



Article

# From compensation to competition: The impact of graphicons on language use in a Chinese context

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## Abstract

This study examines the impact of graphicons (emoticons, emojis, and stickers) on the use of sentence-final particles (SFPs) in Chinese based on a 13-year longitudinal corpus of 941,020 comments posted on the popular Chinese social media platform Bilibili. Quantitative analysis shows that graphicon frequencies increase while SFP frequencies decrease over time, and that the correlation between these two trends is statistically significant. However, the more an SFP

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**Correction (June 2023):** This article has been updated with minor style corrections in Table 2 and Funding section since its original publication.

encodes a grammatical function or has a negative connotation, the less likely it is to be replaced by graphicons. Qualitative analysis suggests that the relationship between graphicons and SFPs is evolving from syntagmatic, where the two co-occur in the same sentence, to paradigmatic, where either can fulfill the function of expressing (positive) attitude or sentiment. This suggests that the functions of graphicons are shifting from compensation to competition with language, as an alternative to SFPs.

## Keywords

Bilibili, Chinese social media, emoji, evolution, graphicons, kaomoji, paradigmatic, sentence-final particles, stickers, syntagmatic

## Introduction

Graphicons are graphical icons used in text-based computer-mediated communication (Herring and Dainas, 2017), including but not limited to emoticons (facial expressions made with keyboard symbols, known as kaomoji for Japanese-style expressions), emojis (graphical faces plus objects and symbols), and stickers (character-driven illustrations that typically come in sets). These three graphicon types have been the focus of considerable study due to their popularity, especially in social media interactions (e.g. Herring and Dainas, 2017; Logi and Zappavigna, 2021; Tang and Hew, 2019). A large amount of data is available concerning their use, including their use over time.

These data suggest that the forms and functions of graphicons are continually evolving. New types of graphicons are larger, more colorful, and more complex than earlier types, while the functions of each type have tended to shift from emotion expression to conventionalized, even grammatical, usages (Konrad et al., 2020). These innovations have contributed to the increasingly ubiquitous use of graphicons in digital communication. Along with this increase in use, a discourse of ‘language endangerment’ (Thurlow and Jaroski, 2020) has emerged, particularly in news discourse, whereby graphicons are viewed as a threat to words. Predictions that emoji will replace language (e.g. Cochetti, 2021) are part of ‘long-standing narratives of linguistic degradation [and] ruin’ in digital communication (Thurlow and Jaroski, 2020: 45).

Indeed, instances have been reported in the scholarly literature of graphicons taking on the functions of verbal language. Emoticons have grammaticalized over time from expressions of emotion into a system of punctuation that indicates utterance mood (Dresner and Herring, 2010; Markman and Oshima, 2007). More recently, there is evidence that emojis, too, are becoming increasingly language-like (Danesi, 2016). They can convey a variety of speech acts (Herring and Ge-Stadnyk, forthcoming) and can be used as replacements for subjects, verbs, or objects in sentences (see examples in Logi and Zappavigna, 2021; Parkwell, 2019). When used in sequences, emojis display a tendency to follow word order patterns (Herring and Ge, 2020), although they lack grammatical structure on their own (Cohn et al., 2019). Emojis have also been found to be processed like language in our brain (e.g. Barach et al., 2021; Weissman and Tanner, 2018). Stickers as a more recently introduced type of graphicon can replace phrases and sentences (Zhang et al., 2022).

It remains largely unexplored, however, to what extent such replacements take place systematically, and how language is affected by the use of graphicons. Therefore, the

present study aims to investigate empirically the impact graphicon usage is having on language through analysis of a large longitudinal corpus of comments from Chinese social media.

We focus on sentence-final particles (SFPs) in Chinese as a likely case to explore the impact of graphicon usage on language. This is because, like graphicons, SFPs tend to occur at the end of sentences and convey speakers' attitudes and sentiment. To investigate the interactions between graphicons and SFPs, we built a longitudinal corpus of comments from the popular Chinese social media platform Bilibili that includes the use of emoticons, emojis, stickers, and SFPs. We conducted quantitative analysis of trends of SFP and graphicon usage, as well as pragmatic and semiotic analysis of selected examples to identify stages of interaction involving graphicons and SFPs.

Our quantitative findings show that graphicon frequencies increase over time, while SFP frequencies decrease over time in the Bilibili corpus, and the correlation between these two trends is statistically significant. In particular, SFPs that lack a grammatical function or a negative connotation are most likely to be replaced by graphicons. Based on our qualitative analyses, we propose a three-stage model to characterize the interactions between graphicons and SFPs over time: (1) SFPs are first used before graphicons become popular; (2) graphicons are used together with SFPs; and (3) graphicons and SFPs combine with or alternate with each other. Based on this trajectory, we propose that the relationship between graphicons and SFPs is evolving from syntagmatic to paradigmatic, or put differently, that graphicons are shifting in function from compensating for paralinguistic features to competing with language itself. We propose that the mechanism of pragmatic unmarking (Konrad et al., 2020) is facilitating this evolution.

## Relevant background

### *Approaches to graphicon studies*

Investigations into graphicon functions have drawn on different theoretical perspectives. Pragmatic analyses of graphicon functions have been conducted by a number of researchers. Their findings show that emoticons were first used to express emotion (Rezabek and Cochenour, 1998) and as signals of lightness and/or humorous intent, before conventionalizing to indicate the intended tone or the illocutionary force of the textual utterances they accompany (Dresner and Herring, 2010). Emojis convey a variety of pragmatic functions that “act on” the illocutionary force of textual utterances in CMC and “act as” linguistic acts in their own right’ (Herring and Ge-Stadnyk, forthcoming). Stickers fulfill additional functions such as self-representation (Konrad et al., 2020).

Alongside these pragmatic analyses, an increasing number of studies are describing how graphicons make meaning in combination with language from a social semiotic perspective (e.g. Logi and Zappavigna, 2021; Parkwell, 2019). This perspective is underpinned by the theoretical architecture of Systemic Functional Linguistics, as elaborated by Halliday (1978). A key concept in social semiotics is ‘semiotic resource’, which refers to the notion that the grammar of a language is not a set of rules for reproducing correct sentences, but a ‘resource for making meanings’ (Halliday, 1978: 192). This concept highlights that what a sign stands for is not pre-given but rather is affected by its use

(van Leeuwen, 2005). The meaning potentials of graphicons as visual resources are different from language as verbal resources. As Logi and Zappavigna (2021: 7) write, ‘in some regions of meaning-making emoji afford fewer and thus less delicate options for making meaning than language, but in others they afford more’. The value assigned to the options comprising a semiotic choice is related to the ‘markedness’ of the choice, which is a useful notion for addressing the ways norms are built into the language system (Djonov and van Leeuwen, 2012: 120). New forms tend to be more marked than older forms. In examining the evolutionary trajectories of graphicons, Konrad et al. (2020) observed that stickers are more pragmatically marked for emotional intensity, positivity, and playfulness than emojis, while emojis, an older graphicon type, are becoming pragmatically unmarked, in that their pragmatic meanings of playfulness and emotionality are starting to weaken through frequent use.

A social semiotic perspective takes into account both syntagmatic and paradigmatic relations in meaning making. Syntagmatic relations address ‘what goes together with what’, while paradigmatic relations are concerned with ‘what could go instead of what’ (Halliday and Matthiessen, 2004: 22). Existing graphicon studies, whether adopting analytical tools from pragmatics or social semiotics, mainly focus on syntagmatic relations to investigate the contribution of graphicons to a textual message. Meanwhile, studies examining the development of graphicons have focused mainly on how different types of graphicons are related to each other (De Seta, 2018; Konrad et al., 2020). The only study we are aware of that reports a paradigmatic relationship between graphicons and language is that of Pavalanathan and Eisenstein (2016), who found that emojis are in competition with, and replacing, non-standard orthographic features such as expressive lengthening (e.g. coooooo!!!) and abbreviations (e.g. lol) on Twitter. In the present study, we consider whether graphicons could also replace standard language features.

### *Interaction between graphicons and language*

Graphicons are typically explained as compensation for the absence of facial expressions, intonation patterns, gestures, and other types of paralinguistic features, along with other ‘Netspeak’ features such as all caps, reduplication of letters and punctuation, and representations of laughter (Androutsopoulos, 2011). This *compensation perspective* is overwhelmingly dominant in current graphicon studies. Some scholars go so far as to claim that emojis are digital gestures (Gawne and McCulloch, 2019), while others take a less explicit position by describing how graphicons complement text in social media communication to indicate the message producer’s intended meaning (for a review see Herring and Ge-Stadnyk, forthcoming). It is thus not surprising to find the claim that graphicons ‘complement, but [do] not overpower, the meaning of the verbal expression’ (Tang and Hew, 2019: 2469).

The emergence of emoticons as compensation for missing paralinguistic features in text is an example of the economy principle. According to Androutsopoulos (2011), ‘linguistic economy’, which refers to strategies of shortening the message form, can be a force for language change in digital communication. This perspective is in line with the well-known Principle of Least Effort (Zipf, 1949), which holds that people tend to use the least amount of effort to accomplish their communicative tasks. An emoticon that indicates utterance mood could save a few sentences/words and avoid miscommunication.

As new graphicons are introduced to express an ever-widening range of meanings, however, their expressive power increases and they potentially become more language-like. Situations could then arise where graphicons and verbal expressions co-occur with the same function. To avoid redundancy, the economy principle dictates that only one form should be used. In such a scenario, graphicons are effectively in competition with language and could replace language features, potentially affecting the structure of the language itself. An actual example is the replacement of textual Netspeak features by emoji on Twitter, as reported by Pavalanathan and Eisenstein (2016). This *competition perspective*, however, has not been given the attention it deserves in graphicon studies.

### *Graphicons in Chinese social media*

In this study, graphicons in Chinese social media were chosen to explore the impact of graphicons on language use because of their frequent usage and their unique interaction with the Chinese language (De Seta, 2018; Zhang et al., 2022).

The popularity of graphicons in Chinese social media is related to the Chinese language. First, the difficulty of inputting Chinese words based on Pinyin (Romanized phonological coding of Mandarin Chinese) leads Chinese users to prefer graphicons, which can be used by simply clicking or tapping on smartphones (Ma, 2016). The Bilibili platform has its own form of graphicon shorthand, with stickers that graphically represent selected popular expressions from comments posted to the platform (Zhang et al., 2022). The practice of encoding verbal expressions in stickers saves user effort in inputting Chinese characters and is therefore likely to increase the usage of these graphicons.

The pictographic nature of Chinese characters may be another reason for the popularity of graphicons. Chinese internet users are already accustomed to using written characters that derive from (and in some cases, still resemble) pictures (Ge and Herring, 2018). This may make users more likely to accept and use graphicons, especially when language features have been integrated into the design of emojis and stickers, for example, by adding colors to different fonts of Chinese characters (Zhang et al., 2022) or when the graphicons make use of the pictographic and spatial properties of Chinese characters (Li and Zhu, 2019).

Further, the political and social context plays an important role in increasing the usage of graphicons. Chinese social media users create graphicons as euphemisms for taboo words and to circumvent politically sensitive issues and avoid internet surveillance and censorship (Li and Zhu, 2019). Meanwhile, graphicons are a new form of expression that allows Chinese users to be humble and avoid face threats, resolving ‘the tension between the openness and freedom in social media and the conservative, constraint-bounded nature of established social norms’ in China (Zhang et al., 2021: 247).

### *Sentence-final particles in Chinese*

Sentence-final particles (hereafter SFPs), as their name suggests, appear at the end of a sentence or utterance and lack explicit denotative or referential meaning. Somewhat imprecise in meaning, SFPs can be used to suggest propositional meanings or, alternatively, to express non-propositional meanings along with speaker attitude (Huang and Shi,

2016). Chinese has a rich variety of SFPs (Pan, 2019) which can be divided into three categories (Zhu, 1982): (1) particles related to tense, for example, LE [了], suggesting a change of state which could be related to perfect tense; (2) particles indicating the mood<sup>1</sup> of an utterance as interrogative, imperative, or exclamatory, for example, MA [吗], indicating an interrogative; and (3) expressive particles conveying the speaker's attitude or sentiment, for example, A [啊], expressing surprise or disappointment, and BA [吧], suggesting hesitation or reluctance. The first two categories fulfill grammatical functions, while the third category functions as pragmatic illocutionary force indicating devices (hereafter IFIDs), as do many graphicons (e.g. Herring and Ge-Stadnyk, forthcoming).

These three categories are not mutually exclusive. Some SFPs can fulfill multiple functions simultaneously; for instance, A [啊] could be used in an interrogative to suggest a speaker's surprise or disappointment. Some SFPs convey the combined functions of two SFPs (Zhao, 2019). For instance, BEI [呗] is considered to be derived from BA [吧], indicating an interrogative, plus EI [欸], conveying a tone of disappointment (Zhu, 1982).

For the majority of SFPs, their core semantic meanings (Pan, 2019) and grammatical functions (Zhao, 2020) remain unclear. SFPs are used mainly in spoken genres and are seldom found in formal written genres such as academic writing, reports, or news (Huang and Shi, 2016). But our observations show that they are frequently used in genres of online communication that mix spoken and written features, such as discussion forums and comments.

In this study, the use of SFPs is hypothesized to be influenced by the use of graphicons due to their similar structural position and pragmatic functions. SFPs are used at the end of a clause, like the majority of graphicons. Though kaomojis, emojis, and stickers can appear in different positions, they tend to be used at the end of a sentence. Pragmatically, graphicons function as IFIDs to indicate the tone of an utterance (Danesi, 2016; Herring and Dainas, 2017), to suggest affective and attitudinal meanings (Konrad et al., 2020), or to align with interlocutors (Sampietro, 2019).

## Research questions

This study addresses the following research questions:

RQ 1: What trends are evident in frequencies of use of graphicons and SFPs in Chinese social media discourse over time?

RQ 2: How are the overall trends correlated to each other? Does the correlation depend on the type of SFP and/or graphicon?

## Data and methods

### Data

Our corpus is composed of 13 years of longitudinal data from the Bilibili platform. Bilibili is a video-sharing platform that, like YouTube, allows users to post comments

below the videos. It is one of the most popular Chinese social media platforms, with 272 million average monthly active users (almost one-fifth of the Chinese population) at the end of 2021.<sup>2</sup> The platform was chosen mainly because it allows automatic capture of older comments posted below the videos, and the comments include both graphicons and SFPs. In designing our study, we considered other popular Chinese social media platforms (e.g. Sina Weibo, WeChat) as possible data sources, but they would not have allowed automatic capture of longitudinal data.

The data consist of comments and replies to comments from the channel devoted to Bilibili's annual Spring Festival Gala Show (hereafter, the Bilibili show),<sup>3</sup> which displays mash-up videos that celebrate the Chinese New Year. This channel was chosen because it is the only one with annual comments dating back to 2010. The Bilibili show started in 2010 and soon became an important and popular annual event on the platform.<sup>4</sup> Besides the show videos themselves, the channel also includes a number of videos related to the gala show, such as trailers, teasers, and outtakes. These videos are included in our data because they include longitudinal comments and replies, like the gala show videos do.

Comments and replies from the 42 videos available in the channel, covering the years from 2010 to 2022, were captured and stored in February 2022 using Python and the Scrapy tool. A total of 941,020 messages (including both comments and replies) was collected.

## Methods

This study adopts a mixed-method approach that involves both quantitative and qualitative analysis. We first obtained the frequencies of graphicons and SFPs before investigating the relationship between the two.

**Graphicon frequencies** To obtain the frequencies of graphicons in our corpus, we developed exhaustive lists of the three types of graphicons found in the corpus. The emoticons in our corpus are Japanese-style kaomojis. The identification of kaomojis was carried out by a semi-supervised process of deep learning and manual identification. The emoji list includes Unicode emojis from the Python emoji module, as well as a set of emojis that are unique to the Bilibili platform. The set of sticker types was developed based on the package of Bilibili stickers available on GitHub. Further details of how each list was developed can be found in Zhang et al. (2022). Based on the lists, the raw frequencies of graphicon types and tokens in each year were normalized frequencies of graphicons for each year were calculated based on the total number of messages. The emoticons in our corpus are Japanese-style kaomoji, so the term kaomoji is used to refer to ASCII emoticons henceforth.

**SFP frequencies** A list of SFPs was first compiled from several Chinese grammar books (Huang and Shi, 2016; Li and Thompson, 1981; Zhao, 2019) for the purpose of obtaining the frequency distribution of the SFPs. The category of SFPs related to tense was excluded because we have not identified any literature suggesting that graphicons are used to indicate tense or aspect. SFPs with zero occurrence in our corpus were also removed from the list. A final list of 13 SFPs was obtained, consisting of: A

[啊], BA [吧], YA [呀], NE [呢], MA [嘛], BEI [呗], YO [哟], MA [吗], LIE [咧], LI [哩], WA [哇], LOU [喽], and NA [呐].

The data were cleaned before calculating SFP frequencies. First, we deleted from the corpus all words and phrases that include SFP-like sequences, such as the common phrases BILIBILI [哔哩哔哩] and HALOU [哈喽],<sup>5</sup> which if included would have yielded misleading counts of the SFPs LI [哩] and LOU [喽]. Second, we replaced all coding names for emojis and stickers, as some of the names of emojis and stickers appear to include SFPs (e.g. a sticker named [原神\_哇] will impact the frequency of WA [哇]).

We did not attempt to conduct sentence parsing for SFP identification, because what counts as a sentence in social media discourse has become complicated, with graphicons and space as potential markers of sentence boundaries. Nonetheless, to minimize noise in the data, we only counted SFPs used at the end of messages. We also excluded messages that consisted of only a single SFP such as A [啊] and WA [哇].

The occurrences of the 13 SFPs were obtained for each year. The frequencies of SFPs for each year were obtained and normalized in relation to the total number of messages, to be consistent with how the frequencies of graphicons were calculated, that is, on a per message basis.

**Methods of analysis** Quantitative and qualitative analyses were conducted to investigate the interaction between graphicons and SFPs. The rank frequency distributions of both graphicons and SFPs were first examined for their shared properties. The correlation between the frequencies of graphicons and SFPs was obtained to determine the overall trend of interaction. Trend lines for individual SFPs were also obtained. We then conducted qualitative analysis of the evolution of (co-)occurrence patterns of SFPs and graphicons. In interpreting these patterns, we draw on the semiotic notions of syntagmatic/paradigmatic and pragmatic markedness.

## Findings and discussion

### *Overall trend of graphicons and SFPs*

We first justify the interchangeability of graphicons and SFPs from a quantitative perspective by fitting the rank frequency distribution of graphicons and SFPs to the power law  $y=ax^b$ , which shows a functional relationship between frequency and frequency rank.<sup>6</sup> We ranked the occurrences of all types of graphicons and SFPs and applied the ranked data to the model of  $y=ax^b$ . The model fittings of distributions are excellent, having an  $R^2$  value of 0.9344 for graphicons and an  $R^2$  value of 0.8407 for SFPs, as shown in Figure 1.

This shows that the frequencies of both graphicons and SFPs are inversely proportional to their ranks in the frequency table, demonstrating a long-tail tendency. That is to say, a small number of graphicons and SFPs accounts for a large proportion of uses, while most items occur a limited number of times. Put differently, only a small number of graphicons and SFPs were used frequently in the corpus. The reciprocal relationship between frequency and rank of graphicons and SFPs can be attributed to the ‘principle of least effort’ (Zipf, 1949), which is the result of a maximally economical compromise between the competing needs of speakers and hearers. The speaker’s effort is preserved



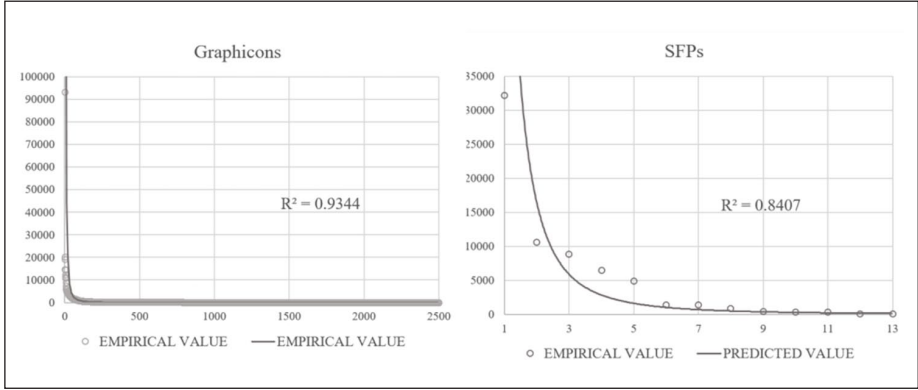


Figure 1. Fitting the rank frequency distribution of graphicons (left) and SFPs (right) to  $y=ax^b$ .

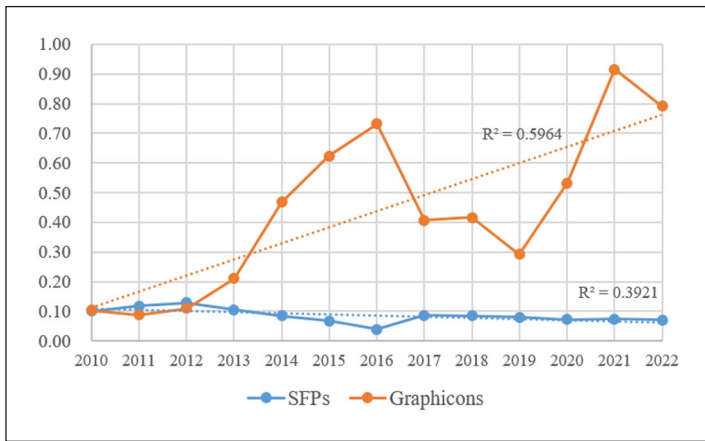
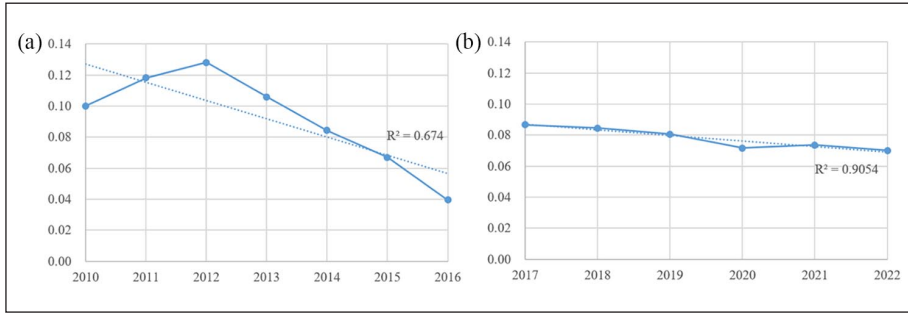


Figure 2. Frequencies of SFPs and Graphicons (based on the total number of messages). The dotted lines are the trend lines identified by Microsoft Excel based on the frequencies of SFPs and graphicons across the years.

by having a small number of common words, while the hearer’s effort is lessened by avoiding a large number of rare words (Manning and Schutze, 1999). The  $R^2$  values of both model fittings with the long tail model suggest that graphicons and SFPs share similar distributional properties.

Next, we present the overall trends of the use of graphicons and SFPs. The frequencies of graphicons increase while those of SFPs decrease over time, as shown in the trend lines in Figure 2. Their frequencies are significantly negatively correlated,  $r(11)=0.82$ ,  $p=0.00058$ . What is particularly worth noticing is that the frequencies of graphicons and SFPs from 2010 to 2016 are more significantly correlated  $r(5)=0.94$ ,  $p=0.0013$ . As kaomojis were overwhelmingly dominant in those years (Zhang et al., 2022), it appears that kaomojis, out of all the graphicon types, contribute most to the decrease in SFPs.



**Figure 3.** Trend lines of SFPs in (a) 2010–2016 and (b) 2017–2022.

Figure 2 shows that graphicons dropped significantly in 2017 and in 2019. Around that time, Bilibili changed from a closed community for fandoms of Japanese animations to be more inclusive of the general public. We posit that this change had two consequences for graphicon use. First, many older users disliked the change, which included changes in the kinds of videos posted on the site. We found that a large proportion of the comments in 2017 were complaining about that year’s gala show, and graphicons tend not to be used in those comments. The overall negative emotion of comments in 2017 is likely partially responsible for the drop in graphicon usage. The change in the user base also contributed to the drop, in that the new users were less identified with the kaomojis favored by the Japanese fandoms. Kaomojis started to be replaced by emojis and stickers, albeit slowly at first. As Chinese social media users favor platform-specific emojis (e.g. De Seta, 2018; Zhang et al., 2021), they tended not to use the Unicode emojis that were available on the platform. However, in 2020, Bilibili released a platform-specific package of emojis,<sup>7</sup> which boosted the usage of emojis. Stickers started to gain popularity in 2020, as well. This transitional period for graphicon types occurred in tandem with the change in user groups.

The trend line for SFPs appears to be flat in Figure 2 due to the large difference in the range of their frequencies compared to that of graphicons. To show the decrease in a more visually evident way, we break the trend into two stages at the critical point of 2016, the year when the frequency of kaomojis reached its peak. The two trend lines are shown in Figure 3(a) and (b). From 2010 to 2016, SFPs dropped with an  $R$  square value of 0.674, while from 2017 to 2022, the  $R$  square value is 0.9054.

### Trends of individual SFPs

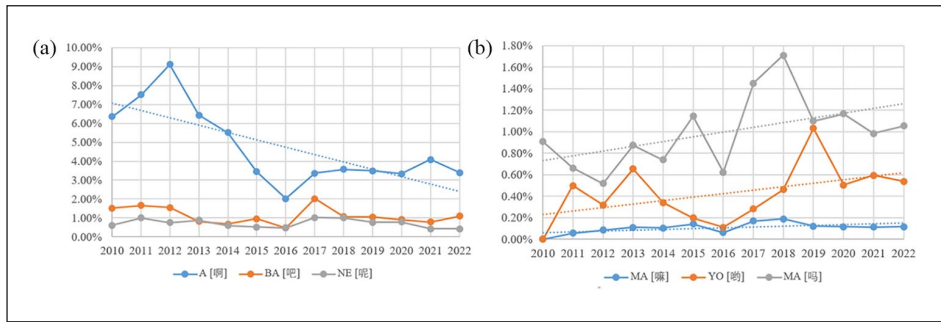
To explore further how graphicons and SFPs interact and why SFPs appear to be being replaced by graphicons, we focus on trends in the frequencies of each SFP.

We applied trend lines for the frequencies of each SFP, based on which we identified three trends, as shown in Table 1: (1) *decrease* as found for A [啊], WA [哇], and YA [呀]; (2) *increase* as found for MA [嘛], MA [吗], YO [哟], and NA [呐]; and (3) *fluctuation* as found for BA [吧] and NE [呢]. Examples of the trends are shown in Figure 4.

**Table 1.** Occurrences and trends of SFPs.

	A [啊]	YA [呀]	WA [哇]	BA [吧]	NE [呢]	BEI [呗]	LOU [喽]	LIE [咧]	LI [哩]	NA [呐]	YO [哟]	MA [嘛]	MA [吗]
Trend	DE	DE	DE	F	F	F	F	F	F	IN	IN	IN	IN
Raw freq	32149	4892	1372	8795	6490	324	286	58	26	405	752	1352	10604
freq	48%	7%	2%	13%	10%	0.4%	0.4%	0.08%	0.03%	0.6%	1%	2%	16%

Notes: 1) DE is short for decrease, IN for increase, F for fluctuation. 2) The trends of decrease and increase are based on the trend lines obtained from Microsoft Excel for each SFP’s frequency across the years.

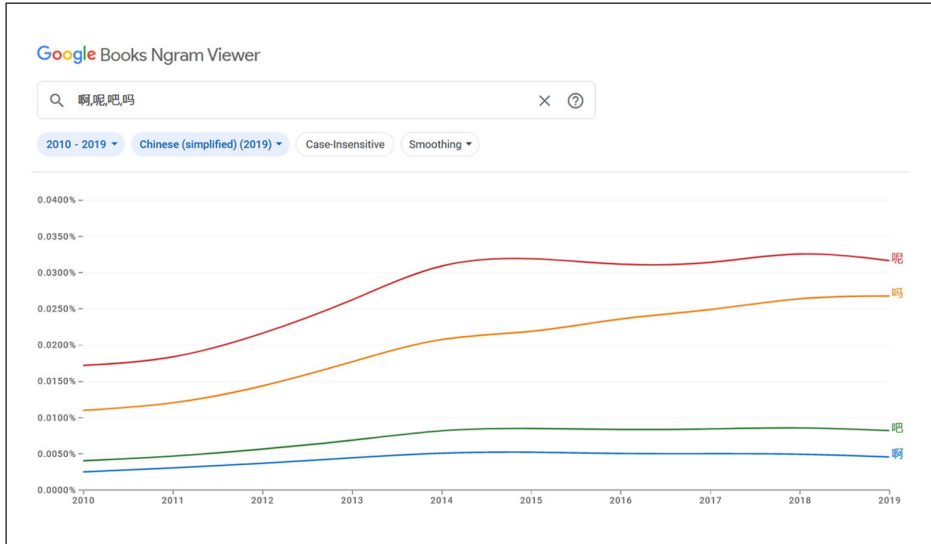


**Figure 4.** (a) Decreasing and fluctuating (left), and (b) increasing (right) frequencies of SFPs. The dotted lines are the trend lines identified by Microsoft Excel based on the frequencies of each SFP across the years.

The overall decreasing trend for SFPs is mainly shaped by A [啊], which accounts for the majority of SFPs (48%, as shown in Table 2). The decreasing group, A [啊], WA [哇], and YA [呀], includes SFPs used mainly for expressing the speaker’s attitude or sentiment. Similar functions have often been attributed to the usage of graphicons (e.g. Dresner and Herring, 2010; Sampietro, 2019; Tang et al., 2021; Zhang et al., 2021). Therefore, we can infer that SFPs decrease because they are replaced by graphicons that express similar functions.

In contrast, the increasing group consists mainly of SFPs that fulfill grammatical functions. For instance, MA [吗] is used to indicate an interrogative. Another characteristic of SFPs from the increasing group is that they can be used for expressing negativity. For instance, MA [嘛] tends to be used to suggest dissatisfaction, anger, impatience, or noncompliance, while YO [哟] could convey a tone of dissatisfaction and distain (Zhao, 2019). SFPs expressing negativity are less likely to be replaced by graphicons, because graphicons themselves tend to represent positive concepts (e.g. smiley and hearts) (Zhang et al., 2022), and the use of graphicons conveys a meta-message of playfulness and positivity (Herring and Ge-Stadnyk, forthcoming).

A pattern could thus be generalized from the two groups that expressive SFPs are more likely to be replaced by graphicons, while SFPs that indicate grammatical relations



**Figure 5.** Trends of SFPs in Google Ngram (captured 09/18/2022).

or express negativity are less likely to be replaced by graphicons. This pattern is further supported by evidence from the fluctuating BA [吧], which is multifunctional and possesses the most complicated semantic meanings of the SFPs (Zhao, 2019). It conveys grammatical functions, in that it can be used to indicate an interrogative (Zhu, 1982), as well as rich meanings for expressing the speaker's attitude or sentiment, such as uncertainty (Zhu, 1982), solicitation of agreement (Li and Thompson, 1981), and tone modification (Han, 1995). As only some of these functions of BA [吧] are shared by graphicons, it is not surprising that its usage shows a fluctuating trend.





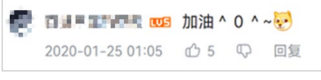
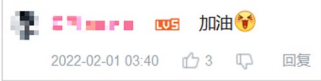


To understand change in the use of SFPs in the Chinese language more broadly, we also collected data about the usage of SFPs from the Google Book Ngram Corpus. The corpus consists of words and phrases (ngrams) and their usage frequency over time for quantitative analysis of linguistic and cultural trends (Michel et al., 2011). The Google Ngram trends for the 13 SFPs were obtained from 2010 to 2019, the latest year available on Google Ngram. Due to space constraints, we only display in Figure 5 the Ngram trends of the four SFPs with frequencies higher than 10% in our corpus (see Table 2, NE [呢], MA [吗], BA [吧], A [啊]). In contrast to the decreasing trends of some SFPs in our social media data, all of the SFPs in Google Ngrams show an increase in their frequencies, except for the SFP BEI [呗],<sup>8</sup> which shows an increasing trend from 2010 to 2015, but a decreasing trend from 2015 to 2019. The Ngram trends suggest that the increase over time of some SFPs in our corpus can be attributed to an overall trend for SFPs to be used more often, for example, as markers of orality in written genres. At the same time, the overall increasing trend in SFP usage makes our decreasing findings in Figure 3(a) stand out even more, and points more strongly to the influence of graphicon use.

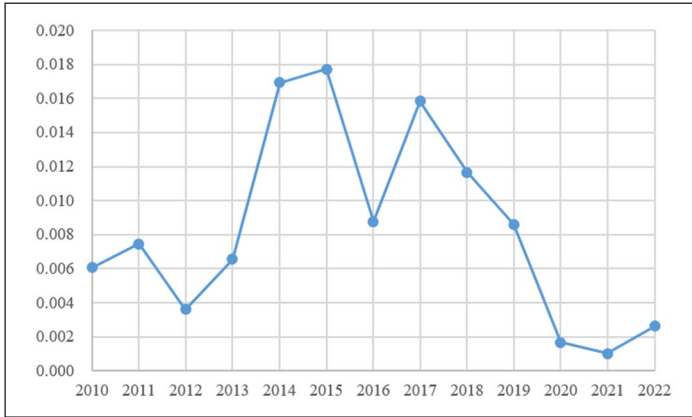
## Stages of interaction between SFPs and graphicons

This section explores the interaction between SFPs and graphicons from a qualitative perspective. We focus on the case of the most frequently occurring SFP, A [啊]. A concordance search of A [啊] in our corpus revealed that the phrase ‘keep it up’ is the most frequent text segment that occurs before the SFP. We thus manually examined messages that include the phrase ‘keep it up’, identifying cases that illustrate patterns of interactions between the SFP and graphicons. Selected examples are shown in Table 2.

The SFP A [啊] can be used as a mood indicator or an expressive SFP. When used after the phrase ‘keep it up’, the SFP fulfills the expressive function of enhancing the

**Table 2.** Examples of SFPs and graphicons.

No.	Year	Format	Example
1	2013a	Phrase + SFP	 B Site! Keep it up in the new year [A]!
2	2013b	Phrase + punctuation	 Keep it up, B Site ~~~ Up, up, up, up~
3	2015	Phrase + SFP+Kaomoji	 Everyone keeps it up [A] [smile]
4	2018	Phrase + Kaomoji	 Keep it up [smile]
5	2020	Phrase + Kaomoji + Emoji	 Keep it up [smile] ~ [doge face]
6	2022a	Phrase + Emoji	 Keep it up [laugh]
7	2022b	Phrase + Sticker	 Keep it up [Diana heart hands] [Bella heart hands]
8	2022c	Phrase + SFP	 Keep it up [A]



**Figure 6.** Co-occurrences of SFPs and graphicons.

encouraging mood, and it is a nonobligatory element of the sentence. It can be used to reinforce an encouraging mood (Example 1 & 8), or it can be skipped (Example 2) in textual utterances that also lack graphicons. When the SFP is followed by a smile kaomoji (Example 3), the graphicon functions as an IFID (Herring and Ge-Stadnyk, forthcoming) to enhance the cheering mood and intensify the positive affect of the message. Graphicons can also replace the SFP with positive emotions, including smiling (kaomojis in Examples 4 & 5), laughing (emoji in Example 6), and the ‘heart hands’ gesture (sticker in Example 7). Where graphicons are used instead of the SFP, the graphicons appear to be functionally equivalent to the SFP. Emojis and stickers are more visually expressive and illustrative of positive emotions than kaomoji, however.

The examples in Table 2 are displayed in the chronological order in which they were posted, suggesting a diachronic trajectory according to which a graphicon was first added to the SFP, and later the SFP was replaced by one or more graphicons.<sup>9</sup> To verify the trend, we charted the co-occurrences of SFPs and graphicons at the end of a message for the entire corpus. As shown in Figure 6, SFPs and graphicons are increasingly used together from 2010 to 2015, but co-occurrences of the two saw significant decrease from 2017 to 2022.

Based on these examples and the trends of co-occurrence of SFPs and graphicons, we propose a three-stage model to describe the interactions between SFPs and graphicons, as shown in Table 3.

At the first stage, SFPs are used by themselves to indicate the illocutionary force of the preceding text. At stage 2, graphicons are used after an SFP to reinforce the encouraging mood. These graphicons are pragmatically marked for positivity and visual appeal (cf. Konrad et al., 2020). At this stage, graphicons and SFPs are in a syntagmatic relationship, and graphicons can only be used after SFPs. At stage 3, we posit that the functions of graphicons start to conventionalize with frequent usage, becoming pragmatically ‘unmarked’ (Konrad et al., 2020) and taking on the functions of the SFPs they appear together with. As they conventionalize, they become redundant with SFPs, so the SFP tends to be dropped and replaced by one or more graphicons. This leaves graphicons in

**Table 3.** A three-stage model.

Stage	Pattern	Pragmatic markedness of graphicons	Relationship between SFP and graphicons	Examples from Table 2
1	SFP	–	–	2013a
2	SFP + Graphicon(s)	Pragmatically marked	Co-occurrence, syntagmatic	2015
3	SFP/Graphicon(s)/ SFP + Graphicons(s)	Pragmatically unmarked	Alternative, paradigmatic	2013a, 2022c 2018, 2020, 2022a 2015

a paradigmatic relationship with SFPs. However, as degree of pragmatic markedness could be understood differently by individual users, it is not surprising to find that SFPs and graphicons still co-occur at this stage.

## Discussion

We now bring together the quantitative and qualitative findings to explore the impact of graphicons on language use. Based on a longitudinal corpus of comments from the Bilibili platform, we found that there is indeed a relationship between graphicons and language use over time. The increasing usage of graphicons was found to be significantly correlated to the decrease of SFPs over the 13-year period. However, the correlation of the overall trends is sensitive to the types of graphicons and SFPs. Kaomojis were found to be most significantly negatively correlated to the decrease of SFPs. Although kaomojis developed into a complex sign system for meaning construal in the Japanese context (Kaneyasu, 2022), the kaomojis in our corpus were mainly used for emotion expression. As graphicons evolved and kaomoji were largely replaced on Bilibili by emojis and stickers, the functions of the new graphicons expanded beyond emotion expression (e.g. Zhang et al., 2022; Herring and Ge-Stadnyk, forthcoming; Tang et al., 2021). This could explain why the correlations between SFPs and emojis and stickers in our data are less clear than between SFPs and kaomojis. Moreover, we found that SFPs with grammatical functions or connotations of negativity were less likely to be replaced by graphicons.

Graphicons have generally been considered as a type of ‘compensation’ (Androutsopoulos, 2011) for language or paralinguistic (e.g. Dresner and Herring, 2010; Logi and Zappavigna, 2021). However, the frequent co-occurrences of graphicons with SFPs enable graphicons to take on more of the functions of SFPs. We posited that this process is facilitated by pragmatic unmarking, which tends to weaken the emotionality and expressivity of graphicons through frequent use over time (Konrad et al., 2020). When graphicons are increasingly functionally parallel to SFPs, the graphicons and SFPs become redundant with each other, and their co-occurrence becomes less likely based on the principle of linguistic economy, according to which shortened message forms are preferred in communication (Androutsopoulos, 2011). That is, the economy principle drives them into a competitive relationship. This trajectory is also supported by our quantitative results.

Unexpectedly, we found an overall increasing trend for SFPs in Google Ngram. As the Google Ngram data are drawn from published written books, the increase of SFPs suggests an overall historical trend for spoken language features to be incorporated into writing. This phenomenon has been described as ‘informalization’ (Jucker, 2003), whereby features of informal conversational style are incorporated into formal speech or writing. The trend toward informality in written genres is accelerated by the Internet (McCulloch, 2019). The increasing trends shown on Ngram make the decrease of some SFP frequencies in our social media corpus even more notable, and lend support to the conclusion that the decrease was caused by a corresponding increase in graphicon use on Bilibili.

## Conclusions

Over a recent 13-year period, graphicons were first used on Bilibili as compensation for paralinguistic features together with SFPs, but they gradually became alternatives to SFPs that can either replace or co-occur with SFPs. This finding, to our knowledge, is the first solid piece of evidence that graphicons are having an impact on standard features of verbal language. Digital language innovations have long been assumed to rise and fall (Androutsopoulos, 2011; Konrad et al., 2020). Emojis have replaced textual Netspeak features (Pavalanathan and Eisenstein, 2016), and emoticons have been replaced by emojis and stickers (Konrad et al., 2020). Our systematic micro-diachronic study (Androutsopoulos, 2011) illuminates how and why one aspect of the ‘rise and fall’ is taking place on Chinese social media. The competitive perspective we advanced provides new insights into the functions of graphicons from a diachronic perspective. It implies, for instance, that graphicons could eventually grammaticalize as SFPs and become (non-obligatory) parts of Chinese grammar. More generally, the change of perspective in the relationship of graphicons to the grammatical systems of languages could affect the interpretations of the meanings and functions of graphicons in future studies.

The study also has broader implications for digital communication. Despite the growing concern in the popular media that graphicons are degrading language (Thurlow and Jaroski, 2020), our findings suggest that graphicons are enriching language rather than impoverishing it. On the one hand, when complementing text, graphicons provide information about the type and strength of emotions being expressed, compensating for facial expressions, prosody, and gestural cues in face-to-face communication. On the other hand, when in a paradigmatic relationship with a grammatical category such as SFPs, graphicons take on textual functions while also preserving some of their emotional expressivity, thereby investing new nuances of meanings into the category of SFPs. In these ways, verbal language is enriched by graphicons both synchronically and diachronically.

This study’s limitations highlight several opportunities for further research. First, each individual sentence final-particle should be studied more in-depth. Ideally, future research should correlate specific categories of graphicons with SFPs. However, since the meanings and functions of graphicons are constantly evolving, whether it is possible to have a one-to-one mapping between graphicons and SFPs remains an open question. Second, the investigation was limited to the platform Bilibili. As the Google Ngram data show, the frequencies of SFPs are increasing overall. Thus, it remains to be seen how



extensive and how persistent the impact of graphicons on SFPs will be in other types of Chinese discourse. Finally, the impact of graphicons on verbal language is almost certainly not limited to SFPs in Chinese. For instance, the use of modal expressions such as ‘surprisingly’ and ‘ridiculously’ may be affected by graphicons, since a major function of graphicon use is tone modification (Dainas and Herring, 2021). The competitive perspective advanced in this study thus suggests new directions for the study of language change as it takes place through online discourse.

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### Notes

1. In Chinese theoretical linguistics, the term ‘illocutionary force’ is used to refer to these phenomena. The term ‘mood’ from Anglophone linguistics is used here to avoid potential confusion with the pragmatic notion of ‘illocutionary force’.
2. <https://m.jiemian.com/article/7167482.html>, retrieved April 4, 2022.
3. <https://space.bilibili.com/1868902080>, retrieved April 4, 2022.
4. <https://www.bilibili.com/read/cv1069082>, retrieved April 5, 2022.
5. A phonetic transliteration of the English word ‘hello’.
6. In statistics, a power law is a functional relationship between two quantities, where a relative change in one quantity results in a proportional relative change in the other quantity, independent of the initial size of those quantities.
7. <https://www.bilibili.com/read/cv5906662?from=search>, retrieved March 13, 2023.
8. The frequency of BEI [呗] is too low to be shown in the figure.
9. These examples were selected to show an idealized evolutionary trajectory. In our corpus, not all combinations of the phrase with SFP or graphicons fall within the time frames indicated in Table 2.

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