#covid is war and #vaccine is weapon?
COVID-19 metaphors in India

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Abstract

Metaphors are creative cognitive constructs that are employed in everyday conversation to describe abstract concepts and feelings. Prevalent conceptual metaphors such as WAR, MONSTER, and DARKNESS in COVID-19 online discourse sparked a multi-faceted debate over their efficacy in communication, resultant psychological impact on listeners, and their appropriateness in social discourse. In this work, we investigate metaphors used in discussions around COVID-19 on Indian Twitter. We observe subtle transitions in metaphorical mappings as the pandemic progressed. Our experiments, however, didn't indicate any affective impact of WAR metaphors on the COVID-19 discourse.

1 Introduction

Metaphors are cognitive artefacts to anchor one's thoughts and navigate a situation whether it is social, political or even financial. Conceptual metaphors restructure an abstract domain in terms of a relatively concrete domain, influencing how we perceive reality [Lakoff and Johnson, 1980]. Consider the conceptual metaphor, "DREAMS are BUTTERFLIES". Here, the abstract domain, DREAMS is mapped to a more concrete domain as that of BUTTERFLIES evoking meanings such as *vibrant* and *delicate*. Linguistic metaphors are the manifestations of these conceptual mappings in text. For instance, Her eyes were full of *vibrant* dreams.

India reported the first case of COVID-19 infection in January, 2020 [Andrews et al., 2020]. Soon after that, various control measures including the restriction on international travel, screening of air passengers and institutional quarantine were implemented to curb the infection. The government of India imposed the first nationwide lockdown[1]

from Mar 25, 2020 to Apr 14, 2020 as a preventive measure to curb COVID-19.

Various conceptual metaphors with source domains such as WAR (*defeat the virus*), HAMMER/LANDSCAPE (*flatten the curve*) and even MONSTER (*grappling with virus*) were used to communicate state's guidelines as well as reactions to situations arising due to the pandemic [Ruão and Silva, 2021]. In the mapping, COVID-19 is WAR, healthcare staff have been reconceptualised as *warriors*, and the citizens as *soldiers* fighting unitedly against the *enemy* COVID-19. Flusberg et al. [2018] advocate the use of domain WAR to deliver urgent communication infused with motivation. Consider another phrase "*Covid 2.0: Threat of an administrative cytokine storm building up in India*"[2]. Here, administration's RESPONSE is being compared to a biological phenomenon, CYTOKINE STORM to emphasize the lack of attention to ground-reality while drafting COVID-19 protocols. This mapping does bundle subtle aspects such as *failure to identify key points of action*, *overly restrictive protocols* and its resultant *undesired effect on citizens*.

Another direction of research on COVID-19 metaphors reflects on the appropriateness of these cognitive constructs in COVID-19 discourse. There is widespread discontentment against re-imagining the pandemic using source domains such as WAR or MONSTER which may negatively manipulate the understanding of the society. World Emergency COVID-19 Ethics (WeCope) Committee advise against the use of WAR metaphors as it instills fear amongst masses and leads to stigmatization towards those who do not respect the guidelines [WeCope, 2019]. Höijer [2011] calls out the use of metaphors as an instrument by the state to defend its actions and policies during the pandemic. Por-

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[1] 'Coronavirus in India: 21-day lockdown begins; key highlights of PM Modi's speech', Business Today (Mar 25, 2020). Available at LINK

[2] Blog by Samir Shukla, Times of India (Mar 30, 2021). Available at https://timesofindia.indiatimes.com/blogs/science-nomad/

traying the pandemic as a WAR legitimizes state-imposed violence and excessive control. Kahambing [2021] warns against the portrayal of COVID-19 virus as Mother Nature's way to clean the planet. Sabucedo et al. [2020] further demonstrated the ill-effect of commonly used violent source domains such as WAR, MONSTER in COVID-19 discourse on public health. Semino [2021] thus emphasizes the need to reframe COVID-19 metaphors. Rohela et al. [2020] speak in favour of correcting the WAR narrative in COVID-19 discourse using substitute domains such as CRICKET and DANCE. Inspired from this debate, we study the metaphors embedded in Indian tweets posted during the pandemic. The main contributions of this study are:

- We manually identify COVID-19 conceptual metaphors used in headlines of major Indian newspapers published from March'20 to May'21.

- We detect linguistic metaphors embedded in Indian tweets on COVID-19 posted between Mar'2020 to Jul'2021 by fine tuning BERT model.

- Using diachronic embeddings, we detect the transition in manifestations of conceptual metaphors as the pandemic progressed.

- We study the hypothesis if the conceptual metaphor WAR has an affective influence on COVID-19 discussion on Twitter.

The rest of the paper is organized as follows. We discuss the prior works on conceptual metaphors in context of the ongoing global pandemic in Section 2. We describe data collection and the procedure to frame different conceptual metaphors in Section 3. Section 4 discusses the evolving interpretation of mappings as well as the role of WAR metaphors on COVID-19 discourse. We conclude our work in Section 5.

2 Related Work

Wicke and Bolognesi [2020] studied the source domain WAR and how its pervasive nature when describing diseases, plays a role in the COVID-19 dialogue. Prior research discusses the role of conceptual metaphors in moulding public perception in India [Rohela et al., 2020, Wagener, 2020]. Das [2020] describes the crisis and wrath faced by marginalized sections of society due to

WAR centered analogies by the Government of India. The readers are encouraged to refer [Rai and Chakraverty, 2020] to know more about metaphors and theories.

Our work differs from the existing works in multiple ways. First, our work focuses on the COVID-19 metaphors of India. We detect metaphorical tweets and also label the underlying conceptual mapping. We study the transition in the linguistic metaphors as the pandemic progressed. Taking inspiration from WEAT [Caliskan et al., 2017], we measure affective influence of metaphorical tweets on COVID-19 discourse as well as see if WAR metaphors indeed present a grimier picture. To the best of our knowledge, this is the first computational approach designed to understand metaphorical themes in India during the pandemic.

3 Discovering Metaphors of COVID-19

3.1 Dataset

Twitter is a micro blogging platform, used widely during the pandemic to express one's feelings and seek help. We extracted Indian tweets on COVID-19 posted between March'20 to July'21 using *snscrape*[3] library. A tweet is considered a COVID-19 tweet if it has at least one COVID-19 related hashtag such as *#coronavirus, #covid19, #quarantine, #covid_19, #vaccine, #TogetherAgainstCovid etc*. To ensure that the extracted tweets are from India, we check if the location attribute within the tweet object pulled by snscrape contains "India". Our dataset comprises of over $1.3M$ tweets.

3.2 Filtering literal tweets

To filter out literal tweets, we fine tuned a BERT model [Devlin et al., 2018]. Two human annotators were asked to tag a random subset of collected tweets into categories *metaphor* and *not metaphor*, for the task of finetuning. Both annotators are undergraduate students aged between $19 - 22$, proficient in English with sufficient knowledge of Indian society. The guidelines shared with annotators to identify metaphors in tweets is as described by Pragglejaz group [Group, 2007]. Below are the steps:

- Read the text to get a general understanding of the meaning

- Determine the lexical units

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[3]https://pypi.org/project/snscrape/

– Establish the contextual meaning of the unit
– Determine if it has a more basic meaning

- Does the contextual meaning contrast with the basic meaning but can it be understood in comparison with it?

- If yes, mark the unit as metaphorical.

A total of $3.7K$ tweets were tagged by annotators, out of which $1.8K$ were marked as metaphorical. We obtained Cohen's kappa of 0.719 on a common sample of 100 tweets indicating good reliability of annotation. The hand annotated dataset of tweets is available at link[4].

We split this dataset into a training set with 3006 tweets, test and validation sets with 376 tweets each. On finetuning BERT for 25 epochs with a learning rate of $2e^{-5}$, we obtained an accuracy of 74.4% on the validation set. On the test set, we achieved accuracy of 72.6% with a precision of 77% and recall of 67%.

We used this finetuned model to identify metaphorical tweets from the dataset collected in Sec. 3.1. Out of almost $1.3M$ tweets, the system predicted $264K$ tweets as metaphorical. We hereafter indicate this set of metaphorical tweets as $\mathbf{M_0}$.

3.3 Framing the source domain

The next task is to derive a list of conceptual metaphors used in COVID-19 metaphorical tweets from India. #ReframeCovid[5] is one such ongoing open-source work which collects metaphorical mappings present in global COVID-19 tweets and related media.

For our study, we created a list of metaphorical mappings S_0 (of the form SOURCE DOMAIN is TARGET DOMAIN) inspired from #ReframeCovid along with the manual analysis of major Indian newspaper headlines on COVID-19 published during Mar'20-May'21. Few examples are VACCINE is SHIELD, COVID-19 is TEACHER and PANDEMIC is SPEEDBREAKER. The complete list of mappings is available at link[4].

Prior works [Choi and Lee, 2019, Wicke and Bolognesi, 2020] used websites[6] to extract lexical units that they then use to frame the source

domains. However, we found that the these lexical units are not used commonly in Indian English. We thus use pretrained *word2vec* embeddings [Mikolov et al., 2013] to expand the set of relatable lexical units/concepts close to a source domain $s \in S_0$. We train a *word2vec* skip-gram [Mikolov et al., 2013] model on the 264K tweets in $\mathbf{M_0}$ to derive the lexical units . We define lower and upper thresholds for cosine similarity to filter out overly specific as well as generic concepts. The thresholds are decided empirically. The set P_s denotes the set of lexical units that we use to frame source domain $s \in S_0$. Below are few lexical units from the set P_{war}:

fight, battle, defeat, enemy, soldier, menace, biological_war, weapon, battlefield, soldier, defend, warfare, bio_war, unseen_enemy, hero, confrontation, army, combat, biowar, invasion, biowarfare, destruction, war, attack, superpower, destruction, fighting, standoff, invisible_enemy, invade, invasion

We manually filter the list to make it contextually suitable for COVID-19 discourse. For instance, the above list for the source domain WAR comprises of words such as *menace*, *hero*, *superpower* which was used in literal sense while discussing the pandemic. Therefore, these words are removed from the list. This forms the basis for identifying underlying source domains in Indian metaphorical tweets.

3.4 Identifying Conceptual Metaphors in Tweets

In this section, we describe our approach to identify the inherent conceptual mapping that is, TARGET DOMAIN is SOURCE DOMAIN in the tweets.

3.4.1 Labeling Source domain

We categorize a tweet t to source domain $s \in S_0$ if t consists a word $w \in P_s$. There is a possibility that a tweet may have words related to two or more source domains. For our analysis, we have eliminated these tweets and will only be utilising tweets that uniquely indicate a particular source domain. Below are few example tweets:

" *A **storm** is coming. Brace yourselves. Impact on Indian economy will be severe. I have started studying and will write a detailed article on it. Will publish soon. #coronavirusindia* ". - COVID-19 is STORM

"*In a #World divided by #religion, greed and*

Table 1: Top-10 Source Domains

Source Domain	#Tweets
WAR	48415
MONSTER	2884
SUCCESS/CHALLENGE	1382
LESSON/TEACHER	1252
STORM	1213
DARKNESS	1080
PUNISHMENT/BANE	851
PRISON	851
LUXURY	602
CATALYST	542
SAVIOR	486
SHIELD/BARRIER	426

*inflated egos, it took an **invisible** virus to instill a common fear. And we still believe that #human beings are the most intelligent species on this planet. #coronavirus"* - COVID-19 is DARKNESS

*"Janata Curfew on 22nd March 2020 from 7 AM to 9 PM AND "Ghantanad" on 5 PM, which will help Indians to fight against the corona viruse. It will help to kill the **devil**"* - COVID-19 is MONSTER

We list the Top-10 source domains on the basis of their volume in M_0 in Table. 1. It may be noted, this list is derived using $s \in S_0$. It is thus possible that there are undetected source domains $s \notin S_0$ with metaphorical tweets in our dataset. From Table. 1, we observe that WAR is the most often used source domain to describe COVID-19 related events. Source domains such as MONSTER, CHALLENGE, LESSON, STORM also contribute significantly to the discourse.

3.4.2 Assumption regarding target domain

Since the tweet extraction process focused only on tweets with COVID-19 related hashtags, it is safe to assume that all tweets are inherently descriptors of COVID-19 and related dialogue. We initially considered segregating tweets with vaccine related hashtags to the target domain VACCINE. We discovered a total of 3701 metaphorical tweets on VACCINE. On careful analysis, we discovered that tweets tagged with VACCINE related hashtags, were also essentially reconceptualizing COVID-19/PANDEMIC. Few such tweets are provided below.

*"Another **deadly** wave of Covid19 is ravaging countries including India Stricter observance of*

anti Covid protocol and stepping up vaccination manifold are urgently called for to face the crisis #tkan #vaccine" - VIRUS/COVID-19 is MONSTER

*"Got vaccinated today with first dose of indigenously developed #Covaxin Thank you narendramodi. Thank you all the scientists who worked hard to invent the vaccine in record time. Together India will **defeat** COVID-19."* - COVID-19 is WAR/VIRUS is ENEMY

Due to the plentiful presence of such tweets in the VACCINE targeted set, we decided to go ahead with COVID-19 as the sole target domain for further analysis.

4 COVID-19 Metaphors of India

4.1 Evolving Conceptual Mappings

As the pandemic progressed, the conceptual mappings describing COVID-19 also evolved. Consider the topic of VACCINE, which was initially conceptualized as a WEAPON[7] to decimate the *enemy*, COVID-19 virus. Later, VACCINE evolved into a PASSPORT/TICKET[8] to freedom which allowed unrestricted movement and gradually, it metamorphosed to LUXURY[9] which was rare and accessible to only few.

In this section, we study the evolving conceptualization of COVID-19 through the notion of semantic shift. To compute semantic shift, the standard approach is to first slice a corpus with respect to time. The granularity for time slicing may vary depending on the problem statement. For our analysis, we consider the duration (a) t_0: *during lockdown* i.e. Mar'20 to Jun'20 (b) t_1: *post lockdown* i.e. July'20 to Oct'20 and (c) t_2: *second wave* i.e. Mar'21 to Jun'21. Given corpora $\mathbf{C} = [C_{t_0}, C_{t_1}, C_{t_2}]$, the task is to analyse the change if any in semantic neighbourhood of COVID-19. Here, C_{t_i} indicates the set of metaphorical tweets posted during the time interval t_i.

On slicing the set of metaphorical tweets M_0 from Sec. 3.2, C_{t_0} has 136K tweets, C_{t_1} has 39K tweets and C_{t_2} contains 65K tweets. We learn word embeddings using *word2vec* skip-gram architecture [Mikolov et al., 2013] for the first phase using

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[7]The Hindu, May 26, 2021. "Vaccination is our only weapon" available at LINK

[8]The Diplomat, July 12, 2021. "Vaccine Passports: Ticket to Freedom or Path to a Divided World?" available at LINK

[9]Quartz India, Aug 2, 2021. "India's vaccine supply is a curious mix of abundance and shortage" available at LINK
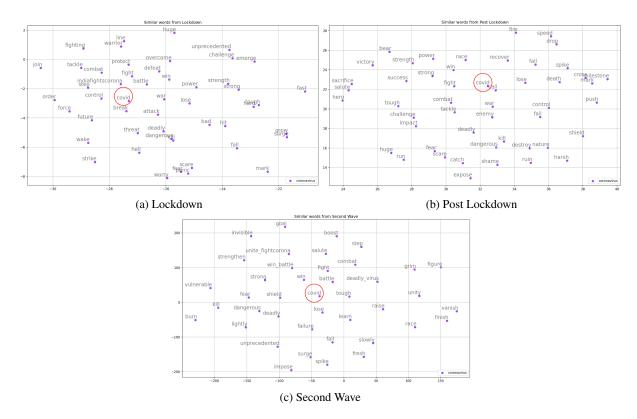
(a) Lockdown

(b) Post Lockdown

(c) Second Wave

Figure 1: t-SNE representation of diachronic word embeddings

time-specific corpora C_{t_0}. Here, the vectors are randomly initialized. For next two phases, we update the embeddings initialized with the embeddings learnt from the previous phase. In order to compare word vectors from different time-periods, we align word vectors to the same coordinate axes using orthogonal Procrustes [Hamilton et al., 2016].

4.1.1 Analysis

To analyze the semantic shift in the conceptualization of COVID-19, we plot the t-SNE visualization [van der Maaten and Hinton, 2008] in Fig. 1 for all phases.

Fig. 1-a visualises the semantic concepts related to COVID-19 based on tweets posted in t_0 phase. Fear and determination are reflected from the metaphors such as *scare, fear, panic, worry, deadly, dangerous* and *combat, win, threat defeat, protect* respectively used in this phase. COVID-19 is conceptualized as MONSTER, and even as an OBSTACLE/GAME (*challenge, overcome, strike, tackle*). This overview is consistent with the mixed feelings of fear and hope in the early stages of COVID-19 in India.

The post lockdown embeddings are aligned on t_0 embeddings. We present *covid* related concepts for this period in Fig. 1-b. Metaphors such as *fight,*

call, win, race are getting closer to COVID-19 indicating the positive attitude. MONSTER related words such as *fear, scare, deadly* are moving away. BARRIER metaphors such as *shield* and other units such as *nature*, *shame*, *ruin* start to appear in this phase.

Concepts related to *covid* from the Second wave embeddings aligned on t_1 are depicted in Fig. 1-c. Defensive WAR metaphors such as *failure*, *lose*, *tough* and *shield* are getting closer. DARKNESS related metaphors such as *grim*, *vanish*, *invisible* can be seen. MONSTER related metaphors have come closer when compared to Fig. 1-b. Orientational metaphors such as *fall*, and *surge* are also present.

4.2 Linguistic Metaphors

To identify linguistic metaphors of each phase, we extracted the top-1000 words closest to *covid19* from each of these phases. We manually go through this list to identify linguistic metaphorical units. Relevant tweets were retrieved when needed to substantiate the metaphoricity and rule out the literal use. We present these linguistic metaphors in order of increasing distance from *covid19* in Table 2.

The foremost observation is the pronounced presence of WAR metaphors across all phases. This

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Table 2: Linguistic Metaphors of COVID-19

Phase	Linguistic metaphors (w.r.t cosine distance from COVID-19 in vector space)
Lockdown (t_0)	fight, indiafightscorona, battle, crisis, deadly, break, war, defeat, support, control, win, combat, attack, force, team, protect, hide, coronawarrior, threat, kill, dangerous, suffer, prepare, impact, isolation, hit, border, hell, solution, strategy, survive, fighting, coronafighter, unite, develop, strength, scary, destroy, isolate, disaster, tackle, scare, beat, deadly_virus weapon, soldier, fighter, shut, shame, lesson, cover, enemy, scared, win_battle, win_war, danger, devastating, catch, surge, tracking, deep, victory, vulnerable, evil, cut, surpass, giant, expose, break_chain, boom, unlock, push, hail, chain, flatten_curve, heal
Post-Lockdown (t_1)	indiafightscorona, break, stand, block_case, battle, line, strong, support, war, combat, save, warrior, frontline, duty, fighter, leader, play, win, strategy, fear, hit, control, covidwarrior, scary, deadly, attack, base, push, tackle, brave, hell, team, force, defeat, game, fall, race, power, action, united, build, struggle, beat, dangerous, kill, strike, panic, powerful, peak, danger, stage, crusader, frontline_warrior, tough_time, scared, deadly_virus, deep, crisis, hide, throw, win_battle, lose_life, rage, threat, grim, nightmare, block, havoc, unlock, fire, fighting, flood, wall, victory, impact, kick, boost, storm, invisible, weapon, disaster, shoot
Second Wave (t_2)	battle, support, deadly, crisis, strong, win, suffer, defeat, hit, indiafightscovid, handle, dangerous, safety, warrior, control, strength, protect, overcome, fear, difficult, attack, tough_time, hard, scary, war, kill, struggle, win_battle, tough, scare, pain, beat, peak, panic, strike, grim, catastrophe, save_life, unite_fightcorona, hell, shame, difficult_time, lose_life, combat, frontline_worker, stay_united, devastating, disaster, wake, hero, breakthechain, powerful, shift, destroy, fighting, deadly_virus, indiafightsback, blast, tackle, seek, shocking, dip, weapon, force, rule, frontline_warrior, game, chance, strategy, decline, hang, target, lightly, enemy, border, wish_speedy, lose_battle, threat, loss, shall_pass, push, catch, build, breach, blame, player, rage, bio_bubble, shock, frontline, hit_hard, nightmare, gloom, danger, tsunami, tear, kick, casualty, terrible, brutal, lethal, mark, pressure, devastate, devastation,

includes *enemy, fight, defeat, attack, weapon, battle, casualty* etc. We further note the presence of domains including MONSTER (*deadly, scary, giant, fear*), GAME (*team, race, tackle, push, player, strike*), STORM/DISASTER (*crisis, devastate, havoc, flood, hail, tsunami*), DARKNESS (*hide, cover, nightmare, gloom, grim, invisible*), HAMMER (*beat, flatten_curve, hit, impact*) and ACCIDENT (*chance, rage, shock*). There are also other metaphors such as *dip, surge, blast, tear, kick, build, shame, hell, evil, heal, chain, deep* in the corpus.

During t_0 phase, the closest words are *fight, battle, crisis, deadly, break, war, protect, hide* etc. It may be noted that India had only few reported cases of COVID-19 in comparison to t_1 phase. Nevertheless, the metaphors are relatively grim and fear inducing. The fear of unknown and the lack of confidence on Indian healthcare might be the reason behind these overly gloomy tweets.

We note increased use of GAME metaphors in t_1 phase when compared to other two phases. It may be noted that Post-Lockdown is the phase where India faced the first wave of COVID-19. COVID-19 is discussed using concepts such as *race, action, kick, team* and *block*. Moreover, even WAR metaphors are used in more authoritative fashion when compared with the Second Wave phase. This indicates the transition in lexical manifesta-

tions of WAR metaphors while discussing COVID-19. Metaphors such as *duty, strategy, push, tackle, brave, fighter, crusader* convey a sense of control. The metaphors used in this phase indicate a more confident and controlled reaction to the pandemic in comparison to t_0 and t_2 phases.

We see the highest volume of metaphors in *Second Wave* phase. There are more negative metaphors such as *battle, deadly, crisis, suffer, defeat, dangerous* closer to COVID-19 when compared with the previous two phases. There are also increased occurrence of DISASTER/DARKNESS metaphors such as *grim, catastrophe, devastating, disaster, panic, nightmare, gloom, danger, tsunami* etc. We also note metaphors such as *breach, blame, rage, pressure* from GAME domain indicating the shift in meaning of GAME metaphors. There is a clear difference in the underlying emotional tone of metaphors when compared with t_1 phase. The first wave (t_1) definitely saw a controlled strategy with manageable COVID-19 cases whereas the second wave (t_2) witnessed more suffering, panic and lack of control which is also evident from the metaphors.

4.3 Impact of WAR metaphors on COVID-19 online discourse

To better understand the role of WAR metaphors in COVID-19 discourse, we analyse if metaphors based on WAR mapping indeed paint an overly

grim picture contrary to the true reality of COVID-19 in India. We take inspiration from Word Embedding Association Test (WEAT) proposed by Caliskan et al. [2017] to identify the polarity of associativity between WAR metaphors and COVID-19 concepts. We define our hypothesis $\mathcal{H}_a$ as " WAR has an affective influence if COVID-19 concepts show associativity towards negative or positive attribute sets." The null hypothesis $\mathcal{H}_o$ therefore is " WAR metaphors have no affective influence on the meaning of COVID-19 concepts."

Let $\mathcal{D}_o$ be the dataset of non-metaphorical Indian tweets as predicted by the fine-tuned BERT model in Sec. 3.2. Let $\mathcal{D}_s$ be the set of predicted metaphorical tweets belonging to source domain $s \in S_0$. For our analysis, we first learn word embeddings using skip-gram word2vec model on the dataset $\mathcal{D}_o$. These representations will serve as the baseline for our analysis. We fine tune the learnt embeddings using $\mathcal{D}_s$ to capture if there is a change in the meaning of COVID-19 concepts due to the source domain s.

For analysis, let $\mathbf{X}$ be the set of COVID-19 target words, and $\mathbf{P}$, $\mathbf{N}$ be the attribute sets namely *positive* and *negative* respectively. We define $\delta(\mathbf{X}, \mathbf{P}, \mathbf{N})$ as the differential association of the target words embeddings for $x \in \mathbf{X}$ trained on $\mathcal{D}_o$ and $\mathcal{D}_o + \mathcal{D}_s$ with the attribute sets $\mathbf{P}$ and $\mathbf{N}$ as in eq. 1.

$$\delta(\mathbf{X}, \mathbf{P}, \mathbf{N}) = \sum_{x \in X} f(\vec{x}_o, \mathbf{P}, \mathbf{N}) - \sum_{x \in X} f(\vec{x}_s, \mathbf{P}, \mathbf{N})$$
(1)

where

$$f(x, \mathbf{P}, \mathbf{N}) = \mu_{p \in \mathbf{P}} \cos(x, p) - \mu_{n \in \mathbf{N}} \cos(x, n)$$

- $\vec{x}_o$ refers to the embeddings for $x \in \mathbf{X}$ learnt on $\mathcal{D}_o$

- $\vec{x}_s$ refers to the embeddings for $x \in \mathbf{X}$ fine tuned on $\mathcal{D}_s$

- μ indicates mean,

- $cos(\vec{a}, \vec{b})$ denotes the cosine similarity between the vectors $\vec{a}$ and $\vec{b}$.

Each word in sets $\mathbf{X}, \mathbf{P}$ and $\mathbf{N}$ has occurred at least 20 times in both corpus and are provided below:

$\mathbf{X}$ = { covid, corona, virus, lockdown, pandemic, coronavirus, health, hospital }

$\mathbf{P}$ = {hope, faith, strength, unite, support, care, survive, recover}

$\mathbf{N}$ = {death, panic, struggle, concern, stress, chaos, shortage, oxygen}

Using permutation test for sampling, we discovered that the domain WAR is more close to attribute set $\mathbf{P}$ with p-value of 0.98. We reject our hypothesis $\mathcal{H}_a$ due to high p-value. It is thus not evident from our experiments that WAR metaphors have statistically significant affective influence on COVID-19 domain. We further performed this analysis specifically for tweets posted during t_2 phase. However, our experiments did not reveal any affective influence exercised due to metaphors on the understanding of COVID-19. In future, we aim to design extensive experiments to understand the affective influence of different metaphorical themes on COVID-19 discourse.

5 Conclusion

Collecting data for any figurative text related task is a big challenge. Through this study, we release a hand-annotated set of $3.7K$ Indian tweets for metaphor related research. A wide variety of conceptual mappings were used in Indian newspapers while reporting COVID-19 situation in India. Nevertheless, we see a handful of these conceptual mappings in Indian tweets. WAR, MONSTER, DARKNESS and GAME are the most prominent conceptual metaphors in Indian tweets. Our results reveal the shift in the use of conceptual metaphors as the pandemic progressed. Despite intense discussions on the appropriateness of the conceptual mappings used during the pandemic, it is not evident from our experiments if WAR indeed led to an overly negative understanding of COVID-19 in India.

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