of the subcorpora (see Table 1), the calculations take into account relative frequencies. For the computation of key grammatical tags for the VIOLENT/OFFENSIVE subcorpus, the NON-SUD subcorpus is used as the reference. We analyze 5 top-ranking key PoS tags and 50 top-ranking key MSD tags, using the MULTEXT-East Slovene Morphosyntactic Specifications[5] (Erjavec, 2012). We then perform additional frequency analyses of prominent features determined on the basis of their frequency or keyness score (e.g., for demonstrative pronouns, imperative verb forms, prepositions). To avoid erroneously labeling features as SUD-specific, we check them against the GigaFida 2.0 representative corpus of standard Slovene (Krek et al., 2020). In addition, we compare our findings with the Janes corpus of Slovene netspeak (Fišer et al., 2020) in order to differentiate between characteristics of general netspeak and online SUD.[6] Even though both the GigaFida and the Janes corpus each contain a wide range of genres within their scope, the techniques we employ (frequency and keyness) extract the most characteristic features of standard written Slovene overall on the one hand and of Slovene netspeak on the other.

With the qualitative approach we further explore prominent features defined on the basis of keyness analysis by studying concordances and collocations of key grammatical forms (e.g., prepositions, numerals, non-finite verb forms), as well as by manually categorizing 100 random concordances of the selected word form into more fine-grained grammatical categories which are not provided by the MULTEXT-East morphosyntactic tagset. Based on the categorization by Toporišič (2004, 2007), we use the following categories:

- for proper nouns: *proper* (with a subcategory *personal*), *geographical*, *material*, *error;*
- for demonstrative pronouns: *classifying* (e.g., *ta* /this/), *qualifying* (e.g., *tak* /such/), *possessive* (e.g., *tega* /from this one/), *quantifying* (e.g., *toliko* /so much/);
- for participial adjectives: *demonstrative* (ending on -n/-t/-l; e.g., *zablokiran* /blocked/) and *qualifying* (ending in -č/-ši; e.g. *bodeč* /barbed/).

5. Results

This section presents the results of the grammatical analysis of SUD on the PoS and MSD level.

5.1. PoS level

The analysis of SUD on the PoS level takes into account frequencies of word classes and the 5 top-ranking key PoS tags which were computed for the OFFENSIVE and VIOLENT subcorpora with respect to NON-SUD subcorpus and vice versa.

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[5] http://nl.ijs.si/ME/V6/msd/html/msd-sl.html#msd.msds-sl

[6] It should be noted that different taggers have been used for FRENK, Janes and GigaFida 2.0. However, since the same training data was used for all the taggers, we do not expect any
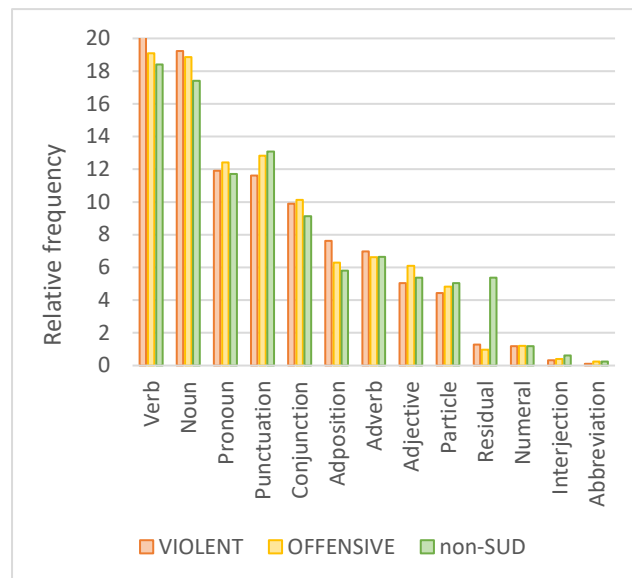
5.1.1. Offensive comments

Figure 1: Relative frequency distribution of PoS for the three subcorpora. It is arranged in a descending order according to the values of the VIOLENT subcorpus.

	OFFENSIVE	VIOLENT
the most key	Adjective	Adposition
	Conjunction	Verb
	Adposition	Noun
	Noun	Conjunction
the least key	Pronoun	Adverb
the least key	Adverb	Punctuation
	Punctuation	Particle
	Particle	Interjection
	Interjection	Abbreviation
the most key	Residual	Residual
	NON-SUD	

Table 2: The 5 top-ranking key PoS tags (OFFENSIVE/VIOLENT vs. NON-SUD and vice versa). The blue cells indicate the function word classes.

Figure 1 shows that the PoS frequency distribution within the OFFENSIVE and the NON-SUD subcorpus is very similar. In fact, the two subcorpora only differ in the ranking of the low-frequency word class, namely residuals[7] which are 5.6 times more frequent in the NON-SUD subcorpus. Furthermore, in the OFFENSIVE subcorpus there are more nouns and conjunctions than in the NON-SUD subcorpus, and more punctuation marks and adjectives than in the VIOLENT subcorpus.

A more detailed frequency analysis shows that the main residual subclass in all subcorpora is the Xf-subclass which represents foreign words. There are a quarter more foreign

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differences in the overall distribution of tags to be due to the tagger used, but rather due to the difference in texts.

[7] These are the elements that do not belong to any other category. In our case mainly strings of foreign words, emoticons, emojis, URLs, hashtags, etc.

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elements in the NON-SUD subcorpus in contrast to the OFFENSIVE (and the VIOLENT) subcorpus. However, the opposite is observed for the second most frequent residual subclass, namely the Xe-subclass which denotes emoticons and emojis[8] where there are a quarter fewer emotive elements in the NON-SUD subcorpus in relation to the OFFENSIVE (and VIOLENT) subcorpus.

As expected, these findings are confirmed by the analysis of the 5 top-ranking key word classes for the OFFENSIVE and VIOLENT subcorpus. In addition to what we have seen from Chart 1, Table 2 shows that offensive comments compared to non-SUD comments are also characterized by adjectives, adpositions and pronouns.

5.1.2. Violent comments

While in the OFFENSIVE subcorpus, the PoS distribution differences in relation to the NON-SUD subcorpus can be detected only in the lower part of the PoS frequency list, differences in the VIOLENT subcorpus appear over the entire PoS list. As Chart 1 shows, there are more pronouns than punctuation marks, more adpositions than adverbs and more particles than residual elements in the VIOLENT subcorpus when compared to the word class distribution in the NON-SUD subcorpus. Furthermore, Figure 1 shows that in the VIOLENT subcorpus, there are more verbs, nouns and adpositions than in the NON-SUD subcorpus, and more verbs and adpositions than in the OFFENSIVE subcorpus. It can also be observed that there are fewer adjectives, punctuation marks and certain functions words (esp. conjunctions, pronouns and particles) in the VIOLENT subcorpus in relation to the OFFENSIVE subcorpus. Keyness analysis of word classes for the VIOLENT subcorpus presented in Table 2 confirms these results and extends the set of typical word classes to conjunctions and adverbs.

5.2. MSD level

The analysis on the MSD level took into account 50 top-ranking key MSD tags which were then organized and analyzed according to parts-of-speech. The keyness of the MSD tags was extracted for the VIOLENT and OFFENSIVE subcorpora with respect to the NON-SUD subcorpus. An excerpt is shown in Table 3.

OFFENSIVE					
Tag	Description	Example /EN/	Freq	Freq/mill	Score
Appnpn	Participial adjective, positive, neuter, plural, nominative	vzgojena /raised/	13	89.4	90.4
Ps3mpap	Possessive pronoun, 3rd person, masculine, plural, accusative, plural possessor	njihove /their/[9]	12	82.5	83.5
Ps1nsap	Possessive pron., 1stp., neuter, sing., accus., plu.possessor	naše /our/	11	75.6	76.6
Npfpa	Proper noun, feminine, plural, accusative	ZDA /the USA/	11	75.6	76.6
Ps1msip	Possessive pron., 1st p., masc., sing., instr., plu. possessor	našim /our/	9	61.9	62.9
VIOLENT					
Vmen	Main verb, perfective, infinitive	zapret /close/	233	26,510.4	5.9
Appfsa	Participial adjective, positive, fem., singular, accusative	bodečo /barbed/	7	796.5	5.7
Pd-fsa	Demonstrative pronoun, fem., singular, accusative	to /this/	20	2,275.6	4.6
Pd-mpa	Demonstrative pronoun, masc., plural, accusative	te /these/	16	1,820.5	4.6
Pd-mpi	Demonstrative pronoun, masc., plural, instrumental	takimi /these/	5	568.9	3.8

Table 3: The 5 top-ranking key MSD tags.

5.2.1. Offensive comments

The 50 top-ranking key MSD tags of the OFFENSIVE subcorpus include six word classes in the order presented below.

Adjective. The most key MSD tag is the participial adjective in plural. By analyzing 100 random participial adjectives (e.g., *odprt /open/*), we found that the great majority of them are descriptive adjectives (e.g., *požgan /burnt/*), and only 2 are qualifying adjectives (e.g., *vladajoč /governing/*). Among all key adjectival MSD tags, the most frequent ones are the possessive adjectives which are followed by the already mentioned participial and general adjectives (e.g., *primeren /appropriate/*). Key adjectives appear in singular and plural form.

Pronoun. On the list of 50 most key MSD tags for the OFFENSIVE subcorpus, the pronoun appears in the second place. In addition, pronominal MSD tags are also the most numerous group of tags among the 50 top-ranking key tags. The key pronominal MSD tags include the following pronoun types[10] (indicated in the descending order by their keyness score): possessive pronouns, general, indefinite, reflexive, demonstrative and personal pronouns. The most key pronominal MSD tag is the possessive pronoun. Possessive pronouns mainly express first person plural possession, followed by third and second person plural and second person singular. By taking into account the ratio of actual and possible forms for a particular pronoun type, we see that the most prominent pronoun type are demonstrative pronouns, followed by general and indefinite pronouns. Key demonstrative pronouns show a balanced distribution for gender, and they appear in singular and plural.

We supplemented this results with data from the Janes corpus, which represents Slovene netspeak, and from

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[8] Emoticon is a representation of a facial expression with a combination of standard keyboard characters (e.g., :-)), whereas an emoji is a character that represents facial expressions, emotions, other notions or objects in a form of a symbol or icon (e.g., ☺).

[9] Despite *their* being a possessive determiner in English and not a pronoun as written in *Description*, the translation reflects usage in Slovene.

[10] We use *tag* to refer to the complete MSD tag (e.g., Ps3mpap), *type* refers to the next lower level of division (e.g., possessive pronouns), and *form* refers to the third level of division (e.g., 1st person singular possessive pronoun).

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GigaFida 2.0 corpus, which represents standard Slovene. A comparison of lemma frequencies of demonstrative pronouns[11] shows that the most frequent ones in all three datasets are classifying and qualifying demonstrative pronouns. However, it could be observed that the share of the qualifying demonstrative pronouns is the highest in the OFFENSIVE subcorpus (1.1/1.5/1.6 times higher than in the NON-SUD/Janes/GigaFida 2.0 corpus).

Noun. Nouns appear third on the list of 50 top-ranking key MSD tags after adjectives and pronouns. The most key nominal MSD tag represents proper nouns. There are 64% of proper nouns in the nominative case (vs. 73% in NON-SUD), 14% in the locative (vs. 12% in NON-SUD), 10% in the accusative (vs. 6% in NON-SUD), 9% in the genitive (vs. 7% in NON-SUD), and finally 2% in the dative (vs. 1% in NON-SUD) and 1% in the instrumental case (vs. 0,9% in NON-SUD). By manually analyzing 100 random concordances of proper nouns in the OFFENSIVE subcorpus, we found that the majority belongs to the class of proper names of which 71% represent personal names (and 60% of those represent direct address of other commenters), while there are 1.7 times fewer geographical names. The proper noun MSD tag is followed by the common noun MSD tag which has a much lower keyness score.

Verb. Verbal MSD tags represent main verbs and have a high keyness score (they appear in the top quarter of the list). The most key verb type is the participle which is used to form composed grammatical tenses (past and future verb tense) and modes. Further analysis of tense distribution in the OFFENSIVE subcorpus showed (1) that the present tense is more used than the past or future tense, (2) that there are 1.4 times more past tense verb forms than future tense forms, and (3) that 3rd person verb forms are 3–5 times more frequent in all three verb tenses with respect to 1st or 2nd person verb forms. Apart from participles, key verb MSD tags also include two finite verb forms: the negative "to have" in 2nd person singular present tense, and the imperative. Collocations for the 2nd person negative *imeti/to have* show that this verb is predominantly used in constructions that build up the argument of the statement on the basis of discreditation of the addressee (e.g., *nimaš pojma /you don't have a clue/*). The most frequent imperatives proved to be the same as in standard Slovene as represented in the GigaFida 2.0 reference corpus (e.g., *iti /go/, verjeti /believe/, pomagati /help/*). From the list of collocation candidates, it could be observed that the most frequent imperative *iti/to go* predominantly appears in offensive constructions (e.g., *pejdi u kurac; idi od koder si prišu /go fuck yourself, go back from where you came from/*).

Numeral. There are three key numeral MSD tags on the list of 50 top-ranking key MSD tags. The most key numeral MSD tag appears in the upper half of the list. All key numeral MSD tags indicate numerals that are spelled-out as opposed to written in digits. Concordances for all three key forms show that the lemma of the most frequent numeral is *prvi /first/* which is in majority of cases used to underline the statement (*Haha pa ti **prvi** svoje ne spostujes /Haha but you're **the first** one not respecting your lot/*). Considering its frequency, it is followed by the numeral *drug /other/* in all of the concordance examples (*Moje življensko vodilo pa je med **drugim** tudi to, da ne solim pameti /Among **others**, my motto is also that I don't try to be a smart-ass./*) and is used to indicate indefiniteness.

Adverb. On the list with the 50 top-ranked key MSD tags, we find only one type of adverb, namely the participial adverb, and it appears as the last item on the list. Concordances for this particular tag show that in all but one case the adverb is *sodeč/judging from/*[12] and it is mainly combined with 2nd person verb forms. If we check the use of this adverb in standard Slovene as represented in the GigaFida 2.0 reference corpus, we can see that this adverb predominantly appears in printed periodicals and is used to accompany an argument.

5.2.2. Violent comments

The 50 top-ranking key MSD tags of the VIOLENT subcorpus include six word classes in the order presented below.

Verb. The list of top 50 key MSD tags includes both auxiliary and main verbs. The verb category is represented by the most key MSD tag of the VIOLENT corpus, namely the infinitive of a main verb, and by the highest number of different MSD tags on the list. Almost half of the key verb MSD tags on the list represent non-finite verb forms, that is participles and infinitives. Collocation analysis for these two verb types show that the basic meaning of the participles is non-hateful (e.g., *priti /come/, narediti /do/, morati /must/, delati /work/*), it is rather the context that renders the comment socially unacceptable, while the infinitives directly express violent actions (e.g., *streljati /shoot/, poslati /send/, pobiti /kill/, zapreti /close, imprison/*). The grammatical tense distribution analysis for the finite verb forms shows that the present tense prevails heavily and that there are 1.5 times more future tense verbs forms than past tense verb forms. Furthermore, we can observe a considerably higher frequency of the 3rd person verb forms across the verbal tenses in comparison to 1st person verb forms (which are from 3 to 7 times less frequent) and 2nd person verb forms (which are from 7 to 30 times less frequent).

Adjective. The adjective is the second-highest ranked key word class for the VIOLENT subcorpus. The most key adjectival type is the participial adjective (e.g., *imenovan /named/*). By analyzing 100 random participial adjectives, we found that the great majority belongs to the category of descriptive adjectives (e.g., *ubit /killed/*), and only 7 to qualifying adjectives (e.g., *bodeč /barbed/*). Among all key tags that are denoting adjectives, the most frequent ones are the general adjectives in positive form which are followed by participial adjectives. Key adjectives appear in singular and plural form.

Pronoun. On the list of 50 top-ranking key MSD tags for the VIOLENT subcorpus, the first pronominal MSD tag appears in the third place. Among the key pronominal MSD tags, we can find the following pronoun types, arranged in descending order by their keyness score: demonstrative pronouns, personal, general and reflexive pronouns. The most key MSD tag represents the singular demonstrative pronoun in accusative case. Demonstrative pronouns also have the highest ratio of actual and possible forms for a

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[11] The analysis took into account the 5 most frequent demonstrative pronouns as they appear in the GigaFida 2.0 corpus. We did not control for their nominal or adjectival use.

[12] We are ignoring the orthographical variations.

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particular pronoun type. They mainly appear in plural and the accusative case. In the VIOLENT subcorpus (like in the NON-SUD subcorpus, Janes corpus of Slovene netspeak, and GigaFida 2.0 reference corpus of standard Slovene), the most frequent demonstrative pronouns are classifying and qualifying demonstrative pronouns, but the share of the latter is the highest in the VIOLENT subcorpus (1.004/1.3/1.4 times higher than in the NON-SUD/Janes/GigaFida 2.0). Personal pronouns in the VIOLENT subcorpus mainly represent 3rd person plural, the remaining forms indicate 1st person plural and 3rd person singular. Finally, general pronouns indicate singular and plural, with the plural form appearing in the top quarter of the list of top 50 key MSD tags.

Numeral. There are two key numeral MSD tags on the list of 50 top-ranking key MSD tags. The most key numeral MSD tag appears in the top quarter of the list. Both key forms indicate numerals that are spelled-out as opposed to written in digits. The analysis of concordances shows that the lemma of the most frequent numeral is *en* /*one*/ which is used to stress the statement (e.g., *te islamiste bi na križ nabijala* **enga** *po* **enga** /*I would crucify those Islamists* **one** *by* **one**/), or express indefiniteness and generalization (e.g., *ja* **en** *dan jim bo trebo tistole raketo ubrnt na glavo* /*well* **one** *day that missile should be directed to them*/. The next key numeral, namely *drug* /*other*/ (e.g., *ne zaslužjo si* **druzga** /*they don't deserve* **other**/), also indicates indefiniteness.

Noun. Nouns appear in the upper half on the list of the top 50 key MSD tags for the VIOLENT subcorpus. They are also among the three most prominent word classes on this list with regard to the number of different MSD tags (after verbs and pronouns). The big majority belongs to the group of common nouns and only one key MSD tag represents proper nouns. There are 59% of proper nouns in the nominative case, 16% in the locative, 12% in the accusative, 10% in the genitive, and finally 2% in the instrumental and 1% in the dative case. By manually analyzing 100 random concordances of proper nouns in the VIOLENT subcorpus, we found that geographical names are only slightly (1.2 times) less frequent than proper names, 76% of which represent personal names (and 53% of those represent direct address of other commenters).

Preposition. On the list of 50 top-ranking key MSD tags, we find one tag indicating prepositions. The MSD tag appears in the lower half of the list and represents prepositions in the accusative case. The most frequent forms are *v* /*in, to*/, *na* /*on*/ and *za* /for, behind/. A comparison with GigaFida 2.0 reference corpus of standard Slovene showed that these prepositions are in fact among the most frequently used prepositions in Slovene, but the normalized frequency preposition in the accusative case actually proved to be more frequent in the VIOLENT corpus (33,109.57 per million for VIOLENT subcorpus against 23,665.94 per million for the GigaFida 2.0 corpus). In addition, collocation analysis of prepositions in the VIOLENT subcorpus showed that prepositions are typically used in socially unacceptable constructions (e.g., *na mejo* /*on the border*/, *v glavo* /*to the head*/, *v morje* /*into the sea*/, *v rit* /*in the ass*/).

6. Discussion

This section discusses the results of the study and is based on the comparison of characteristics between offensive and violent comments with the non-SUD comments.

6.1. SUD against non-SUD on the PoS level

The results show that differences in grammatical structure of the comments increase relatively to the severity of SUD. This means that differences between OFFENSIVE and NON-SUD subcorpora are less pronounced than between VIOLENT and NON-SUD subcorpora. This graduality can be illustrated with the following example: the OFFENSIVE comments differ from NON-SUD comments in having fewer residuals, while VIOLENT comments differ from NON-SUD comments in having fewer residuals and punctuation marks.

We can also see that SUD comments are characterized by adpositions, conjunctions and nouns. In addition to these three word classes, adjectives and pronouns are typical of offensive comments, while verbs and adverbs are typical of violent comments. Furthermore, calculations showed that comments in the OFFENSIVE subcorpus are statistically significantly longer than comments in the other two subcorpora. This reveals greater descriptiveness of offensive comments on the one hand, and greater emphasis on the action in the violent comments on the other. Based on the results, we can also conclude that SUD comments are characterized by content words (verbs, nouns, adjectives, adverbs) and certain function words, i.e., the ones used to form complex discourse (conjunctions, adpositions, pronouns), while function words used as discourse markers (particles, interjection) are more typical of non-SUD comments. This indicates more spontaneous, dialogic nature of non-SUD comments, and more complex, argumentative nature of SUD comments.

6.2. SUD against NON-SUD on the MSD level

The 50 top-ranking key MSD tags of the two SUD subcorpora computed against the NON-SUD subcorpus both include six word classes of which the majority (5 out of 6) is shared: adjectives, nouns, numerals, pronouns and verbs. The 6th key word class represents adpositions for the VIOLENT subcorpus, and adverbs for the OFFENSIVE subcorpus. Despite the similar set of word classes among the top 50 key MSD tags, their frequency and distribution show that adjectives and pronouns prevail in the OFFENSIVE subcorpus, while nouns, pronouns and verbs appear to be the most key features of the VIOLENT subcorpus. This is another confirmation that violent comments lexicalize action, while offensive comments are more descriptive. In addition, the results suggest that violent comments typically contain features that can convey generalizations, while typical features of offensive corpus exhibit a tendency towards dialogism. These characteristics, as will be shown in the following paragraphs, are manifested on the level of several grammatical forms which were identified as key forms of SUD.

Descriptiveness and dialogic style. The descriptiveness of the offensive comments is first shown in pronouns where we can observe high keyness of possessive and demonstrative pronouns. Possessive pronouns only appear as a key pronoun type in the OFFENSIVE subcorpus and they mainly represent 1st person plural possession, followed by 3rd and 2nd person plural possession. Key demonstrative pronouns appear in both

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SUD subcorpora and are of two types: classifying (e.g., *ta /this/*) and qualifying (e.g., *tak /such/*). However, we could observe that the share of qualifying demonstrative pronouns is higher in offensive comments in comparison to the violent ones, which once more indicates a greater descriptiveness of offensive comments.

Next, descriptiveness is also shown on the level of adjectives. The most key MSD form of the OFFENSIVE subcorpus is the participial adjective. This adjective type is among key MSD tags also in the VIOLENT subcorpus, but detailed analysis shows that the ratio between descriptive and qualifying participial adjectives is higher in the OFFENSIVE subcorpus. In addition, similar to pronouns, possessive adjectives are only typical of the OFFENSIVE subcorpus.

Next, we can observe descriptiveness on the level of nouns. Proper nouns appear high on the list of key MSD tags of the OFFENSIVE subcorpus, while in the VIOLENT subcorpus the higher keyness pertains to common nouns. Although proper nouns do not directly indicate a more descriptive style, they correlate to possessive pronouns and adjectives and thus contribute to higher descriptiveness. In summary, the keyness of demonstrative pronouns, especially qualifying ones, shows that referring to the quality of the referent is an important argumentation strategy in offensive comments and SUD in general. Furthermore, the keyness of proper nouns, which also have a higher proportion of direct address than proper nouns in violent comments, and high keyness of forms expressing possession, which only appear in offensive comments, reveal that offensive comments are more descriptive and dialogic.

A more pronounced dialogic nature of offensive comments with respect to violent comments can also be shown on the basis of grammatical case and person used in the two SUD subcorpora. Offensive comments exhibit more prominent use of nouns in the nominal and the dative case than violent comments. The nominative usually refers to the responsible entity, while the dative is likely to focus the discourse on purposes and opponents, rather than on actions (Fidler and Cvrček, 2019). In addition, 2nd person forms appear as key pronoun and verbal forms only in the offensive comments, and overall, there are more 2nd person verb forms in the OFFENSIVE subcorpus. In fact, there are considerably fewer 2nd person verb forms in the VIOLENT subcorpus with regard to the 1st/3rd person verb forms on one hand, and with regard to OFFENSIVE and NON-SUD subcorpus on the other. The first two grammatical persons indicate the speech participants, more specifically the first one refers to the speaker and the second person to the addressee, while the third person marks the non-active participants (Toporišič, 2004).

As mentioned above, the dialogic nature of offensive comments is shown on the level of verbs where we can observe more finite verb forms than in violent comments. Despite the fact that in both SUD subcorpora the most key verb tag is actually a non-finite verb, a closer look reveals that this non-finite form in the VIOLENT corpus represents infinitives, while in the OFFENSIVE subcorpus it is the participle which is used to form tenses and modes and is therefore an integral part of finite verb forms. Dialogic style and descriptiveness are also manifested through the use of the participial adverb which is a key MSD tag specific to OFFENSIVE subcorpus. The predominant form of the adverb (i.e., *sodeč /judging from/*) is mainly used in combination with 2nd person verb forms. In general standard Slovene (as represented in the GigaFida 2.0 corpus), this adverb is predominantly used in printed periodicals, which makes it interesting that such adverb should appear as a key feature of offensive online comments. This suggests that users try to objectivize and reinforce their argument by mirroring the style of printed publications (***Sodec** po tvojih stavkih si ti nepismena in potrebna stara kura /**Judging** from your sentences you are the illiterate and horny old hen/*).

Generalization and action-orientation. Typical grammatical features of violent comments indicate generalizations and incitement to action. First, generalization can be observed on the level of the grammatical person. The analysis showed a high proportion of 3rd person personal pronouns, and 3rd person verbal forms (in comparison to 1st and 2nd person forms, as well as in comparison to offensive and non-SUD comments). The third grammatical person indicates the non-participant of the conversation and can have human or non-human referent (Toporišič, 2004). As such it can be used to express generalizations, a type of categorization, that can be ideologically consequential since generic *they* often refers to people viewed as outsiders (Scheibman, 2007). The keyness of the (1st and) 3rd person pronouns might thus be explained with the concept of othering which states that SUD is built on the opposition of the in-group and out-group. This especially pertains to violent comments where we can observe a stronger presence of 1st and 3rd person verb forms (as opposed to offensive comments where the 2nd person is as frequent as 1st person) which shows that the division between the two groups stand out more in the violent comments.

In addition, prevalence of the 3rd person verb forms coupled with the finding on predominance of qualifying demonstrative pronouns explained above further suggests that the non-active participant of the discourse and their characteristics are in the spotlight of the comment. Furthermore, strong presence of 1st person plural verb forms in the VIOLENT subcorpus with respect to OFFENSIVE and NON-SUD subcorpus »inherently reports opaque referentiality« (Fidler and Cvrček, 2019). The tendency for generalization is also shown through the use of general pronouns and numerals that were identified as key forms in both SUD subcorpora. However, key numeral forms are, apart from those that convey indefiniteness and generalization, also used to underline the statement and could as such be used to underline the action.

We have claimed that violent comments are more action-oriented. The analysis showed that almost half of all key verb forms are represented by non-finite verb forms, namely participles and infinitives. In fact, the infinitival verb form represents the most key MSD tag of the VIOLENT subcorpus. A closer look at these forms reveals that the participles describe neutral processes, while the infinitives evoke violent actions. Action-orientation as well as the tendency for generalizations can be observed through the use of non-finite verb forms since finite verbs provide explicit reference and option for feedback, while in noun-heavy, nominal phrases the action is taken for granted (Fidler and Cvrček, 2019). The latter could therefore also be applied to phrases with non-finite verbs forms. Action-orientation can further be supported with the results of frequency analysis of verbal tenses which shows that there is from 1.6 to almost 2 times more future tense in the

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VIOLENT subcorpus with regard to the OFFENSIVE or NON-SUD subcorpus, respectively.

Action-orientation once more, despite less prominently, manifests through the use of grammatical person. We observed relatively high keyness of 1st person singular verb forms (esp. future tense forms) which points to explicit speaker agency and their intention to claim credit for their actions (Fidler and Cvrček, 2019). In addition, action-orientation can also be detected through the use of numeral forms that underline the meaning and through the use of prepositions which appear more frequently in violent comments than in general Slovene. The analysis showed that violent comments are characterized by prepositions in the accusative case. Closer examination revealed that they are more frequent in violent comments than in general standard Slovene and that they are predominantly used to form inappropriate constructions. This might be a promising finding with regard to automated detection of SUD.

Graduality. Based on our results, we were able to detect a gradual amplification of observed phenomena proportionately to the severity of SUD (i.e., non-SUD→offensive→violent comments). First, a comparative analysis of the grammatical case of proper nouns showed that the share of all of the cases individually gradually increases from the socially acceptable towards the least socially acceptable comments, except for the nominative case where the share increases in the opposite direction. The only deviation is the dative case which is most prominently used in the OFFENSIVE subcorpus. Next, comparative analysis of proper nouns showed that in all three subcorpora, proper nouns include more personal names than geographical names. The share of personal names (including direct individual addresses) decreases in the direction from socially acceptable towards the least socially acceptable comments, while the share of geographical names increases in this same direction. Both grammatical case and proper noun distribution support the claim that SUD comments in general are less dialogic than non-SUD.

In addition, graduality can be observed in the distribution of the grammatical person. Analysis of grammatical person distribution among verbal forms showed that despite the fact that 3rd person verb forms predominate in all three subcorpora, the share of 3rd person forms actually increases in the direction from non-SUD to violent comments. On the contrary, the share of 1st person verbal forms is smaller in the two SUD subcorpora than in the non-SUD subcorpus. The 1st person singular verb forms, for example, are most used in non-SUD comments. This is not unexpected since the »first person singular is the prototypical site for expression of speaker point of view« (Scheibman, 2007) with which the speaker overtly takes the responsibility for the statement (Fidler and Cvrček, 2019). It should be noted, however, that since we are analyzing comments to media posts of which a considerable part is dedicated to reporting events, such distribution of grammatical person could be expected to a certain extent. Nevertheless, this cannot fully explain the identified graduality phenomenon.

Next, graduality can be observed in the use of demonstrative pronouns. The analysis showed that the less formal the language is (i.e., from general standard language (GigaFida 2.0) towards netspeak (Janes corpus), non-SUD, offensive and violent comments), the higher the share of qualifying demonstrative pronouns is. We should note, however, that comparison of the results with the non-SUD subcorpus showed that the degree of social unacceptability pertaining to the comments under scrutiny might not be the sole influencing factor. The fact that the share of qualifying demonstrative pronouns is only slightly higher in SUD than in non-SUD comments indicates that the discourse topic might be impacting the results as well.

Throughout our analysis of offensive and violent comments we have noticed that graduality also applies to the use of future tense since the share of future tense in violent comments strongly exceeds the share in offensive as well as non-SUD comments. In addition, we observed that the forms in dual number are only typical of offensive comments. Comparative analysis once more confirmed the phenomenon of graduality: if there are 0.27% of verb forms in dual[13] in the NON-SUD subcorpus, there are 0.14% per million in the OFFENSIVE subcorpus and only 0.11% in the VIOLENT subcorpus. In addition, this again shows that offensive comments are more dialogic and personal than violent comments.

7. Conclusion

The aim of this paper was to produce a grammatical description of SUD on the level of word classes and morphosyntactic labels in order to answer the question whether SUD is realized through any specific grammatical features. To this end, we performed a comparative analysis of the FRENK corpus that contains Facebook comments and contrasted two SUD subcorpora (offensive and violent comments), and a NON-SUD subcorpus.

We found that the grammatical skeleton of SUD has its distinctive characteristics in comparison to non-SUD, but that the differences are subtle. Furthermore, we showed that these differences increase proportionately to the degree of social unacceptability of comments. The more we move away from socially acceptable discourse, the larger the set of specific grammatical features or the larger their share. For example, frequency-wise, internal word class distribution of offensive comments differs from that of non-SUD comments only in the representation of residuals, while violent comment-specific are also pronouns and prepositions. Likewise, the graduality can be observed, for example, in the use of qualifying demonstrative pronouns or future tense where their frequency increases proportionately to the intensity of SUD in the comments.

The analysis shows that offensive comments have greater similarities with non-SUD than with violent comments. We could observe that with respect to SUD comments, non-SUD comments are characterized by discursive function words. On the other hand, content words and function words used to form complex sentences prevail in SUD comments. Based on the analysis of key morphosyntactic tags, we can conclude that offensive comments tend to be more dialogic and descriptive than violent comments (e.g., by using more 2nd person and possessive forms), whereas violent comments exhibit a greater inclination toward generalization and action-

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[13] Other word classes also agree in number and could therefore be used to check the frequency of grammatical forms in dual

number. We opted for verbs because forms in dual are more frequently preserved with verbs that for example with nouns.

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orientation (e.g., by using more infinitives and future tense).

This study does not offer a full description of grammatical structure of SUD, but rather indicates the tendencies of online SUD on the morphosyntactic level. The main limitation pertains to the small size of the VIOLENT subcorpus which prevented generalizations of certain infrequent phenomena but the issues of size were taken into account in study design and the selection of the analytical techniques used. It should also be noted that the dataset was automatically tagged which does not ensure error-free output, but based on manual inspection of random samples of the annotated concordances in the qualitative analysis, the quality of the output was sufficient for this study.

The main contribution of this study is that it shows that the grammatical footprint of SUD is different from non-SUD (e.g., prevalence of future tense and 3rd person verbal forms, higher frequency of prepositions, prominent use of qualifying demonstrative pronouns and infinitives). This could be a promising finding for the development of automated detection of SUD. In our future work, we envisage supplementing these results with lexico-syntactic analysis and observations of the phenomenon at higher levels of linguistic descriptions. Furthermore, based on the prominent features from this study, we plan to analyse certain stylistic aspects of SUD, such as the expression of agency.

8. Acknowledgement

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