"Nice Picture Comment!" Graphicons in Facebook Comment Threads

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Abstract

Facebook has increasingly incorporated graphical means of communication such as emoticons, emoji, stickers, GIFs, images, and videos ('graphicons') into comment threads. Adapting methods of computer-mediated discourse analysis, we analyze the frequency and pragmatic functions of each graphicon type in threads sampled from public graphicon-focused Facebook groups. Six main functions emerged from the data: mention, reaction, tone modification, riffing, action, and narrative sequence. Reaction was most common, and emoji expressed the widest array of functions. We propose structural, social, and technical explanations for variation in graphicon use, and suggest improvements for the design of conversational graphical elements in social media systems.

1. Introduction

Recently the Oxford Dictionaries chose the Crying Tears of Joy 😂 emoji as the 2015 word of the year, explaining that "emoji have come to embody a core aspect of living in a digital world that is visually driven, emotionally expressive, and obsessively immediate."[1] Considering this graphical symbol as a 'word' is in line with recent popular speculation that *emoji* (in Japanese, 'picture character') are evolving into a language of their own [24] – if not a complete grammatical system, at least a set of signs that can be used to convey propositions in conversational exchanges.

In this paper, we analyze the conversational uses of emoji and five other types of graphical devices found on contemporary social media platforms: emoticons, stickers, GIFs, images, and videos. As a shorthand for this set of devices, we introduce the term 'graphicons,' a blend of 'graphical' and 'icons' (cf. Greek *grafikon* 'graphics'). In particular, we investigate how and to what extent graphicons are used to convey meaning in public Facebook comment threads.

Facebook lends itself well to graphicon analysis, in that its interface allows users to employ all six graphicon types in their private messages and all except GIFs in comments on posts on Facebook Profiles, Pages, and Groups. This sets Facebook apart from other multimodal communication platforms such as Tumblr and Instagram, where some of the graphicon types are either unavailable, or not commonly used.

In what follows we first situate our investigation in relation to previous research on the use of graphical elements in digital conversation and identify the unique contribution of this study. We then describe our dataset of comment threads collected from public graphicon-focused Facebook groups, along with our methodology, which employs computer-mediated discourse analysis [8] to identify the pragmatic functions of the graphicons in context. Six main functions are identified and illustrated: mention, reaction, tone modification, riffing, action, and narrative sequence. Reaction was the most common function, and emoji were most prevalent and expressed the widest array of functions, whereas the other graphicon types tended to specialize for certain functions. We propose explanations for these findings in terms of the graphicons' structural properties, ease of use, and history; we also consider social factors associated with their use. In concluding, we identify challenges that arise in graphicon analysis and suggest changes that could be made to improve the design of graphical social media platforms.

2. Background

Emoticons formed from ASCII characters have been used in computer-mediated communication (CMC) since 1979 [4]. The general findings of emoticon studies indicate that they are multifunctional [27], having at least four uses in CMC that potentially overlap: (1) expression of emotion [4], (2) nonverbal signaling [1, 3, 14], (3) tone management or indication of illocutionary force [4, 12, 14], and (4) as punctuation or structural markers [1, 12, 20].

[1] http://blog.oxforddictionaries.com/press-releases/announcing-the-oxford-dictionaries-word-of-the-year-2015/, retrieved June 14, 2016.

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Initial research on *emoji* suggests that they fulfill similar roles as emoticons, although emoji are more visually complex and may be expected to function somewhat differently in CMC as a consequence. For example, [7] found that emoji had a greater effect than emoticons on reader perceptions of a writer's commitment and personal mood. At the same time, there are important limitations to emoji use, due in part to the fact that different viewing platforms render emoji differently. [16] found that people often disagreed on the sentiment and meaning of the same visual representation of an emoji, and these disagreements only increased when the "same" emoji were compared across platforms.

Research on photographic *images* typically does not focus on their conversational functions [e.g., 25, 26]. However, there are some notable exceptions. [28] examined the use of personal photographs in online chat. [15] analyzed a community image blog and found six conversation styles, including image quote and text-in-picture. [6] studied Radar, a mobile application that allows users to post personal photographs, including 'selfies,' to a private list of invited friends. Users of Radar sometimes exploited the chronological nature of the app to post sequences of images meant to tell a story. [5] found that images on a messaging application were woven into the thread of conversation meaningfully, rather than simply being mentioned.

Another study [10] explored how selfies are perceived and used in the U.S., U.K., and China through surveys and interviews. The respondents reported that selfies often elicited comments and encouraged conversational partners to send their own selfies in reply. U.S. respondents also indicated a high enjoyment of conversational partners 'playing on' shared images, especially on Snapchat.

An internet meme is a "particular idea presented as a written text, image, language 'move,' or some other unit of cultural 'stuff'" that is taken up and spreads rapidly [11, p. 202]. Considerable research has been done on how memes form and spread [e.g., 22, 23], but there has been less research on how such memes are used in conversational exchanges. An exception is [29], which explores CAHOOTS, a chat system that continuously analyzes participants' chat and suggests relevant humorous images and internet memes. In comparison to random image insertion and plain text chat, users preferred using CAHOOTS. They felt that the way the system allowed human and computer to riff off one another enabled them to express their unique sense of humor. Another study analyzed how internet memes were used in the Occupy Wall Street movement [17]. It found that image memes facilitated conversation from divergent perspectives and increased the accessibility of the discourse.

Little research has investigated how *videos* are included in ongoing conversational contexts, although [9] investigated how young girls use video messages to chat in VideoPal, an asynchronous communication system designed around the exchange of videos, and [19] analyzed a religious debate that occurred through the dyadic exchange of videos on YouTube.

GIFs are also understudied, although what research has been done is suggestive. The preliminary analysis of Tumblr posts carried out by [2] found that animated GIFs typically expressed reactions to previous propositions, and they expressed more emotion, more intensely, and were more positive in valence than text. Similarly, [18] characterized exchanges involving reaction GIFs and images in a *Sherlock* fan group on Tumblr as conversational interaction.

One of the very few papers to consider *stickers* [13] suggested that stickers, together with photographs, videos, and emoji, function to improve the interpretability of messages and help users express complex emotions. At the same time, the author noted (p. 3) that stickers can lend instant messages "an air of equivocation, allowing the conversation to be shaped by the different parties as it went along." This observation recalls the findings of [16] regarding the potential ambiguity of emoji.

There is thus considerable evidence that each graphicon type can function pragmatically in CMC, although little research has taken a conversational or discourse approach to graphicon use. Moreover, most previous studies have analyzed graphicon types individually, rather than comparing across types. In this study, we employ a discourse-pragmatic approach and systematically compare multiple graphicon types in order to understand how they function in relation to one another in conversational threads.

Specifically, we address two research questions:

RQ1: How often are different graphicons used in FB comment threads in groups devoted to graphical content?

RQ2: How do different graphicons function in FB comment threads in groups devoted to graphical content?

3. Methodology

3.1. Data

The use of multiple graphicon types in Facebook comment threads is a relatively new and as yet not widespread phenomenon. To locate groups with a rich concentration of graphicons to analyze for the purpose of this study, we searched in Facebook for the keywords (ASCII) Emoticons, Emoji/Smileys,

Stickers, GIFs, and Images/Memes.[2] No groups on the topic of ASCII emoticons were found, but we sampled two public groups from each of the remaining four categories, for a total of eight groups. See Table 1.[3]

Table 1. Public Facebook groups sampled

Cat GIFs Anime GIFs	EmojiXpress Smiley
Grumpy Cat Memes Nihilist Memes	Stickers Stickers FB

From each of these groups, we sampled three recent threads between January and May 2016 based on the number of comments and variety of graphicons they contained. The posts that served as prompts for the threads were dated between January 29, 2014 and May 15, 2016. The 24 threads included 2,888 comments and 975 graphicons. Of these, 527 graphicons were used by females, 377 by males, 7 by individuals identifying with a gender neutral pronoun, and 64 by non-personal accounts.[4] Gender was determined by following the link from a commenter's userID to their Facebook profile, where each user is referred to as either 'she/her,' 'he/him,' 'they/them,' or as a community (non-personal).

Perhaps due to the global appeal of images, the threads included many comments in languages other than English. We were able to translate most of the non-English comments,[5] especially since similar content was produced across languages. To check our translations, and for languages we did not know, we used Google Translate, the 'translate this' feature of Facebook, and/or we consulted native speakers.

3.2. Analysis Methods

An assumption of this study is that each graphicon occurrence potentially expresses meaning in conversational interaction, where 'conversation' is operationalized as message exchange in asynchronous comment threads. Computer-mediated discourse analysis, or "language-focused content analysis" [8, p. 4], was employed to analyze the frequency and pragmatic functions of each type of graphicon for each thread and group, taking into account the discourse context surrounding each instance of graphicon use. All 975 instances of graphicon use in the dataset were analyzed. (Facebook's 'reaction' emoji, which became globally available in late February 2016, in the middle of our data collection period, were not analyzed, because at the time they could not be used in comments, but rather only to react to posts.)

We adopted a grounded theory approach to allow the function categories to emerge from the data, and succesively refined the operationalization of each category through iterative coding. The interpretation of some graphicon usage was subjective, however, and coding was made more challenging by the fact that each group used graphicons somewhat differently. In order to identify all the functions attested in the data and reach saturation in our coding categories, the two authors ended up coding all of the data jointly, with disagreements resolved through discussion until consensus on the most likely interpretation of each graphicon in context was reached.

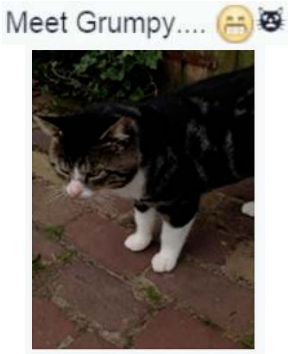
4. Findings

4.1. Pragmatic Functions of Graphicons

The main pragmatic functions that emerged through our analysis are: *mention* (vs. use), *reaction*, *riff*, *tone modification*, *action*, and *narrative sequence*. In addition, there were some *ambiguous* uses, and a few *other* uses. Each of these functions is operationalized and illustrated in this section.

Following the classic distinction in analytical philosophy of *mention* versus *use* [21], we first identified simple *mentions* of graphicons. These refer to the graphicon itself, in contrast to communicative uses of a graphicon. Examples 1-3 are graphicon occurrences that were coded as mentions.

1) [Grumpy Cats; Sourpuss thread; emoji and image]



(Cat emoji and photo are both 'mentions' of Grumpy.)

[2] We did not plan to analyze videos at first, so we did not search for video groups. However, since some videos were found in the comment threads, we decided to include them in our subsequent analyses.

[3] The quote in the title of this paper is from a comment posted to a group we did not select, Rough Roman Memes.

[4] No claims are made regarding the generalizability of the frequency distributions in our data to Facebook groups as a whole, since our sampling procedure employed judgment criteria rather than systematic sampling.

[5] The first author had studied 12 languages as a doctoral student in linguistics.

2) [Cat GIFs; Kisses thread;[6] emoji]

Muah 😘😘 of cats

(Emoji duplicate kissing motion implied by 'muah.')

3) [EmojiXpress, Purple theme thread; sticker]

I need this one. Srsly.

('This one' refers to the flag face sticker.)

All of the non-mention graphicon functions fall under the broad rubric of 'uses.'

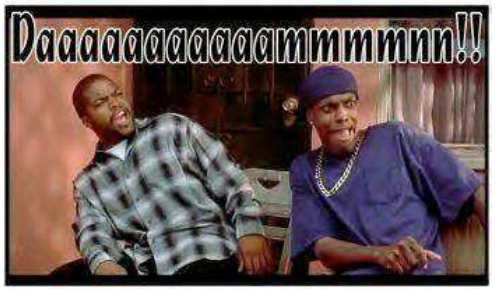
The first of these, *reaction,* was operationalized as a graphicon use that depicts an emotional response to content that was posted earlier in the thread, typically in the initial prompt. Examples 4-6 illustrate reactions. The emotions expressed are great happiness, gloom, and amazement, respectively.

4) [Cat Memes; Booty cat thread; emoticons]

=)))))))))))))) :)))))))))))))))))))))

5) [Anime GIFs; Goat thread; sticker]

6) [Anime GIFs; Goat thread; image]



Another type of response is *riffing*, a humorous elaboration on, play on, or parody of a previous graphicon or text comment. A prompt in the Nihilist Memes group, an anime-style image of a man with a bitter expression on his face and the superimposed text "Pancakes are too sweet for the bitter pain consuming my heart," triggered the riffs in examples 7-9.

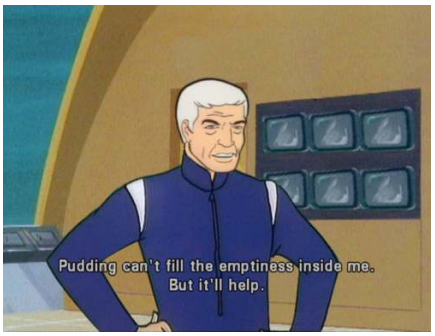
7) [Nihilist Memes; Pancakes thread; video]

(extends idea of pancakes in prompt to waffles)

8) [Nihilist Memes; Pancakes thread; sticker]

(reverses idea of [not] eating pancakes in prompt to [cat] eating pancakes)

9) [Nihilist Memes; Pancakes thread; image]



Text: 'Pudding can't fill the emptiness inside me. But it'll help.' (parodies idea of pancakes and emptiness in prompt as pudding and [partial] emptiness)

In contrast to stand-alone graphicons, *tone modification* is graphicon usage that directly modifies the text it accompanies. The graphicon functions as a nonverbal, paraverbal, or paralinguistic cue as to how the text should be interpreted. This includes the use of graphicons to clarify intent and hedge the illocutionary force of an utterance [cf. 4]. Consider examples 10-12:

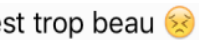
10) [StickersFB; Opi thread; emoji]

April 26 and I still don't get these stickers 😕

(in a discouraged manner)

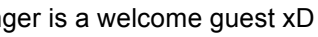
[6] Names of threads in examples were assigned by the authors.

11) [Smiley; Lantern thread; emoji]



(French) 'It's too beautiful'
(with intense emotion, fighting back tears)

12) [EmojiXpress; Blue theme thread; emoticon]



(delightedly)

An *action* is a graphicon used to portray a (typically) physical action. An action can sometimes substitute for the predicate in a text comment, as in the heart to mean 'love' in example 13. It can add a nuance of meaning, as do the praying hands in 14, or stand alone as a proposition, as in 15 (offering a rose).

13) [EmojiXpress; Blue theme thread; emoji]

14) [Smiley; Mug thread; emoji]

(in response to the prompt: "Who makes your life beautiful?"

15) [Anime GIFs; Bad boy thread; sticker]

A *narrative sequence* is a series of consecutive graphicons that tells a story of sorts. Two examples (along with approximate verbal glosses) are given in 16 and 17.

16) [StickersFB; Rilakkuma thread; emoji]

'Get well soon. May you eat fast food and chocolate, and your sickness break, ok?'

17) [EmojiXpress; Emoji stickers thread; emoji]

'Fuck you up there (who are complaining); zip it, ok?'

A few graphicons in our data were *ambiguous*, in the sense that they could have multiple distinct meanings. The graphicons in User5's comment in example 18 could be interpreted in several ways.

18) [Cat GIFs; Kisses thread; emoji]

In response to a prompt of two kittens "kissing", User5 posted in Spanish "But what cute kitties!" followed by a 'see no evil' monkey and a bear. What is the function of these two emoji: Are they riffs (other cute animals)? Or is the monkey a reaction, and the bear intended as a cat (mention)? The context of the thread does not provide sufficient cues to disambiguate.

Finally, a code of *other* was assigned for graphicon functions that did not fall into one of the above categories. An example is the use of repeated arrows[7] to point to the user's "favorite" emoji mentioned in ex. 19. (The two smirking emoji on the right express tone.)

19) [EmojiXpress; Emoji stickers thread; arrows]

4.2. Frequency Distribution of Graphicons

Table 2 displays the frequency distribution of the pragmatic functions of graphicons found in the 24 comment threads. Reactions were most frequent, followed by tone modification and then mentions. Riffs and actions were less common; sequences and other uses were infrequent; and ambiguous cases were rare.

Table 2. Frequency of graphicon functions

Function	Number	Percentage
Reaction	334	34.3%
Tone	247	25.3%
Mention	178	18.3%
Riff	95	9.7%
Action	66	6.8%
Sequence	24	2.5%
Other	24	2.5%
Ambiguous	7	0.7%
Total	975	100.1%

[7] A pointing finger emoji was also sometimes used in this deictic function.

Table 4. Graphicon function by graphicon type

Function	Emoji	Emoticon	Image	Sticker	Video	GIF	Totals
Action	55 (8.2%)	5 (4.3%)	2 (2.2%)	4 (5.3%)	0 (0.0%)	0 (0.0%)	66 (6.8%)
Ambiguous	6 (0.9%)	0 (0.0%)	0 (0.0%)	1 (1.3%)	0 (0.0%)	0 (0.0%)	7 (0.7%)
Riff	6 (0.9%)	3 (2.6%)	61 (**65.6%**)	8 (10.5%)	16 (**94.1%**)	1 (50.0%)	95 (9.7%)
Mention	142 (**21.1%**)	1 (0.9%)	13 (14.0%)	22 (**28.9%**)	0 (0.0%)	0 (0.0%)	178 (18.3%)
Other	14 (2.1%)	2 (1.7%)	6 (6.5%)	0 (0.0%)	1 (5.9%)	1 (50.0%)	24 (2.5%)
Reaction	215 (**32.0%**)	68 (**59.1%**)	10 (10.8%)	41 (**53.9%**)	0 (0.0%)	0 (0.0%)	334 (34.3%)
Sequence	24 (3.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	24 (2.5%)
Tone	210 (**31.3%**)	36 (**31.3%**)	1 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	247 (25.3%)
Total	672 (101.1%)	115 (99.9%)	93 (100.1%)	76 (99.9%)	17 (100%)	2 (100%)	975 (100.1%)

The distribution of graphicon types in the data is shown in Table 3. Emoji were used the most by far. ASCII emoticons were a distant second, and the other types each accounted for less than 10 percent of the total graphicon use.

Table 3. Frequency of graphicon types

Type	Number	Percentage
Emoji	672	68.9%
Emoticon	115	11.8%
Image	93	9.5%
Sticker	76	7.8%
Video	17	1.7%
GIF	2	0.2%
Total	975	99.9%

Table 4 shows the distribution of graphicon functions by graphicon type. The most common functions (in boldface) expressed by emoji were reaction, tone modification, and mention; emoji were also used more than the other types for actions and sequences. Emoticons most often expressed reactions, followed by tone, whereas stickers mainly expressed reactions, followed by mentions. In contrast, images and videos mostly functioned as riffs. Our small sample of GIFs (n=2) prevents us from drawing conclusions about their functions.

Table 4 also shows that videos are the only graphicon type that express only one function (riff). At least two graphicon types express each function, with one exception: Sequence is expressed only by emoji. All six types of graphicons can function as riffs.

These findings provide justification for our decision to consider the different visual elements as part of an overarching phenomenon. They show that while the functional profiles of the individual graphicon types are relatively distinct, the types overlap considerably in function. In this sense, they form part of an interrelated ecology of visual communicative elements.

Overall graphicon use also varies according to group category (cf. Table 1), as Table 5 shows. Use was densest in the two Emoji groups and sparsest in the Meme groups. The GIF groups patterned like the Meme groups, while the Sticker groups inclined in the direction of the Emoji groups.

Table 5. Graphicons per comment by group category

	Graphicons	Comments	Graphicons per Comment
Emoji	360	554	0.65
Sticker	79	190	0.42
GIF	272	911	0.30
Meme	264	1233	0.21
Total	975	2888	0.34

The two densest categories, Emoji and Sticker, had prompts that introduced new graphicon sets and that attracted many 'mentions' of members of the sets in the subsequent comments. This appears to account for the higher density of graphicon use in those categories.

It was not the case that the graphicons used in each group were mainly the same type as the group's focus, as might have been expected. Emoji were indeed most common in the two Emoji groups, and stickers were found most often in the Sticker groups. However, emoji, emoticons, and images were distributed relatively equally in the GIF groups, and emoji were favored over all other types in the Meme groups, where one might have expected images to be preferred.

4.3. Graphicons in Conversational Interaction

In addition to their pragmatic functions in comments, graphicons can also function as conversational turns in and of themselves, conveying propositional content. Of the 975 graphicons in our sample, 45.9% appeared by themselves, with no text. This occurred in all the functions, with the exception of tone marking, which accompanies text by definition.

Stand-alone reactions and actions such as those in examples 4-6 and example 15 function as turns in response to a prompt. In other cases, stand-alone graphicons respond to comments by other users in interactive exchanges. In example 20, User7 uses a smirking emoji following User6's comment that the cat in the prompt is like User7's cat Tinker. User7's emoji was coded as a reaction. But it also functions as a turn at the interactional level, communicating a proposition to the effect: 'I am wryly amused by your suggestion.'

20) [Grumpy Cats; Sourpuss thread; emoji]

In example 21, User9 posted "But waffles are shit, man," to which User8 responded with an image that contains text. 'Nah, son!' is a popular internet expression used for negation; the image is also a reverse image of the logo for the Hanson waffle company. This instance was coded as an action (of speaking, made explicit by the inclusion of the text in a speech bubble). In addition to being a clever intertextual reference, it functions as a conversational move expressing disagreement with the previous turn.

21) [Nihlist Memes; Pancakes thread; image]

5. Discussion

5.1. Research Question Revisited

Our research questions asked how often and in what functions graphicons are used in Facebook comment threads in groups devoted to graphical content. The relative frequencies of occurrence of the graphicon types can be represented as a hierarchy, with emoji most frequent and GIFs least frequent.

Emoji > Emoticon > Image > Sticker > Video > GIF

It is unsurprising that GIFs were rarely used, since the Facebook interface does not yet support their inclusion in comments. The low relative frequencies of occurrence of images, stickers, and videos, even in groups devoted to graphical content, are perhaps more surprising; they confirm our initial impression that use of multiple graphicon types is not yet common in Facebook comment threads.

As regards functions, the graphicons in our data were used most often to react to something, usually the initial prompt of the thread.[8] The relative frequencies of the functions can be represented as a hierarchy, with reactions most frequent and sequences least frequent.

Reaction > Tone > Mention > Riff > Action > Sequence

Each graphicon tends to specialize for function: emoticons are mostly used for reactions; stickers are used most in reactions, then mentions; and images and videos are used most to riff. In contrast, emoji express all of the functions, especially tone and reaction. The emoji results partially align with previous research on emoticons [4, 12, 14], which found that emoticons express tone modification and emotional reactions. But the present findings go beyond previous findings in that they identify riffing and narrative sequences, for example, as functions of emojis, but not of emoticons.

The association of videos and, especially, images with the function of riffing is also consistent with observations in previous studies [10, 29]. At the same time, the fact that other graphicon types are also used to riff shows that videos and images are part of a larger graphical communication system.

5.2. Explaining Variation in Graphicon Use

What accounts for the variation we found in graphicon use? At the level of the thread, we observed that different prompts triggered different kinds of responses. Prompts containing cats were more likely than other prompts to be responded to with personal

[8] Facebook's 'reaction' emoji function similarly, although there are much fewer of them.

photos and/or positive reaction emoji (ex. 2), for example. Threads that announced new graphicon sets, as in the Emoji and Sticker groups, attracted mentions of those graphicons (ex. 3). Prompts that asked questions (e.g., the Mug prompt in the Smiley group, which asked 'Who makes your life beautiful?') tended to receive comments tagging other users with reaction, action, or tone emoji (ex. 14).[9] Finally, prompts that referenced subcultural knowledge (such as those in Anime GIFs and Nihilist Memes) generated more riffing comments (exx. 7-9) than did other prompts.

More general explanatory factors can also be invoked. Structural factors such as size and dynamicity suggest that the graphicon types can be arranged in a hierarchy with videos as the most complex and emoticons as the least complex:

Videos > GIFs > Images > Stickers > Emoji > Emoticons

Graphicon complexity can also be mapped on a two-dimensional grid, with a third dimension, duration of movement, indicated by font size, as in Figure 1.

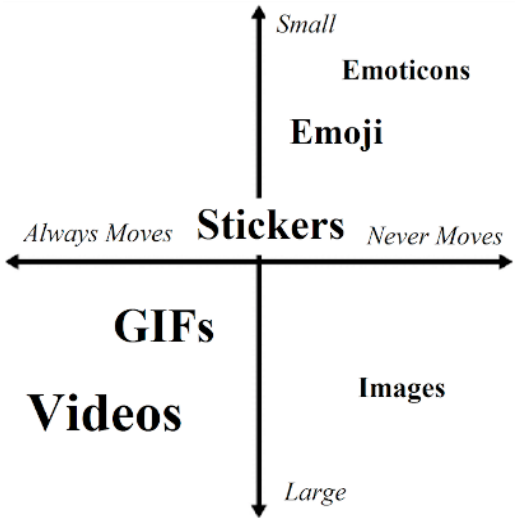


Figure 1. A map of graphicon complexity. Duration of movement is indicated by font size.

The complexity hierarchy is roughly an inversion of the frequency hierarchy in section 5.1, except that emoticons, stickers, and GIFs are less frequent than their complexity would predict. It may be that emoji, which are small, relatively static, and lacking in detail, but which are not as minimalist as emoticons, hit a sweet spot – they are neither too large nor too detailed, and thus lend themselves to a wide array of uses.

Historical and social factors also play an explanatory role. Emoji are well-established on numerous social media platforms, whereas stickers are relatively new and specific (so far) to Facebook on web platforms,[10] and GIFs are not currently enabled in Facebook comments. The variation in usage of the same graphicon type across Facebook groups also appears to reflect different user demographics and to express in-group identification. For example, Nihilist Memes and Grumpy Cat Memes are both Meme groups, but the members of Nihilist appeared more sophisticated (and possibly older and more educated) than those of the other group. Emoji, a relatively less complex graphicon type, are mainly used in Grumpy Cats, whereas the graphicon types used on Nihilist are more complex and varied (e.g., exx. 7-9 and 21).

6. Conclusions

6.1 Implications

We have shown that the graphicon types analyzed here are part of a larger ecology of visual communication devices that share functions, at the same time that they specialize for certain functions more than others. This specialization is due to a variety of factors, including the graphicons' complexity, social history, and technical ease of use; the current greater popularity and functional range of emoji within that ecology can be similarly explained. An implication of this finding is that as other graphicon types become more familiar and accessible, their frequency and range of functions are likely to increase, reducing the functional space taken up by emoji, similar to how emoji have taken over many of the uses of emoticons.

Our analysis also suggests that, all else being equal, the complexity (size, dynamicity, and duration) of a graphicon is associated with the frequency of its use. This suggestion could be tested experimentally. If supported, it would have implications for the design of graphicons by sites such as Facebook that seek to encourage graphicon use.

More generally, this study provides further evidence [cf. 2, 5, 6, 15, 18] that users are disposed to adapt graphical means – even those originally intended for unrelated purposes such as entertainment or general amusement, for example videos and text-in-image memes – as conversational devices. It follows from this that other kinds of graphics, such as three-dimensional representations, may well be similarly adapted in future computer-mediated communication.

[9] In such cases, the commenter often appeared to be simultaneously reacting to the prompt and orienting to their Facebook friend addressed in the tag.

[10] Stickers can be used on mobile platforms via applications such as LINE.

6.2. Limitations

In order to have sufficient data for this study, we analyzed only threads in groups focused on graphicons, but an obvious next step would be to apply similar methods of analysis to other Facebook threads and messages in other social media platforms to determine if the functions identified here capture more general graphicon use. Also, the threads we analyzed were public, which enabled us to access and collect them easily, but it remains an open question how graphicons are used in private conversations.

It was beyond the scope of this study to investigate cultural variation in graphicon use, although as it happened there were many non-English comments in the threads we analyzed. Research into such variation is needed to determine whether the pragmatic functions we identified are similar or different for different cultural linguistic groups, and what graphicons are preferentially used to fulfill those functions.

A challenge in graphicon research is that the intended meaning of some instances of use depends on personal or social context that is inaccessible to a researcher considering only manifest content. In this study, we drew on the discourse context in which each instance was embedded to identify the most plausible interpretation, but it would be useful to interview Facebook users about their graphicon use as a complement to the analysis of threads carried out here.

These interpretive difficulties were compounded by inconsistencies in the ways graphicons are rendered. The Facebook interface did not consistently display all posts or comments over multiple visits or on different platforms. One of the authors, a Windows user, could never see some emoji that displayed for the other author, a Mac user. We also found some emoji to be ambiguous, even when they rendered the same for both of us; an example is the wide-grinning/grimacing emoji in ex. 2, which one author sees as happy and the other author sees as angry.[11] We took screenshots of threads from a single computer and coded the screenshots as a way to reduce these ambiguities, but some inherent ambiguities remained.

6.3. Recommendations for Graphicon Design

The problems identified above, as well as those reported for emoji in [16], suggest several design improvements that might be made to graphicons and the platforms that support them. Obviously, graphicons should render reliably and consistently across computing platforms. Solutions also appear to be needed to reduce the likelihood of misunderstandings resulting from ambiguous graphicons. Facebook has tried to address the inherent ambiguity of individual emoji by adding text labels to their 'reaction' emoji, although it remains to be discovered to what extent users actually employ 'reactions' in their labeled meanings. It would be possible to attach labels to all emoji (and all graphicons); indeed, a number of graphicons already include text overlays, such as stickers depicting cute animals with the words 'thank you' or 'good night,' and animated GIFs with text indicating what the person in the GIF is saying. Even videos on social media are increasingly using text overlays to repeat or summarize the video's content.

At the same time, some degree of ambiguity is inherent in communication and is not necessarily undesirable; as [13] observes, ambiguous graphicons can facilitate a more fluid kind of conversation that is "shaped by the different parties as it [goes] along." This may be desirable in some situations, such as in flirtatious communication, which is common between social media users. A more flexible alternative to fixed labeling would be to allow users to attach text of their choosing to graphicons on a use-by-use basis.

Second, our analysis suggests that the size of some graphicons limits their usage. If the larger graphicons could appear on the same line as text, or if multiples of more complex graphicons (see Figure 2) could appear in the same comment, it would likely expand their range of functions, e.g., to include tone marking and sequences, which are currently expressed mostly by (smaller) emoji and emoticons. Relatedly, some stickers convey relatively simple information; they would likely be used more if their size were reduced or scalable to better match their complexity.

Finally, the frequency of a graphicon type is affected by its ease of use on various web-based and mobile interfaces, as is evident from the paucity of GIFs in the comments we collected. We recommend that Facebook support users inserting GIFS in public comments. This is likely to happen eventually, since GIFs are already available in Facebook messaging.

6.4. Future Outlook

In this paper we presented a descriptive snapshot of graphicon use in Facebook comments in graphics-rich groups in the first half of 2016. The incorporation of visual elements into digital conversations is a relatively recent phenomenon; all indications are that it will continue to expand in popularity, on Facebook as well as in other digital media. This expansion will necessitate follow-up study by scholars of digital media, including contextualized research that employs discourse and conversation analysis.

[11] Since the semantics of individual graphicons was not part of our analysis, this did not prove to be a serious problem for our study, fortunately.

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