The pragmatics of text-emoji co-occurrences on Chinese social media

Xiran Yang and Meichun Liu
Shanghai Jiao Tong University | City University of Hong Kong

This paper explores the pragmatics of emojis co-occurring with or embedded in text on Chinese social media with this central research question: what are the patterns and the communicative functions manifested by emojis in co-occurrence with Chinese text? Building on the metafunctional approach of multimodal analysis, popular online posts from Sina Weibo which contain both emoji(s) and text have been collected and analyzed to discover the representational, interactive, and compositional features manifested by emojis co-occurring with text. We have found that these emojis on Weibo appear most frequently at the end of the posts and reflect some unique Chinese cultural and linguistic features. Based on recurring pragmatic and functional patterns of text-emoji co-occurrences, it is proposed that emojis are used to perform speech acts, highlight subjective interpretations, and enhance informality, while substituting, reinforcing, and complementing the meanings conveyed by verbal language.

Keywords: text-emoji co-occurrence, metafunctions, multimodal analysis, componential patterns, pragmatic functions, speech acts

1. Introduction: Research question and object of study

The growth of social networking has highlighted the quickly emerging and evolving expressive means of emojis as an essential element of multimodal literacy (SwiftKey 2015; Danesi 2017; Herring and Dainas 2017; Ge and Herring 2018; Bai et al. 2019; see also Kress 2003).[1] Originating in Japan, emojis are chromatic graphic icons which are usually seen as successors to emoticons, which consist of ASCII symbols and were first used in the US (Moschini 2016; Hakami 2017; Aull

1. The word 'emoji' could be singular and plural, and could also be pluralized (Danesi 2017, 2). In this paper, 'emoji' is used as a singular term, with 'emojis' as its plural form.

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2019). The Romanized word emoji is a blend of the Japanese words "*e* 'picture'" and "*moji* 'character'" (Rodrigues et al. 2018).

Visually adapted to various digital platforms, emojis are now widely accepted and extensively used in China (Lu et al. 2016; Jaeger and Ares 2017; Ge and Herring 2018). Emojis as non-linguistic (or paralinguistic) elements often co-occur with linguistic expressions and form text-emoji co-occurrences, offering pragmatic assistance as well as semantic complements. Such co-occurrences are not haphazard, but appear to follow certain patterns. What, then, are the patterns and the communicative functions manifested by emojis in co-occurrence with Chinese text?

In this study, we adopt a multimodal approach to addressing this question with our data drawn from Sina Weibo (Weibo henceforth), one of the most popular and influential social media platforms in China (Chiu et al. 2012; Zhou and Wang 2014; Fuchs 2014; Rauchfleisch and Schäfer 2015).[2] We are particularly interested in Weibo posts which consist of both text and emoji(s), here referred to as text-emoji co-occurrences, or text-emoji mode mixtures.

The main reasons for choosing Weibo as our data source include the following:

a. It is one of the largest Chinese social networks, with millions of active daily users (Chiu et al. 2012; Rauchfleisch and Schäfer 2015).
b. It is a public platform that allows any user to follow any other user and read any post that is not marked private.
c. It is used by news agencies, corporations, and even governmental organizations to access public opinion.
d. While emojis on Weibo are limited in variety compared to the more culturally diversified Unicode emojis, they carry more Chinese cultural and linguistic features.

In particular, the data of this study were collected from "Hot Weibo", which is a column that automatically pushes trending and popular Weibo posts. The criteria for labelling hot Weibo posts include the amount of reposts and comments. As Weibo does not support data extraction or emoji mining through direct site request, we manually collected hot Weibo posts of Chinese text-emoji co-occurrence from February 1 to May 20, 2017.[3]

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2. The term 'Weibo' refers to Sina Weibo (http://weibo.com/) in this study.

3. We are not using existing corpora of Weibo posts mainly because they have no readily available information on the popularity or accessibility of the posts.

2. Theoretical framework and background

2.1 Multimodal studies and the metafunctional approach

Building on the metafunctional approach of systemic-functional theories (see Halliday 1994), multimodal analysis involves non-linguistic and paralinguistic resources for meaning-making (Kress and van Leeuwen 2001, 2006; Baldry and Thibault 2006). The metafunctional approach has the potential to account for all modes and forms of meaning-making, offering a top-down frame in which anatomic analyses can be conducted (O'Halloran 2004; Kress and van Leeuwen 2006; Painter et al. 2013; Jewitt et al. 2016).

In language use or any form of communication, there are three metafunctions that reflect different aspects of meaning-making: the ideational metafunction construes experience of the world, either with linguistic coding or other semiotic display; the interpersonal metafunction covers social and attitudinal aspects of the discourse; the textual metafunction is concerned with coherence and cohesion in discourse (Halliday 1994; Halliday and Hasan 1976; Kress and van Leeuwen 2001, 2006; Baldry and Thibault 2006). In the context of multimodal discourse, the ideational metafunction is also referred to as representational, the interpersonal as interactive, and the textual as compositional (Kress and van Leeuwen 2006; Baldry and Thibault 2006; Jewitt 2014; Jewitt et al. 2016). Although different terms are used to better capture the expanded potential and modal variety of discourse components and realization, the essence of each metafunction remains relatively unchanged.

Text-emoji co-occurrences comply with the three metafunctions via multimodal meaning-making. They are multimodal in nature since emojis are usually seen as pictograms, providing a refreshing visual alternative to plain text. Thus the patterns and communicative functions of text-emoji mode mixtures are best studied within a multimodal framework. In multimodal analysis, mode is not strictly defined, and is usually used to refer to a set of socially and culturally shaped resources for meaning-making (MODE 2012; Jewitt 2014). Emojis on their own can also be seen as multimodal since they may highlight imagistic or verbal meaning-making processes by activating iconic or symbolic semiotic channels. Emojis can thus be subcategorized into iconic emojis (e.g. smileys), symbolic emojis (e.g. horoscope/star signs), and emojis which contain both iconic and symbolic features. In this study, emojis are viewed as a multimodal component (alongside text) but are not further classified.

Past research on emojis and social media has touched upon various aspects of text-emoji mode mixing. The relations between emojis and text have been found to be mostly complementary or substitutional (Cramer et al. 2016; Ai et al.

2017; Danesi 2017; Ge and Herring 2018). Ai et al. (2017) find that emojis representing entities usually act as replacement to words, whereas emojis expressing sentiments tend to co-occur with and complement text with attitudes and tones. Danesi (2017) studies text message exchanges containing emojis and groups the pragmatic functions of emojis into two main categories: adding tone and injecting a positive mood, while other functions such as salutation, punctuation, and irony are also discussed.

Regarding the pragmatic values of text-emoji strings, Herring and Dainas (2017, 2187) have identified six pragmatic uses of graphicons (emojis, stickers, etc.): mention, reaction, riff, tone modification, action, and narrative sequence. While their study focuses on conversational exchanges and not the co-occurrence of text and emojis, it offers a comprehensive series of steps for investigating mixed modes. Ge and Herring (2018) focus on the speech acts of emojis and the rhetorical relations between emojis and their accompanying text. Ge and Gretzel (2018) have examined the emoji-based communicative strategies of Sina Weibo influencers.

In text-emoji co-occurrences, emojis play a critical role in creating and modifying meaning. Different emojis may shade the same verbal message with different sentiments and attitudes; different verbal messages may activate different senses of the same emoji (Wijeratne et al. 2016; Hakami 2017). Such usages of language in combination with emojis point to an integrated stratum of meaning which combines verbal text and graphical emojis. This stratum is most effectively studied from a metafunctional framework which explores representational, interactive, and compositional aspects of communication.

2.2 Special features of Weibo emojis

Unlike emoticons which consist of ASCII symbols and usually require readers to tip their heads from one side (e.g. :D) to the other (e.g. <3) to grasp the meaning of the horizontal display, emojis are easier to view with their upright and colorful design. Previous studies have compared the two alongside other graphicons such as stickers and custom images (Herring and Dainas 2017; Rodrigues et al. 2018; Tang and Hew 2018; de Seta 2018). Because emojis reflect users' emotions and attitudes in digital communication, they have been considered as multimodal tokens in sentiment analysis and opinion mining (Wolf 2000; Krohn 2004; Churches et al. 2009; Zhao et al. 2012; Schnoebelen 2012; Novak et al. 2015).

While some emojis can be understood across languages and cultures, using emoji as part of the communicative language remains culturally and linguistically dependent. Speakers from different regions or of different languages may prefer different emojis or usages (Lotherington and Xu 2004; Ljubešic and Fišer 2016;

Lu et al. 2016; Sampietro 2019). The interpretation of emojis as part of multimodal discourse, especially alongside co-presented text, is influenced by the text, the linguistic features, and the context (see Halliday and Hasan 1989; Stöckl 2004; Coulson 2006).

According to the Unicode Consortium, the Unicode of each emoji is composed of a Unicode string that identifies it across platforms, and a linguistic description of the emoji's graphic representation (Miller et al. 2017; Hakami 2017; see also Davis and Edberg 2019). Since pictorial appearance is not standardized by the Unicode, the same emoji would have different graphic renderings when displayed on different digital platforms (See Emojipedia).[4]

The emojis available on Weibo are different from emojis that are registered on Emojipedia. While Unicode emojis could be posted on Weibo through smartphones or other devices that have various input systems, Weibo has a set of idiosyncratic emojis specifically designed for use on Weibo. A Weibo emoji, similar to a Unicode emoji, has a pictorial appearance and a verbal description. Unlike other Unicode emojis, however, some particular aspects of Weibo emojis include the following (see Section 4.1. for examples):

a. The verbal description is usually in Chinese.
b. Certain emojis have strong Chinese cultural or linguistic features.
c. Certain emojis are animated with wiggling/flickering effects when displayed on Weibo.[5]

Some Weibo emojis are integrated with the Chinese language and culture, and particular to the communication of users from the online Chinese community. Despite their distinctive features and extensive use, Weibo emojis (and their interaction with text) have been comparatively less studied than Unicode emojis.

4. http://emojipedia.org/

5. In this study moving emojis are still viewed as emojis because (1) the moving effect of emojis on Weibo is simplistic and serves to highlight the emojis, and (2) the moving feature is not held across platforms and once reproduced outside Weibo they will mostly become static (like in this paper).

3. Methodology

3.1 Data collection

Our data set was collected over a period of over three months (February 1 to May 20, 2017) via the column of Hot Weibo.[6] We manually collected Hot Weibo posts that contain both text and emoji(s). The posts were mainly from verified accounts of news agencies, websites, celebrities or other popular media accounts which have large numbers of followers. While online influencers may have contributed extensively to the pool of popular posts, different from other studies which have targeted online influencers' accounts (Ge and Gretzel 2018), our approach to data collection relied on the popularity of the post as the main criterion.

As we primarily focus on text-emoji co-occurrences, we confine the data and analyses to the two types of mode/component: Chinese text and emojis. Posts in which text and emojis co-occur, but whose meaning cannot be understood without referring to other co-presented modes, are excluded to maintain semantic completeness of text-emoji co-occurrences. Altogether we obtained a total of 408 Chinese text-emoji mode mixing posts or strings as our data set.[7] Each text-emoji co-occurrence is seen as an independent unit in the analysis. While not large, still we consider this data set to be representative as the posts, which were popular among users, were collected over a period of over three months.

Some of the Weibo posts may contain a title/headline, which is usually bracketed (' 【】 '), ahead of its main body. Emojis may appear in the title and/or main body of a post. Since the title and the main body have a hierarchical relation, they are collected separately.[8] Within the title or main body, the strings are not further segmented to provide a more holistic picture of emojis used in each post. The title or main body of a Weibo post that contains both text and emoji(s), therefore, is a unit of analysis.

In this study, while emoji-only strings are not discussed at length, it should be noted that emojis have great potential for making meaning, even without assistance from verbal text (see Xu 2012; Mrowiec 2016; Herring and Dainas 2017).

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6. Some posts in our data set might no longer be accessible through the search engine on Weibo now because some accounts have been set so they only show posts in the past 6–12 months, and some posts may have been removed by the users.

7. Since the posts were publicly accessible when we collected them, the ones containing names have not been excluded. In the examples reproduced in this paper, the names mentioned in the posts are replaced with initial letters for ethical concerns.

8. When there are emoji(s) in both title and text of the same post, the post will be divided and counted as two units of text-emoji co-occurrence. About 3.8% of the posts originally collected are of this type.

3.2 Framework of analysis

We study the patterns and communicative functions manifested by emojis mainly by focusing on the representational, interactive, and compositional features of emojis in text-emoji co-occurrences. Viewing text and emojis as two components, we propose a group of componential patterns to capture some recurring pragmatic and functional structures in text-emoji co-occurrences.[9]

The representational features of emojis are analyzed by first looking at visual-semantic representations of single emoji items on Weibo, and second by grouping and systematizing the patterns in which text and emojis co-occur based on the number, type, and positioning of emojis. The number of units is taken as the frequency of different patterns.

The interactive features of emojis when co-occurring with text are approached from their emotion-arousing implications and their potential for facilitating social exchanges (see Churches et al. 2009, 2014; Jaeger and Ares 2017; Ge and Gretzel 2018). Like other forms of communication, emojis could be used to convey attitudes and realize interpersonal exchanges (Gibson et al. 2018; Aull 2019; Bai et al. 2019). We draw upon the speech act theory in highlighting the illocutionary forces, i.e. the forces to perform acts, of emojis when they are co-presented with text (see Austin 1962; Searle 1976; Bach and Harnish 1979; Yule 1996; Skovholt et al. 2014).

The compositional features of text-emoji co-occurrences are based on the visual coherence and reflected by the cohesive patterns in which text and emojis jointly realize the componential integration (see Halliday and Hasan 1985/1976; Kress and van Leeuwen 2006). The componential patterns displayed in the data reflect the compositional structures of text-emoji co-occurrences and showcase the visual interface of pragmatic functions and practices on Weibo.

Overall, the metafunctional framework of multimodal analysis is top-down as it outlines the three strata in which the actual meaning-building and pragmatic functions unfurl. Within this ternary structure, theories of meaning construction, speech acts, and textual cohesion are employed to interpret the multi-layered pragmatics of emojis.

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9. Emojis could be regarded as a mode for its visual consistency in display even though the semiotic nature may range from predominantly iconic to predominantly symbolic in different items.

4. Emojis in representation

4.1 Visual-semantic features of Weibo emojis

Compared with emoji sets in iOS and on Twitter, the most conspicuously special Weibo emojis are those that have been integrated with the symbolic meaning of the Chinese characters, such as '  ' (神马 *shén mǎ*, homonymous to 什么 *shén me* 'what') and '  ' (V5 *V-wǔ*, homonymous to 威武 *wēi wǔ* 'awesome'). Other unique Weibo emojis include those that represent Chinese traditions and concepts, such as '  ' (红包 *hóng bāo* 'red packet'), and those that reflect online memes and trending words/expressions, such as '  ' (二哈 *èr hā* 'silly dog husky') and '  ' (互粉 *hù fěn* 'to follow each other/become each other's online friend on Weibo').[10] Furthermore, some seemingly common emojis have acquired new senses on Weibo, such as '  ' (再见 *zài jiàn* 'bye'). Instead of bidding farewell, this emoji could be used to express discontentment or cold shouldering on Weibo. For example, in "别人家的男朋友 *bié rén jiā de nán péng yǒu* '(Look at) Other people's boyfriends'  ", the emoji is attached to express the will to part ways with the unsatisfactory boyfriend (probably) of the one posting because others' boyfriends have done better. Note that although there are some Unicode emojis that are from built-in input systems of various terminals, most of the emojis found in our data come from the emoji set on Weibo.

4.2 Visual patterns of text-emoji co-occurrences

Emojis are typically found to be either following a sentence or substituted into the sentence (Cramer et al. 2016; Ai et al. 2017). We have found that in a text-emoji co-occurrence, the text is interspersed with emoji(s). Table 1 shows some examples of posts with varied text-emoji representational patterns.[11]

To classify the representational patterns of text-emoji co-presentation in posts, we have examined the number and type of emojis when they appear together with text. In a text-emoji co-occurrence, wherever emojis appear, there might be a single emoji (single), multiple identical emojis (replicated), or multiple different emojis (mixed), forming an emoji grouplet (which consists of a single

10. Red packets are red envelopes containing money that are given to children during the Chinese New Year. Husky dogs are believed to be troublemakers because they could be overly energetic, especially when kept indoors. See Zhang (2017) for more discussions on the integration of Arabic numerals and Chinese on the internet, such as the V5 emoji.

11. The examples are shown in Chinese and pinyin, with word-by-word (sans person, number, tense, and some particles) and overall English translations.

Table 1. Examples of different text-emoji co-occurrences

No.	Text-emoji co-occurrences	Category
(1)	【永未　落地的　MH370 航班💔】 【*yǒng wèi luò dì de MH370 háng bān*💔】 never　landed　MH370 Flight 'The Flight MH370 that never landed 💔'	Final-single
(2)	【开国少将　再陨　一员🕯🕯🕯　仅　剩　这 【*kāi guó shào jiàng zài yǔn yī yuán*🕯🕯🕯 *jǐn　shèng　zhè* founding general　again　die one　only remain these 最 后　30 人了】 *zuì hòu* 30 *rén le*】 last　30 people 'Another of the founding generals passed away 🕯🕯🕯 only 30 are still alive'	Inset-replicated
(3)	Y 入驻　上海　杜莎夫人蜡像馆，🧐　Y家　兄弟， Y *rù zhù shàng hǎi dù shā fū rén là xiàng guǎn*，🧐 *Y jiā　xiōng dì*， Y enter　Shanghai Madame Tussauds　the Ys brothers 相似度　太 高了！👈👍 *xiāng sì dù tài gāo le*！👈👍 likeness　so high 'Y enters Madame Tussauds Shanghai, 🧐 brothers Y, so much alike! 👈👍'	Multiple- (single +mixed)

emoji or multiple emojis).[12] Meanwhile, the positions of emoji grouplet(s) in a co-occurrence unit include onset (one grouplet at the beginning of the text), inset (one grouplet in the middle of the text), final (one grouplet at the end of the text), and multiple emoji grouplets embedded in different positions of the text. The labels "single", "replicated", and "mixed" are used to indicate the type of an emoji grouplet; the labels "onset", "inset", "final", and "multiple" are used to categorize text-emoji co-occurrence units based on the positioning of emoji grouplet(s).

Here we propose a diagram (Diagram 1) to categorize text-emoji co-occurrences along four representational dimensions: (1) number of emoji grouplets in one co-occurrence unit, (2) positioning of emoji grouplets in one

12. The word "grouplet" is used as an umbrella term to refer to any instance of emoji(s) that is preceded and/or followed by text within a unit. A grouplet does not contain text.

co-occurrence unit, (3) number of emojis in one grouplet, and (4) type of emojis in one grouplet. This categorization reflects the visual patterns of text-emoji co-occurrences.

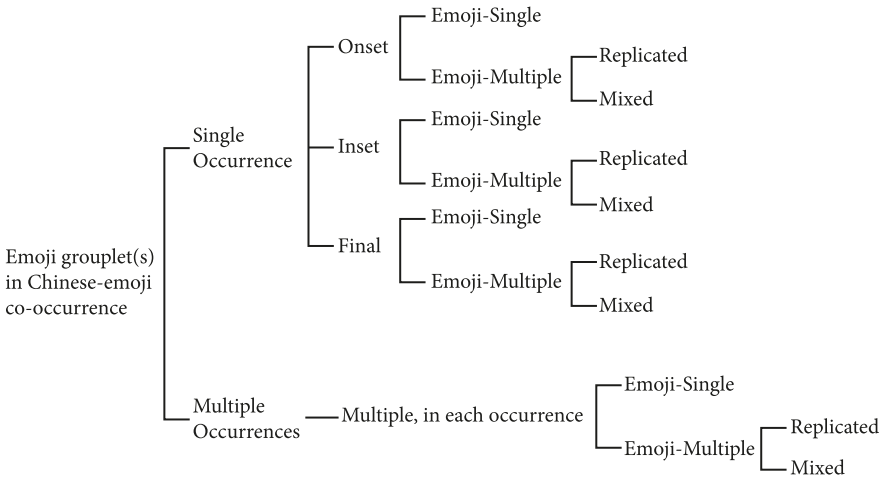

Diagram 1. Representational patterns of text-emoji co-occurrences

The distribution of different representational categories is shown in Table 2. Overall, approximately 77.5% of text-emoji co-occurrences only have emoji(s) at the end (the "Final" category), of which about 80% only have a single emoji. Within the "Multiple (occurrences)" category, 86.4% of the posts contain final-positioned emoji(s).

Table 2. Percentage of different categories of text-emoji co-occurrences

	Text-emoji representational category				
(%)	**Onset**	**Inset**	**Final**	**Multiple**	**Subtotal**
Subtotal	1.7%	4.6%	77.5%	16.2%	100%

A contingency table (Table 3) is given to summarize the detailed frequencies of different emoji grouplets and their positions in different categories of text-emoji co-occurrence. In the "Multiple (occurrences)" category, one unit contains multiple emoji grouplets; other categories only contain one emoji grouplet. Altogether, there are 486 emoji grouplets in the data.

In general, the distribution is skewed towards the final positioning of emoji(s) and the single emoji occurrence. When inserting multiple emojis as one grouplet, the users prefer repeating the same emoji over mixing different emojis. We have observed a common representational pattern of "text followed by emoji(s)" in the

Table 3. Number of emoji grouplets of different types and in different positions

	Position of emoji grouplets				
Type of emoji grouplets	**Onset**	**Inset**	**Final**	**Multiple**	**Subtotal**
Single	6	15	256	110	387 (79.6%)
Replicated	0	4	45	28	77 (15.9%)
Mixed	1	0	15	6	22 (4.5%)
Subtotal	7	19	316	144 (in 66 units)	486 grouplets

co-occurrence units, which suggests that text is the principal method of coding information in these posts, and that emoji(s) contribute additional meaning to the preceding text. This might be in line with earlier studies in which emojis have been found to carry complementary or supplementary meaning to accompanying words (see Danesi 2017; Ai et al. 2017; Ge and Herring 2018).

Based on the metafunctional approach of multimodal analysis and the cognitive meaning-constructing model raised by Coulson (2006), the readers rely on the imagistic feature of emojis to decide the meaningful and structural linkages between the emojis and the accompanying text. In real communication, a single emoji is found to be understood in different senses (Wijeratne et al. 2016). However, different from what has been suggested in some previous studies, we do not consider this potential for ambiguity to be an obstacle in analyzing emoji-embedded text. Rather, we view the multimodal meaning-making of text-emoji as a compositionally based interactive process that allows for flexibility in terms of representational expression. In other words, the multimodal meaning of text-emoji co-occurrence is not only represented by its visual form, but is also generated by functional relations between text and emoji(s). The communicative functions of text-emoji co-occurrences are further examined from interactive and compositional perspectives.

5. Emojis in social interaction

Emoticons were first used to complement the lack of access to emotional contagion or empathy in digital communication (see Hatfield et al. 1993; Churches et al. 2009, 2014; Yuasa et al. 2011; Skovholt et al. 2014), and emojis have further extended the options and convenience of such practice (Tauch and Kanjo 2016; Vidal et al. 2016; Jaeger and Ares 2017; Aull 2019; Smith and Rose 2019). Emojis could be seen as a part of social exchange that is visually materialized and has

become almost indispensable with the rise of information technology (Wolf 2000; Crystal 2006; Danesi 2017; Bai et al. 2019).

For a particular text-emoji string, there are interactive meanings conveyed and realized with the assistance of emojis. The most common interactive functions of emoji(s) observed in this study include performing speech acts, highlighting subjective interpretations, and enhancing informality.

5.1 Speech acts of emojis

Any utterance in actual use carries three layers of force to indicate the implied act: locutionary, illocutionary, and perlocutionary (Austin 1962; Searle 1969/2011; Yule 1996). Like words, emojis and emoticons can be used to perform speech acts and facilitate communication (Dresner and Herring 2010, 2014; Vandergriff 2013; Ge and Herring 2018; dos Reis et al. 2018). Ge and Herring (2018) build on the speech act taxonomy in computer-mediated discourse (see Herring et al. 2005) to categorize the illocutionary acts of emoji sequences on Sina Weibo, discovering that claim, desire, and explain are among the most frequently used acts.

In this study, we highlight the illocutionary force of emojis, which is usually activated by semantic content of the co-occurring text. The referent of the illocutionary act could be objects or notions mentioned in co-occurring text, or textual meaning in general. The acting power of emojis is examined in the context of text-emoji co-occurrence because when an act is being executed by the emoji(s), it is part of the message that is delivered by the text-emoji co-occurrence. We draw upon the general classifications of illocutionary acts and discussions of perlocutionary intentions proposed by Bach and Harnish (1979) and Searle (1976) to label the acts exemplified here (Table 4).

On Weibo, one distinctive emoji that has been used to conduct speech acts is the lit candle emoji '🕯️', which expresses condolences or R.I.P. in posts that contain messages of casualty, mourning, or obituary. In such cases the lit candle emoji carries the illocutionary force of sympathizing or expressing condolences towards the deceased that is often understood from the text or context. On the receiving end, the emoji could effectuate the perlocutionary force of making the readers believe that whoever posts the emoji is mourning and thus appear to be compassionate.

5.2 Highlighted subjective interpretation

Re-posting is frequently seen on social media. We have noticed that when re-posting news briefings, those re-posting, either agencies or individual users, might change emojis in the re-posted news while maintaining the verbal text, reflecting

Table 4. Illustrating speech-act analysis of emojis in co-occurrence units

No.	Co-occurrence units
(4)	【突发！#南宁 某 职业学院 学生 跳 楼#🔥】 *【tū fā! #nán níng mǒu zhí yè xué yuàn xué shēng tiào lóu#🔥】* sudden Nanning a vocational school student jump building 'Breaking news! #A student of a vocational school in Nanning jumped off the roof#🔥' Locutionary act (representational meanings of the emoji): a lit candle stick Illocutionary act: acknowledgement/expressive – expressing condolences and mourning towards the roof-jumping event reported in the preceding text Perlocutionary act (intention): to make the readers believe that the poster is mourning
(5)	论 选择的 重要性 不要 相信 低价 护肤品🤔 *lùn xuǎn zé de zhòng yào xìng bú yào xiāng xìn dī jià hù fū pǐn*🤔 discuss choice's importance do not trust cheap skin care product 'Choice matters Do not trust cheap skin care products🤔' Locutionary act (representational meanings of the emoji): waving goodbye/leaving/parting ways Illocutionary act: directive – refusing or dismissing the low-priced cosmetics mentioned in the preceding text Perlocutionary act (intention): to make the readers believe that they need to refuse cheap cosmetics

the posters' subjective interpretations of the re-post. Examples are given in Table 5.[13]

It can be observed from Table 5 that the reported speech of the rule-breaking driver "我以为可以 (*wǒ yǐ wéi kě yǐ)* 'I thought it was allowed'" has maintained both its verbal content and its relative position to emoji component, while the rest of the verbal information has undergone some minor changes. In general, the information conveyed by text has been left undisturbed in all the re-posts. The emojis included, however, are drastically different.

In Example (6) the emoji depicts a dismissive character that does not seem to take the incident seriously, thereby implying the referent of the emoji is the driver, since the poster of the news is unlikely to be indifferent to the violation of traffic law. In Example (7) an emoji of ashamed face is used after the verbal text, indicat-

13. Example (6) was accessed from the Hot Weibo column. The posts in Table 5 are not in chronological order.

Table 5. Same (or similar) news posts with different emojis

No.	News posts (by different posters)	Emoji descriptors
(6)	【在 高速上 倒车逆行, 司机: 我 以为 【*zài gāo sù shàng dào chē nì xíng, sī jī: wǒ yǐ wéi* on highway back a car driver I think 可以🤔】 *kě yi*🤔】 allowed	Throwing hands up/ dismissive
(7)	【司机 在 高速上 倒车逆行: 我 以为 【*sī jī zài gāo sù shàng dào chē nì xíng: wǒ yǐ wéi* driver on highway back a car I think 可以😅】 *kě yi*😅】 allowed	Sweating/ashamed
(8)	【高速上 倒车逆行 司机: 我 以为 【*gāo sù shàng dào chē nì xíng sī jī: wǒ yǐ wéi* (on) highway back a car driver I think 可以😵】 *kě yi*😵】 allowed	Suffering/pathetic
Eng.	'Backing the car on highway. The driver: I thought it was allowed (Emoji)'	

ing that the driver was mortified of the incident. In Example (8) the emoji features a shocked/overwhelmed face that, instead of a troublemaker, looks like a victim.

All three emojis in Table 5 have complemented the verbal information. However, the different emojis have exerted considerable influence over the original post, supplying different complementary information and judgement about the driver's reaction towards the incident. Simply attaching different emojis can alter how the same incident is interpreted. While emojis generally highlight subjective stance and attitude, those emojis in different re-posts more obviously reveal different attitudes.

5.3 Enhanced informality

Another important and probably more general interactive and pragmatic function of emojis is their power in promoting informality and accessibility. In digital communication emojis are usually associated with informality and a casual tone, and they are often assumed to be used more frequently among peers, friends, and rel-

atives (Danesi 2017). On Weibo, emojis are not only used by ordinary users but have also been incorporated into news briefs and short reports that are publicized by officially acknowledged accounts/users (see Zhou and Pan 2016). Once emojis are embedded, the over-all tone of the message becomes less formal and sometimes more approachable, especially with serious genres such as news brief (see Table 4 and 5).

While news reports are supposed to appear authoritative and formal, online platforms such as Weibo have to some extent mollified the rigid impression, partly by inserting emojis to make the news publishers appear more approachable to their audience. The use of text-emoji co-occurrences on Weibo has encouraged and created more informal and casual exchanges and contexts. The inclusion of emojis also helps make the news posts stand out and compete for readers' attention along with commercial and entertaining posts.

6. Compositional and componential patterning of text-emoji co-occurrences

6.1 Compositional relations

The textual or compositional meaning is manifested primarily through the coherence and cohesion of the discourse (Halliday and Hasan 1985/1976; Kress and van Leeuwen 2006). On the platform of Weibo, text-emoji co-presentation is but part of the entire discourse, which contains other multi-semiotic resources (see Baldry and Thibault 2006; Herring and Dainas 2017). Here we focus on the interaction between Chinese text and accompanying emoji(s), observing how their co-dependence contribute to coherence and cohesion. This part leads to the establishment of the componential patterning of text-emoji co-occurrences by specifying compositional relations between text and emojis, and identifying the functions of emojis in the co-occurrences.

Coherence and cohesion refer to structural and semantic ties that are found among different components of the text (see Halliday and Hasan 1985/1976; Halliday 1994; Kress and van Leeuwen 2001, 2006; Baldry and Thibault 2006). The expansion of componential modality to include emojis means that the realization of coherence and cohesion is also expanded. The compositional relations are based on representational and interpersonal meanings of text-emoji co-occurrences, engaging visual attention and constructing coherence and logical relations.

Cohesive devices commonly found in textual discourse include reference, substitution, and lexical cohesion (Halliday and Hasan 1985/1976, 29). Taking into consideration the multimodal features and meaning-making potential of emojis,

we have observed mainly four types of compositional relations between text and emojis in the data: substitution (where emojis are used to substitute lexical or phrasal items in the text, e.g. ' ' for 'flight'), co-reference (where emojis and verbal elements refer to the same meaning or semantically related concepts, e.g. ' ' and 'cake/birthday'), complement (where emojis are used to code additional tones or other information to verbal text), and others (where the patterning of text and emojis cannot be identified by the previous three types).

These patterns are basically in line with the findings from other emoji studies that used English or Chinese-based examples, namely that emojis could be used to complement, reinforce, and replace words, and that emojis could be used on their own to tell stories (Danesi 2017; Herring and Dainas 2017; Ai et al. 2017; Ge and Herring 2018). However, unlike previous emoji-related analyses, we use a componential approach to sketch the interactive patterns between text and emojis, and distinguish between different uses of complementary emojis – external tonal, internal tonal, and non-tonal.

6.2 Componential patterning

We view text and emoji as two types of component in making meaning on Weibo. Combining the visual patterns and pragmatic functions revealed so far, we propose a set of quasi-compositional rules that would incorporate the communicative features of text-emoji co-occurrences. Since the compositional relations are built between text and emojis, they are termed as componential patterns, indicating that the two different components are seen as interdependent chunks in forming collective meaning.

The basic componential patterning of text-emoji co-occurrence takes shape according to the aforementioned compositional relations, and is manifested in five basic types: componential substitution, inter-modal reinforcement, tonal complement (external and internal), non-tonal complement, and creative illustration. Here the categories are divided and re-named to reflect not only the cohesive ties, but also the forms and functions of text-emoji co-occurrences, as well as the relevant findings in previous studies (see Danesi 2017; Ai et al. 2017). The five basic structures assign different roles to text and emojis to build a multimodal layer of meaning. Within the basic structures, text and emojis have the capacity to formulate various representations and perform interactive functions.

Before elaborating on the basic patterns, key terms of componential patterning are defined and explained as follows:

a. (Componential) Meaning: the meaning of text and the meaning of emojis. The meanings examined in componential patterns are usually labeled in

generic and categorical manner, leading to logical and semantic relations between different components.

b. (Componential) Agreement: the compatibility between the meaning of text and the meaning of emojis. Agreement can be found along a continuum from entirely identical meaning between text and emoji (which may never be achieved), to related meanings or concepts, to logical matches. Note that obvious discrepancies between text and emojis in their co-occurrence would probably render rhetorical meanings such as sarcasm.
c. (Componential) Functions: the contextualized pragmatic functions that reflect the representational, interactive, and compositional aspects of text-emoji co-occurrences.
d. Projection: the reference to, reflection of, or quotation of a certain (part of) component. For example, an emoji could be used to project the information mentioned in the accompanying text, or to project the role of the poster.

In the following analyses, the subscripts of angle brackets ('$< >_{\text{componential meaning}}$') describe the componential meaning of the component, and the subscripts of square brackets ('$[\ ]_{\text{componential agreement}}$') describe the agreements between text and emojis (as two components) that are pinpointed in each case.[14]

In *componential substitution* (Table 6), the meaning of the whole message is usually not complete without including emoji(s) as part of the verbal text. The role of emojis compensates for the obligatory part of the text in line with the grammatical patterns of Chinese. If emojis appear after a noun, they are likely to assume an attributive or modifying function. If an emoji co-occurs with a verb, it likely fills in an adverbial gap.

In *inter-modal reinforcement* (Table 7), the emojis usually repeat or reinforce the notion/object mentioned in the text. Namely, the text or part of the text and the emojis refer to the same or similar concepts. Since different people may associate the same emoji with different meanings, the exact pairing of inter-modal reinforcement might be debatable sometimes. It is, however, mostly straightforward when part of the information conveyed by text is repeated or reinforced by co-referring emojis.

In tonal complement and non-tonal complement, emojis encode meanings beyond the co-presented text, and provide tonal/sentimental/attitudinal or other types of information alongside the text, which then usually becomes (partly)

14. Most of the examples in this section contain a single emoji to reflect the predominant representational pattern in text-emoji co-occurrences on Weibo. Multiple identical emojis in one text-emoji co-occurrence could be interpreted as holding visual emphasis; multiple different emojis would be analyzed separately (see Ge and Herring 2018).

Table 6. Componential substitution

Componential Patterning	
Example	外交 部  *wài jiāo* *bù* foreign affairs ministry 'Ministry of Foreign Affairs'
Meaning	[<Ministry of Foreign Affairs> $_{\text{state institution}}$]$_{\text{topic/modified}}$[<> $_{\text{awesome}}$]$_{\text{modifier}}$
Agreement	A logical match found between the name of an institution 'Ministry of Foreign Affairs' and the emoji that indicates positive properties '' (awesome)
Functions	To substitute Chinese characters with more visually salient components; to enhance the informality of the message that mentions an authority
Pattern	Componential substitution: the emoji '' substitutes a verbal modifier (e.g. awesome) for the preceding text

Table 7. Inter-modal reinforcement

Componential Patterning	
Example	父子俩 对话, 笑死人啊！ *fù zǐ liǎng* *duì huà,* *xiào sǐ rén ā!* father and son conversation laugh so hard 'A conversation between father and son, lots of laugh!'
Meaning	[A conversation between father and son, lots of <laugh> $_{\text{laugh}}$!]$_{\text{related meaning}}$ [<> $_{\text{laughing/hilarious}}$]$_{\text{related meaning}}$
Agreement	A pair of related/similar meanings found between the word 'laugh' and the emoji of laughing expression '' (laughing/hilarious)
Functions	To reinforce verbal message; to visually highlight/emphasize the funny property of the message
Pattern	Inter-modal reinforcement: the emoji '' reinforces the preceding text/word 'laugh'

projected. Here the text and emojis do not refer to the same concept but complement each other to formulate a larger meaningful unit. Functions such as tone-adding/modifying are included in the tonal category (see Danesi 2017; Herring

and Dainas 2017). Functions such as adding contextual or other non-tonal/non-sentimental information are included in the non-tonal category.

Based on our data, the category of tonal complement could be further divided into two sub-categories. *External tonal complement* (Table 8) refers to the cases in which emojis are used to express the post writer's personal attitude, while *internal tonal complement* (Table 9) indicates the cases where emojis depict the attitudes or tonal features of the characters or concepts mentioned in the co-occurring text. Either way, it should be noted that the use of emojis is mostly a subjective choice.

Table 8. External tonal complement

Componential Patterning	
Example	车水马龙 的街道上, 司机们 为一 条 流 浪的 *chē shuǐ mǎ lóng de jiē dào shàng, sī jī men wèi yī tiáo liú làng de* busy (on) a street drivers for a stray dog 汪让路.....❤️ *wāng ràng lù.....*❤️ make way 'Drivers make way for a stray dog on a busy street.....❤️'
Meaning	[<Drivers make way for a stray dog on a busy street.....>$_{\text{warm/adorable scene/action}}$]$_{\text{projected message}}$ [<❤️>$_{\text{heart/love/fondness}}$]$_{\text{external comment/tone}}$
Agreement	A logical match is found between the words that describe a warm and adorable scene/action and the emoji of positive feelings '❤️' (heart/love/fondness)
Functions	To complemnt verbal message; to visually present the posotive attitude of the one posting (toward the warm and adorable scene/action)
Pattern	External tonal complement: the emoji '❤️' serves as tonal information of the post writer to comment on the preceding text

Complementary information other than tones or attitudes, such as contextual and other circumstantial information, is covered by the category of *non-tonal complement* (Table 10).

The last category, i.e. *creative illustration* (Table 11), includes idiosyncratic usage and creative expression, which are made possible by online platforms where the conventional use of language is constantly being challenged. Users are free to combine text and emojis however they like with whatever logical rules they prefer. We avoid using terms that imply sequencing or linearity because even though the established patterns mostly follow linear order, it is possible to formulate non-linear mixtures of text and emojis. As diversified as this structure may be, this pattern is rare in our data mainly because the posts we have examined are

Table 9. Internal tonal complement

Componential Patterning	
Example	【在 高速上 倒车逆行, 司机: 我 以为 可以】 【*zài gāo sù shàng dào chē nì xíng, sī jī: wǒ yǐ wéi kě yǐ*】 on highway back a car driver I think allowed 'Backing the car on highway, the driver: I thought it was allowed'
Meaning	[<Backing the car on highway>$_{\text{traffic violation}}$<The driver>$_{\text{character}}$: I thought it was allowed]$_{\text{partly projected message}}$ [<>$_{\text{dismissive attitude}}$]$_{\text{internal comment/tone}}$
Agreement	A logical match is found between the word 'driver' (the rule-breaking character) and the emoji indicating a dismissive attitude '' (throwing hands up/dismissive)
Functions	To complement verbal message; to visually present the questionable attitude of the character in question
Pattern	Internal tonal complement: the emoji '' serves as descriptive information of the character to partly project the text

Table 10. Non-tonal complement

Componential Patterning	
Example	中国 最 美 十大 古镇, 你 去过 几个? *zhōng guó zuì měi shí dà gǔ zhèn, nǐ qù guò jǐ gè?* China most beautiful top 10 ancient town you been to how many 'Top 10 most beautiful ancient towns in China, how many have you been to?'
Meaning	[<Top 10 most beautiful ancient towns in China>$_{\text{scenic attractions}}$, <how many have you been to?>$_{\text{engaging question}}$]$_{\text{projected and contextualized message}}$[<>$_{\text{crowds/tourists}}$]$_{\text{contextual information}}$
Agreement	A logical match is found between an engaging question on scenic spots/attractions and the emoji indicating the context of the question, namely crowds and tourism '' (crowds/people)
Functions	To complement verbal message; to visually present the contextual and circumstantial information of the message
Pattern	Non-tonal complement: the emoji '' serves as non-sentimental information to help contextualize and specify the text

popular ones that are composed for the general public on Weibo to read and are therefore less challenging in intelligibility.

Table 11. Creative illustration

Componential Patterning	
Example	 , ...脑补 故事  , *...nǎo bǔ gù shì* make up story '  , ...making up a story'
Meaning	[<  , >$_{\text{emojis with meaning-making potential}}$]$_{\text{illustration}}$[<...making up a story>$_{\text{message related to emojis}}$]$_{\text{verbal description}}$
Agreement	Idiosyncratic relations that are appointed by the one posting are found between the text and emojis in this unit that could be understood in different ways without additional contextual information
Functions	To satisfy creative and idiosyncratic needs in expression
Pattern	Creative illustration: the emojis co-presented with text in ways that the user prefers and approves

While most of the componential links could be categorized based on the relations of the emojis and the text which have clear pragmatically functioning patterns or tend to recur in the data set, there are also creative links established by individual preferences. Although the general componential structures should apply to make the co-occurrences intelligible to others, the co-occurring patterns may change and new templates or structures might be able to emerge and stabilize through creative associations.

Of all the co-occurrence units we have examined, nearly 90% of them contain only one type of componential patterns. For the cases with one type of componential function, the distribution of the patterns is summarized in Diagram 2.

External tonal complement (71.2%) appears to be the most popular pattern of text-emoji co-occurrence on Weibo. Another commonly seen pattern is intermodal reinforcement (23.6%), and the other three patterns only play minor roles in the larger picture (internal tonal complement 1.6%; non-tonal complement 1.6%; componential substitution 1.4%; creative illustration 0.6%).

While both supplementary (replacement/substitution) and complementary (co-presentation) uses of emojis (see Ai et al. 2017) are seen in our data, our findings show that the supplementary use is less popular on Weibo, and the complementary use could be divided into different patterns depending on the nature and target of modification. Adding emojis as complementary message to convey the

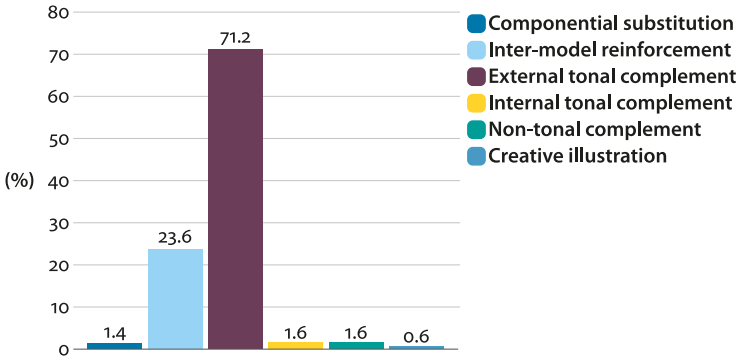

Diagram 2. Distribution of the componential patterns (%)

poster's attitude or opinion seems to be the common reason to use emojis in our data set.

Similar to Ge and Herring (2018)'s category of "evaluation (using emojis to give subjective comments)", our notion of tonal complement represents one of the prominent usages of emojis alongside text on Weibo. However, the category that takes up the highest percentage in Ge and Herring's study, "restatement", is not comparable to any of our categories since most of our inter-modal reinforcement cases would likely be interpreted as "partial repetition" which holds no rhetorical significance in their framework. The discrepancy might have been due to the different purposes of study and criteria used for data collection.

Function-wise, the category of inter-modal reinforcement in our study may correspond partly to Herring and Dainas (2017)'s category of "mention" based on data from Facebook, although their study is not confined to the co-occurrences of text and emojis. Also, their category of "tone" resembles our proposal of tonal complement. Our findings have verified the popularity of these two types of pragmatic functions also observed in their study. It seems that the patterns may hold to some extent for both Chinese and English text with emojis.

In general, emojis are mainly used to complement or reinforce textual information, with intentions to highlight certain points, perform acts, and build more informal and usually less authoritative voices and exchanges. Meanwhile, emojis also carry other pragmatic functions such as punctuating and attention seeking that could also be attributed to the interpersonal and interactive aspect of text-emoji co-occurrence (see Sampietro 2016; Danesi 2017).

7. Conclusions, limitations, and prospective studies

This paper examines the patterns and communicative functions of Weibo emojis in their co-occurrence or co-presentation with text. While emojis can be used independently in making meaning (see Mrowiec 2016; Herring and Dainas 2017; Ge and Herring 2018), we highlight the mode-mixing of pictographic emojis and textual Chinese that produces an extra layer of meaning which carries pragmatic forces. This approach partly echoes the view that emojis could form a paralanguage (see Bai et al. 2019). Based on the data from Weibo, we have found that text-emoji co-occurrences have a multimodal layer of meaning in which emojis may not only substitute, reinforce, or complement text, but also perform speech acts, highlight subjective interpretations, and convey higher degrees of informality and/or casualness.

The metafunctional framework adopted from multimodal studies is used to structure our analysis of text-emoji mode-mixing. After classifying the representational patterns of text-emoji co-occurrences by the number and position of emojis in one co-occurrence and the number and type of emojis within one emoji grouplet, we have found that the most popular visual display of text-emoji co-occurrence in our data is the "single-emoji-at-final-position" pattern, where the text is followed by one emoji. This observation confirms the findings of previous studies based on other social media platforms (see Novak et al. 2015; Cramer et al. 2016; Danesi 2017). Meanwhile, we have found in our data that emojis with their visual-semantic features are employed to perform speech acts, profile subjective attitudes, add casualness or approachability to a post, and in general make the messages more dynamic and enriched.

Viewing text and emojis as two components, the componential patterns help reveal their interactions and corresponding roles in the co-occurrences. The patterns of inter-modal reinforcement, tonal and non-tonal complement have been repeatedly observed in our data and have showcased some common ways of including and using emojis in computer-mediated communication on Weibo, one of the leading Chinese social media platforms. The finer division of complementary use of emojis helps distinguish different meaning-making patterns of emojis that are employed by Weibo users.

Against the background of multimodal discourse on social media, the scope and focus of this study are limited to the interaction of Chinese text and emoji(s) in Weibo posts. Although the multimodal approach is well-justified and revealing for studying text-emoji co-occurrences in such context, the combination of text and emojis may occur in places other than posts, such as comments and conversational exchanges among the users (see Herring and Dainas 2017; Gibson et al.

2018). It might be beneficial to systematically compare the use of emojis alongside text in different contexts and with different purposes.

Admittedly, emoji use is still undergoing change. New items and new meanings are being added; creative ways of using emojis are being invented. Nevertheless, when it comes to text-emoji co-occurrences, it is likely that new emoji items will comply with the basic patterns of co-occurrence, which, over time, may expand and grow, to enrich pragmatic dimensions in multimodal communication of the new media age.

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