From disinformation to fact-checking: How Ibero-American fact-checkers on *Twitter* combat fake news

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Abstract

In recent years, the disinformation phenomenon, brought about by the ease with which fake news and hoaxes spread on social networks, has grown considerably. *Twitter*, especially, is a network that from the outset has been closely linked to news processes that are widely used by journalists. It has become a highly efficient means of spreading disinformation owing to its immediacy and capacity to spread contents. The microblogging network has attracted the attention of researchers and is a suitable subject matter for analysing how fact-checkers communicate as agents who nurture digital literacy in the general public to help them spot disinformation. The aim of this research is to characterise the use of *Twitter* by Ibero-American fact-checkers and to determine to what extent their posting habits influence interaction. To do so, the trending and timing for posts, the type of contents and resources used by each fact-checker and the interactions created on all levels are analysed. This research stated that Ibero-American fact-checkers throughout 2021 were highly active on *Twitter*. This was closely linked to the crises related to Covid-19. Communications from these organisations have helped to spread and reinforce their fact-checking and digital literacy mission, even though their performance is no more efficient in terms of the scope and impact of their work. The results show that boosting posts of reactive tweets, adjusting posting time to the *Twitter* dynamics and increasing the use of resources such as images and mentions are useful strategies for promoting interaction.

Keywords

Twitter; Fact-checking; Fact-checkers; Ibero-America; Latin-America; Spain; Portugal; Disinformation; Digital literacy; Media literacy; Transparency; Interaction; Engagement.

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1. Introduction

In recent years, the disinformation phenomenon caused by the easy spread of fake news and hoaxes on social networks, has grown immensely. International studies on activity on social media (*We are social*; *Hootsuite*, 2020; **Newman** *et al.*, 2020) reflect a concern about the problem of online disinformation and the suspicion users have about the content received by these means. **Guallar** et *al*. (2020) identified social networks as the main channel for disseminating hoaxes. The *European Commission* (2018) also linked the implementation of digital media to disinformation and called for online news transparency to be strengthened and media literacy improved.

Bernal-Treviño and **Clarés-Gavilán** (2019) mention two factors which increase exposure to inaccurate information, involuntary mistakes or deliberate deception.

- The first of these is the capacity users have to create and spread their own contents, which lack professional supervision and, hence, may be deceitful. By way of example, the study results from **Pérez-Curiel** and **Velasco-Molpeceres** (2020) on the posts about the *Process* (trial for Catalan independence leaders) on *Twitter* confirmed there was a link between authorship of fake news and private accounts. However, this type of contents may be perceived as valuable information by recipients. In fact, 56% of the interviewees in the *Digital 2021: Global Overview Report* (*We are social*; *Hootsuite*, 2021) stated that they used social media, with a high amount of user-generated content, to keep themselves informed. This percentage swings between 48% of individuals who are 55 years of age or over and 66% of 18-24 years ones, but this figure is high for any age group.
- The second factor concerns searching for clickbait (**Bernal-Treviño**; **Clarés-Gavilán**, 2019). The algorithms that select the posts shown to users are designed to prioritise contents that can easily be consumed and with great potential for going viral. Among these, long and sophisticated news items are rarely found. Although social networks such as *Facebook* or *Twitter* have taken measures to provide greater visibility to official news and have implemented strategies for minimising the spread of fake news, identifying them, labelling them, and penalising them (**Ardèvol-Abreu**; **Delponti**; **Rodríguez-Wangüemert**, 2020; **Salaverría** *et al*., 2020), a great deal of content whose truthfulness is questionable still manage to circumvent these filters.

The information obtained on social networks is not only consumed, but shared, too, regardless of whether it is true or not. **Ardèvol-Abreu**, **Delponti** and **Rodríguez-Wangüemert** (2020) detected both unintentional and intentional behaviour when fake news was spread on social networks. Consuming, creating, and sharing fake news and hoaxes, albeit unintentionally, helps disinformation spread. Just as set out by Del-Fresno-García,

> "however obvious the patterns are for how information disorders operate, it is still very hard to tell the difference between true and fake news" (**Del-Fresno-García**, 2019, p. 8).

One factor that has contributed to this process is the substantial amount of people who lack digital literacy. People born before the surge in digital media and social platforms have been exposed to tools that they have received no training on, and they have not been warned about the potential dangers of consuming content from these sources. Even literacy among digital natives is scarce, since there is not enough schooling on how to interpret new technologies (**Civila**; **Romero-Rodríguez**; **Aguaded**, 2020). This has led to the ideal conditions for creating a disinformed and vulnerable society.

1.1. Fact-checking actions

One example of the initiatives for combating disinformation are fact-checking actions taken in response to the request from the *European Commission* (2018) to improve media literacy. They are also an example of media competence tackling disinformation (**Portugal**; **Aguaded**, 2020). In the words of Lotero-Echeverri, Romero-Rodríguez and Pérez-Rodríguez, it means

> "media literacy for users and journalists is nurtured, by showing them a simple and replicable method for verifying information published in the media and on the social networks, prior to sharing them" (**Lotero-Echeverri**; **Romero-Rodríguez**; **Pérez-Rodríguez** (2018, p. 313).

Therefore, fact-checking initiatives from not only the media, but also from other types of companies and third sector institutions aim to debunk fake news and hoaxes, and help them identify them. In this way, disinformation and fact-checking act as opposing forces in the news (**Jiang**; **Wilson**, 2018).

Fact-checkers also respond to the premise of reinforcing transparency (*European Commission*, 2018), on clarifying the truthfulness or false nature of discourse spread in the public domain by means of different media. In order to fulfil this mission, these institutions must first demonstrate their own transparency. This is one of the fundamental attributes, which, according to **Singer** (2019), adds value to fact-checkers in the media. In fact, transparency in the checking process increases the usefulness and reliability of the services fact-checkers provide (**Brandtzaeg** *et al*., 2016).

In order to ensure excellence in fact-checking initiatives, in 2015 the *Poynter Institute* created the *International Fact-checking Network* (*IFCN*). Transparency of sources, funding, organisation and methodology is one of the requirements that fact-checkers must fulfil in order to participate in this network, according to the principles code (*Poynter*, 2021). Research by **Humpretch** (2020) shows that belonging to this institution ensures there are the highest standards in transparency.

Apart from meeting these standards, different studies have attempted to corroborate the usefulness of the work by fact-checkers, whose results vary. Some research cast doubt on the usefulness of fact-checking initiatives, proposing they have a limited impact on spreading rumours (**Margolin**; **Hannak**; **Weber**, 2018). Also, some even suggest they may help fake news go more viral than the rebuttal (**Pérez-Curiel**; **Velasco-Molpeceres**, 2020). Likewise, different experts assert these checks have little effect on the most polarised audiences (**Herrero**; **Herrera-Damas**, 2021).

However, some recent studies show encouraging results. Research from **Zhang** *et al*. (2021) and **Lee**, **Kim** and **Lee** (2022) on vaccines showed including fact-checking labels for disinformation helped create more positive attitudes to vaccines or to dispel myths about them. Experiments by **Chung** and **Kim** (2021) corroborated these results and also proposed that posting false news along with its rebuttal cancelled out the effect that the social network metrics had on sharing intention: without any fact-checking, the highest metrics created there was a greater inclination to share fake news, but when they were refuted, this effect was lost. Likewise, the experiment by **Hameleers** (2020) showed that carrying out digital literacy initiatives were more effective when combined with fact-checking than without it.

Therefore, the work of fact-checkers does help combat disinformation and how they communicate has become an interesting subject matter for research. If they communicate successfully, it is more likely that their checks will be spread adequately and will help to stem hoaxes and fake news, thus promoting greater transparency in the news world.

1.2. Use of *Twitter* as a tool for fact-checkers to disseminate their work

One of the communicative channels fact-checkers most use, apart from their own websites and *Facebook*, is *Twitter*. Of the 104 fact-checking initiatives registered by the *IFCN* in December 2020, 75% have an active account on this social network, as opposed to 72.1% that have a *Facebook* page (**Dafonte-Gómez**; **Míguez-González**; **Ramahí-García**, 2022).

Twitter has 397 million users in the world and ranks a modest sixteenth place on the list of the most used social networks and messaging services. This is a far cry from the over 2000 million uses for the leading platforms worldwide: *Facebook* and *YouTube*. However, if the Chinese market is excluded, *Twitter* takes fourth place in the favourite networks for users, behind *WhatsApp*, *Facebook,* and *Instagram*, but ahead of rising platforms such as *TikTok* (*We are social* and *Hootsuite*, 2021). Moreover, from the outset, *Twitter* has always been closely linked to news processes. **Carrera-Álvarez** *et al*. (2012) identified it as the network used most by journalists. This trend has been maintained over time, and **Coddington**, **Molyneux** and **Lawrence** (2014) concluded it was a suitable network for fact-checking. Likewise, some studies showed that people tended to be swifter at sharing fake news on *Twitter* than on other platforms, especially when they concerned politics (**Vargo**; **Guo**; **Amazeen**, 2017; **Vosoughi**; **Roy**; **Aral**, 2018).

Therefore, *Twitter* is an interesting topic for analysing how fact-checkers communicate as agents who combat disinformation. In fact, some studies on the effect or impact of fact-checking are based on *Twitter* (**Margolin**; **Hannak**; **Weber**, 2018; **Lee**; **Kim**; **Lee**, 2022). In Ibero-America, there is also research that covers the use of this network by one or several fact-checkers in different geographical locations, whether this be from a more generic approximation (**Magallón-Rosa**, 2018) or by analysing specific situations such as

- the "Procés" (**Pérez-Curiel**; **Velasco-Molpeceres**, 2021);
- Covid-19 (**Conde-Vázquez**; **Fontenla-Pedreira**; **Pereira-López**, 2020; **Ramon-Vegas**; **Mauri-Ríos**; **Rodríguez-Martínez**, 2020; **Ceron**; **De-Lima-Santos**; **Quiles**, 2021);
- the elections (**Magallón-Rosa**, 2019);
- the Russian invasion of the Ukraine (**Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022).

Apart from providing a quantitative description of fact-checking initiatives, most of these studies delve into the strategies used to refute rumours, the types of checks carried out and the topics they cover. Others focus on the degree of engagement reached and the resources used for improving interaction (**Ramon-Vegas**; **Mauri-Ríos**; **Rodríguez-Martínez**, 2020; **Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022).

The aim of this study is to broaden this research to encompass the whole of Ibero-America and a greater number of fact-checkers. It also seeks to gain an overall perspective more focused on the activity of the fact-checkers themselves and their repercussion rather than on the topics they cover.

> "Ibero-American fact-checkers published between three and 62 tweets per day in 2021"

1.3. Objectives

The aim of this research is to characterise the use of *Twitter* by Ibero-American fact-checkers in 2021 and to determine to what extent their posting habits influence interaction. For this purpose, the following specific objectives were set:

- To show the trending and timing for Ibero-American fact-checkers on *Twitter*.
- To analyse interactions on all levels (likes, retweets, replies and quotes).
- To explore the type of content posts and the resources used by each fact-checker and within the total sample.
- To identify the possible influence of the variables analysed in the interactions.

2. Methodology

The sample was made up of 18 fact-checkers in Ibero-America that on 17th January 2022 had either been verified by the *IFCN* or were in the process of being checked and had an active account on *Twitter* (Table 1). With the tool *4CAT* (**Peeters**; **Hagen**, 2022) a database was obtained with all the tweets posted by the 18 institutions in 2021. For each one, in a similar vein to that in previous studies (**Magallón-Rosa**, 2018, **Morejón-Llamas**; **Martín-Ramallal**; **Micaletto-Belda**, 2022), information was downloaded for the following variables: transmitter, date and time of posting, full text, language of post, type of post (proactive, retweet, citation or response), source of post, resources used (hashtags, links, images and mentions) and interaction data (likes, retweets, responses and citations).

Table 1. List of fact-checkers included in the sample

Fact-checker	Country	Language	State (17/01/2022)	*Twitter*	Number of tweets
AFP Checamos	Brazil	Portuguese	Verified	*https://twitter.com/AFPChecamos*	2,016
AFP Factual	Uruguay	Spanish	Verified	*https://twitter.com/AFPFactual*	2,512
Agência Lupa	Brazil	Portuguese	Verified	*https://twitter.com/agencialupa*	3,782
Aos Fatos	Brazil	Portuguese	Verified	*https://twitter.com/AosFatos*	2,216
Bolivia Verifica	Bolivia	Spanish	In process	*https://twitter.com/BoliviaVerif1ca*	2,128
Chequeado	Argentina	Spanish	Verified	*https://twitter.com/Chequeado*	4,745
Colombia Check	Colombia	Spanish	Verified	*https://twitter.com/colcheck*	4,261
Cotejo.Info	Venezuela	Spanish	Verified	*https://twitter.com/CotejoInfo*	7,621
Ecuador Chequea	Ecuador	Spanish	Verified	*https://twitter.com/EcuadorChequea*	1,551
EFE Verifica	Spain	Spanish	Verified	*https://twitter.com/EFEVerifica*	2,402
El Sabueso (*Animal Político*)	Mexico	Spanish	In process	*https://twitter.com/ElSabuesoAP*	4,119
Fast Check CL	Chile	Spanish	Verified	*https://twitter.com/FastCheckCL*	2,044
Mala Espina Check	Chile	Spanish	Verified	*https://twitter.com/MalaEspinaCheck*	3,210
Maldito Bulo (*Maldita.es*)	Spain	Spanish	Verified	*https://twitter.com/MalditoBulo*	9,448
Newtral	Spain	Spanish	Verified	*https://twitter.com/Newtral*	22,844
Polígrafo	Portugal	Portuguese	Verified	*https://twitter.com/Polígrafo*	2,336
Verificador de La República	Peru	Spanish	Verified	*https://twitter.com/VerificadorLR*	1,371
Verificat	Spain	Catalan	In process	*https://twitter.com/veri_fi_cat*	1,253

The application used to download data does not yield any information on the number of followers at the time each tweet was posted, so it was not possible to establish an interaction ratio per follower, nor to assess the trend in the size of the communities. To make up for this shortcoming, the number of followers for each fact-checker on 13/02/2022 was considered; this figure was not reliable for establishing the ratio mentioned, because it did not take into account what was trending in the community. However, fact-checkers could be grouped into large categories according to the amount of followers (>100.000 followers, between 50,000 and 100,000 followers and <50,000 followers) and their interaction could be evaluated according to the category they belonged to.

Moreover, in order to detect possible differences between the tweet topics with most interaction and those in the sample as a whole, an analysis was carried out of the key words related to topical aspects or content deemed significant by researchers. Key words were selected from a preliminary analysis of a random set of tweets, in which researchers inductively detected the most common terms the fact-checkers used to refer to various topics or contents, as well as specific formulas that some resorted to to determine whether a content was true or false (e.g. “NoComaCuento”) (Table 2). Topics were selected on the basis of identifying topics frequently dealt with by the fact-checkers according to previous studies (**Bernal-Triviño**; **Clarés-Gavilán**, 2019; **Blanco-Alfonso**; **Chaparro-Domínguez**; **Repiso**, 2021; **Ceron**; **De-Lima-Santos**; **Quiles**, 2021; **Dafonte-Gómez**; **Baamonde-Silva**, 2020; **García-Vivero**; **López**, 2021; **Humprecht**, 2019; **Magallón-Rosa**, 2018; **Salaverría** *et al*., 2020).

Table 2. Keywords identified for analysis

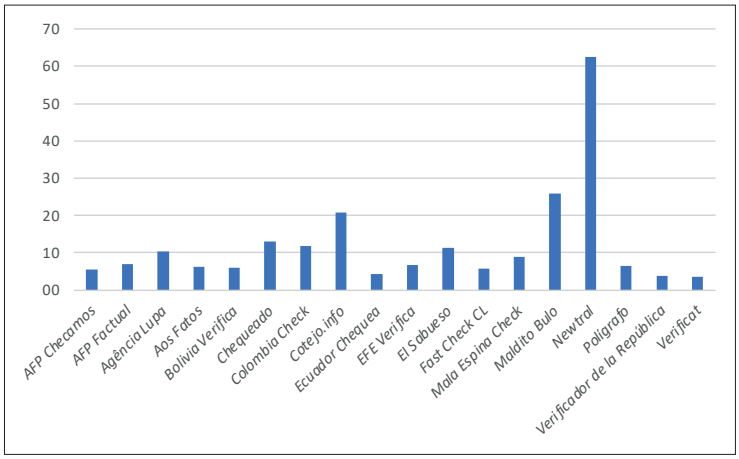
Truthfulness or falseness identifiers	*Bulo, cuestionable, desinformación, engañoso/a, exagerado/a, fake, falsedad, falso/a, farsa, impreciso/a mentira, "noco-macuento".* *"Biencompartido", cierto/a, "infodelabuena", verdad*
Topic identifiers	*Coronavirus, covid, negacionismo, pandemia, SARS, vacuna.* *Comicios, debate, elecciones, electoral.* *Ley, política/o.* *Aborto, hombre, feminazi, feminismo, feminista, gay, género, género fluido, lesbiana, LGTBI, machismo, machista, mujer, no binario, sexismo, sexista, trans (transgénero, transexual), violencia machista* (specifically). *Inmigrante, inmigración, migratorio/a.* *Calentamiento global, cambio climático, clima, contaminación, medio amiente, negacionismo, negacionista, polución, sostenibilidad.*

The term search was carried out in the three languages in the sample (Spanish, Portuguese, and Catalan), considering any possible variations and correcting any duplicated results. The search was first applied to all posts in the sample and, subsequently, to a selection of 5% of the posts with the greatest amount of weighed interactions (hereinafter ViP) for each fact-checker. This indicator (ViP) weighs the standard interactions on *Twitter* (like, reply, retweet and quote) according to a value allocated to their weight. The simplest interaction, marking a tweet as favourite or "like" received one point; sharing content received 5 points; responding to the tweet itself received 10 points and a cited tweet was equivalent to the sum of a response and a tweet or 15 points. Although the ViP was put forward by the authors, this metric is in keeping with the standards on how *Twitter* is typically used (**Boyd**; **Golder**; **Lotan**, 2010; **Comarella** *et al*., 2012) and with the values used by *Facebook*, as revealed by *The Wall Street Journal* (**Hagey**; **Horwitz**, 2021), which refers to the weight for each interaction in terms of their level of implication or proactivity.

3. Results

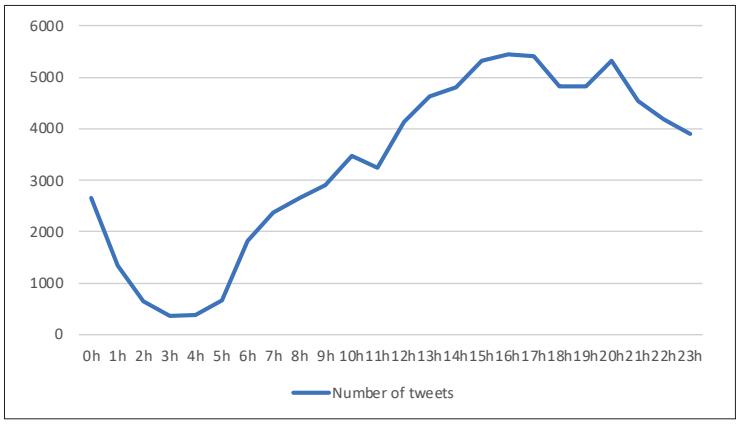
3.1. Posting patterns and tweet features

Among the 18 fact-checkers analysed, there were a total of 79,859 tweets in 2021. This came to an average of 4,437 each and a median of 2,457. This showed an average of 12.2 posts/day and 369.7 posts/month each. However, there was a great deal of variation in their rate of postings: *Newtral* was striking with an average of 62.6 tweets per day, followed by *Maldito Bulo*, with 25.9 posts/day, and *Cotejo.Info*, with 20.9. All the fact-checkers reached a minimum number of three posts per day (Graph 1).



Graph 1. Average number of daily posts from the fact-checkers

Four fact-checkers were Spanish (22% of the total), three Brazilian (16.66%), two Chilean and the rest were from other Ibero-American countries: Argentina, Portugal, Venezuela, Colombia, Bolivia, Mexico, Uruguay, Peru and Ecuador. 72.2% of them posted in Spanish, as opposed to 22.2% in Portuguese; incidentally, Catalan was added for *Verificat*. As for the number of posts, two Spanish fact-checkers took the first two places (*Newtral* and *Maldito Bulo*), followed by Venezuela (*Cotejo.Info*), Argentina (*Chequeado*) and Colombia (*Colombia Check*), all of whom posted in Spanish. In terms of the total amount of posts, Spanish accounted for 85.47% (partly, due to the number of Spanish fact-checkers in the sample, as well as their amount of posts), Portuguese for 12.96% and Catalan, 1.56%.



Graph 2. Trend in postings from fact-checkers throughout the day

For several months, no significant fluctuations were observed in the rate of posting, although there was a slight rise in July, August and September. January and February were the months with least activity. These trends did not apply for a few fact-checkers. For instance, *Chequeado*, was most active in the month of November; *Polígrafo*, was striking in December; *Mala Espina Check* in August; *Aos Fatos*

in June; *Bolivia Verifica* in October; *Verificat* in November and February; and *El Sabueso*, yielded some of its main data in the months when there was lower activity in global trends (Table 3).

Table 3. Annual trend in posts from Ibero-American fact-checkers

Fact-checker	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AFP Checamos	113	92	107	91	102	258	298	177	153	213	181	231
AFP Factual	197	202	236	247	224	228	194	186	178	219	215	186
Agência Lupa	438	154	488	401	425	327	291	240	251	222	302	243
Aos Fatos	138	114	151	155	242	262	220	229	245	216	83	161
Bolivia Verifica	150	167	238	171	170	133	165	175	213	240	160	146
Chequeado	218	264	379	366	435	432	418	374	464	450	530	415
Colombia Check	132	282	312	369	376	365	493	427	469	456	354	226
Cotejo.Info	487	582	804	776	701	838	911	679	459	467	471	446
Ecuador Chequea	38	52	34	62	117	148	187	216	143	211	210	133
EFE Verifica	145	148	182	204	255	231	266	209	173	184	197	208
El Sabueso	428	408	429	468	400	290	294	272	291	291	291	257
Fast Check CL	177	233	198	202	248	157	160	220	100	105	134	110
Mala Espina Check	102	121	246	207	223	172	310	438	383	338	361	309
Maldito Bulo	838	737	868	636	518	774	1114	731	1157	804	697	574
Newtral	1,702	1,641	1,857	1,829	1,944	1,894	2,240	2,122	2,063	1,884	1,790	1,878
Polígrafo	175	146	170	159	158	157	145	134	212	255	292	333
Verificador de La República	122	130	132	132	147	139	115	100	92	97	85	80
Verificat	85	160	79	72	81	90	81	65	128	115	180	117
Total	5,685	5,633	6,910	6,547	6,766	6,895	7,902	6,994	7,174	6,767	6,533	6,053

The preferred times for the fact-checkers for disseminating their contents was between 3pm and 5pm with a new peak in posting at 8pm (Graph 2). No significant differences were seen in the function the fact-checkers had.

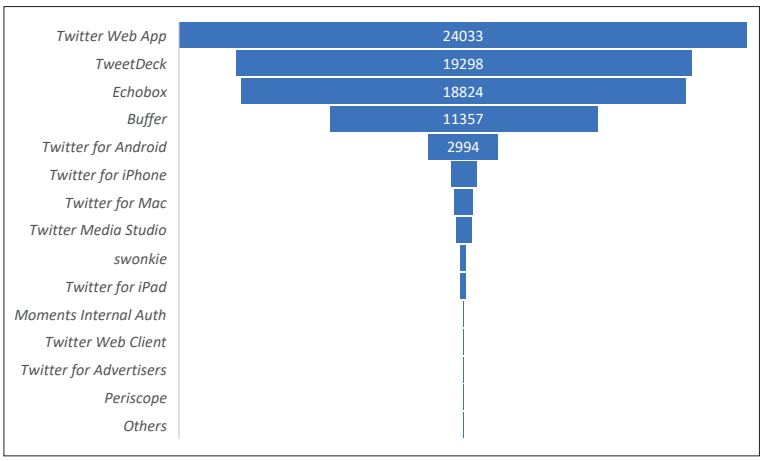
As for the source of the post, it is remarkable that seven applications accumulated over 95% of the posts made. 62% of the tweets were programmed (*Tweetdeck*, *Echobox* and *Buffer*) and 30% were posted directly on *Twitter* (Graph 3).

According to the type of post, total figures show 75.5% of proactive posts, 13.4% of responses, 10.3% of retweets and 0.7% of citations. This trend was mostly maintained for the fact-checkers, albeit with a few exceptions: *Maldito Bulo* mainly focused its posts on retweets (68.1%) and *Aos Fatos*, on responses (62.9%), followed by proactive posts (34.9%) (Table 4).

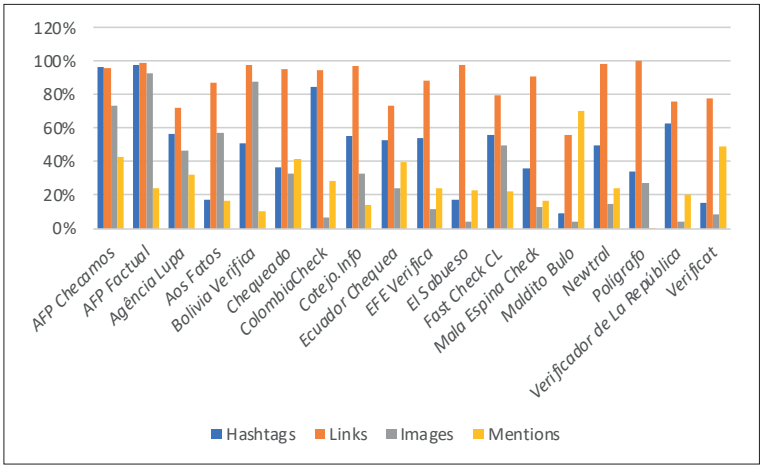
Table 4. Types of posts

Fact-checker	Reactive tweets			Proactive tweets
	Retweets	Citations	Responses	
AFP Checamos	0.0%	1.4%	39.1%	59.5%
AFP Factual	0.4%	0.3%	6.1%	93.2%
Agência Lupa	1.3%	1.3%	75.8%	21.5%
Aos Fatos	1.5%	0.8%	62.9%	34.9%
Bolivia Verifica	0.7%	0.9%	4.9%	93.5%
Chequeado	0.4%	0.1%	16.3%	83.3%
Colombia Check	1.0%	0.5%	8.1%	90.4%
Cotejo.Info	1.8%	0.8%	2.0%	95.3%
Ecuador Chequea	19.3%	0.9%	15.3%	64.5%
EFE Verifica	15.0%	2.4%	0.4%	82.3%
El Sabueso	0.8%	0.1%	3.4%	95.7%
Fast Check CL	8.1%	2.1%	20.1%	69.8%
Mala Espina Check	0.1%	0.0%	0.3%	99.6%
Maldito Bulo	5.0%	1.5%	10.3%	83.2%
Newtral	68.1%	0.1%	1.8%	30.0%
Polígrafo	1.5%	0.2%	9.5%	88.8%
Verificador de La República	3.1%	3.7%	24.8%	68.5%
Verificat	10.4%	4.5%	25.3%	59.8%
Total	10.3%	0.7%	13.4%	75.5%

The analysis of the resources used by the fact-checkers (Graph 4) indicated there were a high amount of links: 89% of posts included an url; this percentage reached 100% with the fact-checker *Polígrafo* and 99% for *AFP Factual*. 46% of the tweets contain hashtags, with figures surpassing 80% for several fact-checkers (*Colombia Check*, *AFP Factual* and *AFP Checamos*). In 25% there were images whose use rose with *AFP Factual*, *Bolivia Verifica*, *AFP Checamos*, *Aos Fatos* and *Fast Check CL*, all of which had images in over 50% of their tweets. Moreover, 28% of the tweets contained mentions, positioned above the average for the use of this fact-checking element such as *Maldito Bulo* (70%), *Verificat* (49%), *AFP Checamos* (43%), *Chequeado* (41%), *Ecuador Chequea* (40%) and *Agência Lupa* (32%).



Graph 3. Number of tweets according to the source of the post



Graph 4. Use of resources in posts: hashtags, links, images and mentions

3.2. Interaction analysis

The average number of retweets per post was slight (8.4), except for any specific fact-checker such as *Fast Check CL*, which reached 48.2 retweets per post.

Interaction by means of responses was also low (average of 1.9 responses per tweet), which placed practically all fact-checkers (88.88%) below 3.6. The highest figures were for likes, with an average of 16.5 likes per tweet, with far higher numbers for *Aos Fatos* (112.2 likes/tweet), *Fast Check CL* (70.9 likes/tweet) and *AFP Checamos* (44.3 likes/tweet). Lastly, just 22.22% had over 2 citations per tweet (Table 5). On an interaction basis, most striking were *Aos Fatos* (Brazil), which had over 100,000 followers, and *Cotejo.Info* (Venezuela), with under 50,000 followers. They represented the fact-checkers in the sample with the greatest and least interaction, respectively. In any event, the estimated amount from the community did not seem to be a determining factor in the average amount of interactions per tweet obtained for each fact-checker.

Table 5. Average amount of interactions per tweet for each fact-checker

Fact-checker community*	Fact-checker*	Retweets	Responses	Likes	Citations
Over 100,000 followers	*Chequeado*	10.6	3.6	25.1	2.0
	Maldito Bulo	9.9	0.4	4.6	0.4
	Aos Fatos	25.8	11.4	112.2	4.4
	Newtral	3.6	1.4	7.8	0.7
	Agência Lupa	6.8	3.5	27.8	1.5
50,000 to 100,000 followers	*Colombia Check*	18.6	1.5	32.0	1.3
	El Sabueso	10.7	1.2	21.8	0.8
	Fast Check CL	48.2	2.7	70.9	2.5
Less than 50,000 followers	*AFP Factual*	18.5	2.6	26.9	2.2
	Polígrafo	1.1	1.5	3.9	0.7
	Mala Espina Check	5.7	0.5	6.6	0.3
	AFP Checamos	11.3	10.4	44.3	3.3
	Ecuador Chequea	3.7	1.0	2.8	0.5
	Verificat	2.4	0.4	3.3	0.3
	EFE Verifica	8.3	0.9	7.2	0.7
	Bolivia Verifica	3.5	0.7	7.0	0.7
	Cotejo.Info	0.7	0	0.4	0
	Verificador de La República	7.7	1.8	15.5	0.3

*Fact-checkers categorised by number of followers on 02/13/2022

The analysis of interaction in terms of the posting time yields interesting results. The average for likes and retweets, responses and citations was highest for the tweets that were posted between three and five o´clock in the morning.

Table 6. Average amount of interactions per tweet by posting time

Hour	Average likes	Average retweets	Average responses	Average citations
0	21.74	10.89	2.50	1.05
1	38.67	18.64	2.73	1.50
2	37.17	23.57	2.23	1.59
3	64.81	36.66	2.87	2.02
4	71.62	38.69	3.47	1.99
5	10.67	8.93	0.90	0.42
6	4.85	6.34	0.74	0.35
7	5.16	6.45	0.96	0.40
8	5.75	6.10	1.08	0.60
9	4.70	4.24	0.83	0.41
10	6.91	5.93	1.47	0.69
11	7.78	5.95	1.36	0.73
12	14.80	6.47	1.48	0.78
13	12.00	7.14	1.35	0.84
14	13.22	7.05	1.73	0.99
15	20.71	8.94	2.10	1.19
16	16.69	9.39	2.20	0.99
17	17.79	8.13	2.30	1.06
18	19.94	9.50	2.45	1.24
19	20.85	8.30	2.65	1.20
20	20.43	8.95	1.85	0.95
21	18.19	8.01	1.95	1.24
22	20.41	9.41	1.71	1.00
23	19.61	7.79	2.34	1.16

Bearing in mind the main sources of posting, it can be seen that posting directly from the website yielded better interaction results than by using programming tools, except for the average number of retweets. The tweets sent from an *iPhone* are those which generated most interaction (Table 7).

Table 7. Average number of tweets according to the source of the post

Source	% tweets	Average likes	Average retweets	Average responses	Average citations
Buffer	14.22	19.51	10.19	1.91	1.27
Echobox	23.57	7.90	3.67	1.39	0.65
Moments Internal Auth	0.08	0.09	0.02	0.06	0.00
Periscope	0.04	2.93	1.86	0.71	0.25
swonkie	0.33	3.64	1.27	1.61	0.60
TweetDeck	24.17	15.66	8.78	1.57	0.96
Twitter for Advertisers	0.04	5.14	2.79	0.24	0.55
Twitter for Android	3.75	4.83	14.62	0.40	0.29
Twitter for iPad	0.33	4.77	8.71	0.22	0.19
Twitter for iPhone	1.43	21.94	20.74	1.34	1.23
Twitter for Mac	1.04	14.69	8.08	1.32	0.50
Twitter Media Studio	0.83	12.75	5.73	1.16	0.68
Twitter Web App	30.09	24.19	9.92	2.73	1.20
Twitter Web Client	0.05	21.11	8.92	1.46	1.00

A reactive tweet is the one that is posted in response to another tweet, to express an opinion or sentiment about it, in the form of a reply, retweet, or quoted tweet

A proactive tweet is the one that is posted in a planned way and for a specific purpose, rather than as a reply to another previous tweet

Regarding the possible influence of the type of tweet in the interaction, the responses to tweets from other users were those which reached a higher average for likes, while retweets were those, which, in turn, were those most retweeted, and responses, were those which obtained the highest amount of responses. The proactive tweets were just striking in terms of the average amount of citations received (Table 8).

Table 8. Average number of tweets according to the type of post

Average/ type of post	Retweets	Citations	Responses	Proactive tweets
Favourites	No data	16.83	21.83	17.81
Retweets	13.67	5.67	4.82	8.39
Responses	No data	0.90	2.83	1.96
Citations	No data	0.31	0.57	1.18

Moreover, we can see that interaction from the posts which used the resources analysed was higher than those which did not. That was true in all cases for the likes and quotes (Table 9).

Table 9. Average number of interactions per tweet according to the resources used

Average	Hashtags		Links		Images		Mentions	
	yes	no	yes	no	yes	no	yes	no
Retweets	9.50	7.55	8,02	11.81	10.72	7.69	11.60	7.10
Replies	2.22	1.56	1.97	1.07	3.24	1.41	1.80	1.90
Likes	19.35	14.10	17.45	8.97	28.15	12.67	17.20	16.20
Citations	1.16	0.81	1.06	0.23	1.76	0.71	0.99	0.96

As for retweets, the only exception to this was the use of URLs, with a lower average number of retweets for the posts which included URLs than for those which did not. As for responses, the tweets with mentions had an average which was a tenth lower than those which did not include them. The difference between the average for likes between tweets with images and those which did not have them was especially remarkable.

Figure 1 shows three examples of successful tweets from fact-checkers in the sample. All of them have links and images depicting the topic, the most valuable resource for creating interaction. The tweet from *Fast Check CL* adds two hashtags and that from *Aos Fatos* directly mentions the user it refers to. It should be added that for *AFP Checamos* and *Aos Fatos* contents programming tools were used which helped reach a broader audience and created more interactions.

Figure 1. Examples of successful tweets.
Sources: *AFP Checamos* (2021), *Fast Check CL* (2021) and *Aos Fatos* (2021).

3.3. Discourse analysis of the tweets with the highest amount of weighed interaction (ViP) in terms of the total sample

The correlation between the presence of key words in the sample as a whole and the tweets with the greatest ViP was very high (r=0.953). That is, there were no differences between those with most interactions from the sample as a whole in the use of terms which indicated truth and falsehood or key words for the topics analysed. However, there was a slightly higher percentage of key words in the tweets with the highest ViP than for the sample as a whole in all groups of indicators. That was the same for all the words analysed, albeit to a different extent.

The difference surpassed 1% for indicators of falsehood and for "Covid", while it only reached 0.31% for the truthfulness indicators and was practically non-existent for "climate change". The set of words for falseness in 3 languages ("*falsidad / falsidade / falsedat / fals / false / falsa*") represented 0.55% more on calculating the words from the posts with the highest ViP than in the sample as a whole; with the words for "vaccine" ("*vaccine/vacina*") the difference came to 0.43%

and for the word "covid", 0.38% (Table 10). These differences in percentage may seem insignificant. However, it must be remembered that the total number of words from the sample (23,537,941) and from the posts with most interaction (123,269), which the percentages are based on, include a far higher amount of terms with no semantic value (determinants, articles, conjunctions, prepositions...) than key words. This reduced the percentage of the latter in the sample.

Table 10. Presence of key words (% of the total number of words)

	All tweets	Tweets with highest ViP
Falseness identifiers	0.093%	1.160%
Truthfulness identifiers	0.031%	0.344%
COVID topic identifiers	0.138%	1.145%
Electoral topic identifiers	0.019%	0.267%
Gender topic identifiers	0.023%	0.312%
Climate change topic identifiers	0.003%	0.023%

4. Discussion and conclusions

The Ibero-American fact-checkers in this study showed highly variable activity on *Twitter*. All reached an average of over three posts per day, a figure which fulfilled the standards recommended by various experts who mention there should be at least three tweets per day and ideally five (*Websa100*, 2021; **Skaff**, n.d.). Some fact-checkers, such as *Newtral*, were remarkable for having a very high rate of posting, but in terms of interaction, they failed to make the most of this intense activity; this was in keeping with the average data for engagement on *Twitter* (*Twitter Engagement Report 2018*, 2019).

The difference in their rate of posting in terms of months means no pattern can be established, nor can any circumstance be determined which may have influenced the timing of the posts. The fact-checkers concentrated their tweets in the afternoons and evenings; however, paradoxically, the data show tweets posted in the early morning were those which had the most interaction. These results were surprising, since the latest report by *Sproutsocial* (**Keutelian**, 13 April 2022) indicated that the best time to post on *Twitter* is at nine o´clock in the morning, although any time between 8:00am and 1pm is good. With the changes *Twitter* made in 2015, it was its own algorithm that determined the potential each tweet had to appear in the followers´ chronological timeline, rather than the so-called reverse chronological feed. In this respect, the tweets posted at unusual times may have some influence on the algorithm and probability of appearing on the wall of more users, thereby creating more interactions.

As for the post source, although posting directly from the website creates more likes, replies and quotes, the fact-checkers preferred to use programming tools which made their work easier. Above all they opted for *Tweetdeck*, probably because it is free and user-friendly, although *Buffer* gives better interaction results, owing to the adjustments the tool itself makes to post the tweet at a time when there is a larger audience from the community for that account.

In terms of the type of post, a high percentage of tweets sent by the Ibero-American fact-checkers were proactive. Assuming their main functions were to enable recipients to see verified contents and help them become digitally literate, then, logically, they strived to spread their own content in terms of these two points. Also, there are studies of other sectors which endorse the assertion that their own contents are those which obtain the most engagement (**Fernández-Gómez**; **Martín-Quevedo**, 2018). However, the results from the Ibero-American fact-checkers showed a lower ability to generate likes, retweets and replies from proactive tweets than with reactive ones; these results were in keeping with those provided by **Gamir-Ríos** *et al*. (2022), which associated the predominance of tweets with their own content, one-way communication, and little interaction with other users. Even so, to qualify this, the proactive tweets did show a greater capacity to generate citations, and although this was the least frequent interaction, it was also the most valuable.

Moreover, they typically added links to their posts, although there were hashtags for under half their posts and images and mentions in only a quarter. However, according to the data obtained from the analysis, the use of hashtags, links, images, and mentions seems to have a positive effect on interaction. These results concur with those from other research which stress the influence of one or several of these resources in interaction (**Xu**; **Yang**, 2012; **Enge**, 2014; **Zhang**; **Peng**, 2015; **Lahuerta-Otero**; **Cordero-Gutiérrez**, 2016). Therefore, it is more probable that users interact with tweets which include interesting or popular links (**Toraman** *et al*., 2021) and which help round off information (**Lahuerta-Otero**; **Cordero-Gutiérrez**; **De-la-Prieta-Pintado**, 2018); mentions help to spark conversation by enabling these users to react to a message (**Lahuerta-Otero**; **Cordero-Gutiérrez**; **De-la-Prieta-Pintado**, 2018); the hashtags provide a context which helps information to be processed more easily (**Gul** *et al*., 2016); and images received 89% more likes and 150% more retweets (**Díaz-Soloaga**, 2018). From this point of view, one good course of action the fact-checkers could take would be to increase their use of these resources, especially images, given that only 25% of the tweets used them and their performance with any type of interaction was high (**Cooper**, 2013).

> "62% of the tweets were published through programming tools such as *Tweetdeck*, *Echobox* and *Buffer*"

> Almost 90% of the tweets include links, half use hashtags and a quarter incorporate images or mentions

According to some recent studies, with hashtags this positive relationship cannot be applied generally. **Lahuerta-Otero**, **Cordero-Gutiérrez** and **De-la-Prieta-Pintado** (2018) proposed that they have a negative influence on how popular the tweets are when transmitters are high-involvement brands. **Toraman** *et al*. (2021) state that including hashtags had little influence on obtaining likes and responses probably owing to unpopular hashtags and hashtag hijacking (hashtags which are used for a purpose other than that originally envisaged). Similar data has arisen from the study on engagement from the *Twitter engagement report 2018* (2019), where average engagement with tweets with hashtags, after an analysis of 700 million tweets, was far lower than that for emojis, citing other users or even when none of these three were included in the content.

However, these factors do not seem to have any influence when it comes to Ibero-American fact-checkers, for those which use hashtags do report positive results, especially for obtaining favourites, so increasing their use is also recommended.

From an analysis of key words, generally speaking, it cannot be deduced that the most common topics in fact-checking are represented in the posts with more interaction than in the rest. However, the words linked to Covid and indicators of falsehood are slightly more abundant in the posts with the most interaction. However, a more comprehensive analysis would be needed from a discourse point of view to confirm that rebuttals receive more reactions than positive verifications or that some topics predominate over others when users interact.

In short, with this research, Ibero-American fact-checkers were seen to be highly active on *Twitter* throughout 2021. This helped to spread and reinforce their fact-checking and digital literacy by means of their websites. However, they must carry out some changes to the way they operate to improve their performance: Boosting posts of reactive tweets, adapting the time they send tweets to the dynamics of the social network and making greater use of resources such as images or mentions could be useful strategies for increasing interaction. Lastly, one limitation of this study is that it is impossible to reliably determine the potential influence of different content and topics on interaction. However, this, in turn, may provide new material for future research.

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