A CMDA Approach to Studying Graphicons

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Abstract

Graphicons (Herring & Dainas, 2017) and their uses in interpersonal online discourse have attracted attention from varied disciplines, yet research on how graphicons function in digitally mediated discourse is in its infancy. Graphicons such as stickers, images, and GIFs, which have been understudied due to their larger size and greater complexity compared to emoticons and emoji, are especially understudied. This article applies the Computer-Mediated Discourse Analysis (CMDA) framework (Herring, 2004) to a review of literature that deals specifically with these understudied graphicons. The review illustrates a continuity between text-based computer-mediated discourse (CMD) and graphical CMD, demonstrating that graphicons can be studied at all four levels of CMDA and that graphicons share discursive functions across CMDA levels. Additionally, it highlights the importance of utilizing a variety of methodological approaches in a multitude of contexts to fully assess how graphicons function discursively. The article concludes by discussing the challenges and limitations of the approach taken and potential directions for future research.

Introduction

In the modern world, an increasing amount of human communication takes place through computer-mediated communication (CMC) and uses *graphicons* (Herring & Dainas, 2017), or graphical icons. Graphicons began to enter computer-mediated discourse (CMD) in the early 1980s with simple ASCII emoticons but have now expanded to include emoji, stickers, GIFs, memes, and personal photos. Given that graphicons are becoming increasingly central to how people communicate online, a scholarly consideration of graphicons will improve our understanding of how human communication is adapting to these changing times.

However, the rapid changes in what graphicon types are available and how they are used has left researchers scrambling to keep up, particularly as regards how to collect, analyze, and interpret multimodal data involving graphicons. The current research is also scattered across many disciplines (e.g., linguistics, information science, communications, media studies, and computer science), leaving most researchers unaware of each other's work and sometimes unknowingly retreading the same ground. Additionally, there is a broad tendency in CMC research to investigate the newest phenomena without making connections to long term trends (Ellison & boyd, 2013). This tendency appears to hold true in graphicon research as well. Alongside this tendency, researchers may also focus only on the most common and easily searchable graphicon type (currently emoji, but previously emoticons), leaving us with a quite limited understanding of other graphicon types such as images, stickers, and GIFs (Herring & Dainas, 2017). In many ways,

research has only just begun to scratch the surface of how graphicons function in digitally mediated discourse.

One consistent finding of graphicon research is that graphicons are multifunctional (e.g., Dainas, 2023; Herring & Dainas, 2017). This review proposes that this multi-functionality can usefully be understood through the framework of Computer-Mediated Discourse Analysis (CMDA) (Herring, 2004). Further, the review illustrates how viewing current graphicon research through CMDA reveals the continuity of uses among graphicon types and suggests new avenues for future research.

While not a theory in and of itself, CMDA is a toolkit of methods for studying online communication. Although originally intended for analyzing textual CMD, as Herring (2018b) noted, CMD has become fundamentally multimodal, and CMDA can potentially analyze multimodal discourse involving graphicons. Following this line of reasoning, this review argues that CMDA offers a structured way to think about the multifunctionality of graphicons, and particularly, how they function at four linguistic levels: Structure, Meaning, Interaction Management, and Social Phenomena (Herring, 2004). That is, graphicons have structural uses such as syntactic functions (e.g., Rintel, 2013); convey meaning, such as emotion expression (e.g., Lee et al., 2016) and tone modification (e.g., Herring & Dainas, 2017); play a role in interaction management such as turn management (e.g., Tolins & Samermit, 2016); and have broader social functions such as identity expression (e.g., Gulotta et al., 2012). In fact, much of the available research on the discursive functions of different kinds of graphicons can be understood as falling into one or more of the levels of CMDA.

This article offers a big picture perspective on the state of graphicon research, brings together the known discursive functions of understudied graphicons, and describes potential new directions that research on graphicons could take within the framework of CMDA. First, the term graphicon is defined, and stickers, images, and GIFs are described. Second, the CMDA framework is described. This is followed by a survey of empirical research at each of the four CMDA levels for stickers, images, and GIFs. Finally, the findings of the review are summarized, the effectiveness of applying CMDA to graphicons is evaluated, and gaps in the current literature that might fruitfully be addressed in future research are identified.

Graphicons

Graphicons are graphical means of communication that are composed of text or graphics and that are either static or dynamic (Figure 1). These graphicons include emoticons, emoji, stickers, images, GIFs, and video clips (Herring & Dainas, 2017). Note that any graphical unit on its own is not necessarily a graphicon. The defining factor of what constitutes a graphicon is the combination of its visual elements with the discursive context in which it occurs. Specifically, graphicons occur in online communicative exchanges (e.g., social media posts, including instant messages and entries on social networking sites) and convey propositional content (Herring, 2018a), although it may not always be easy to translate them into words. Moreover, graphicons
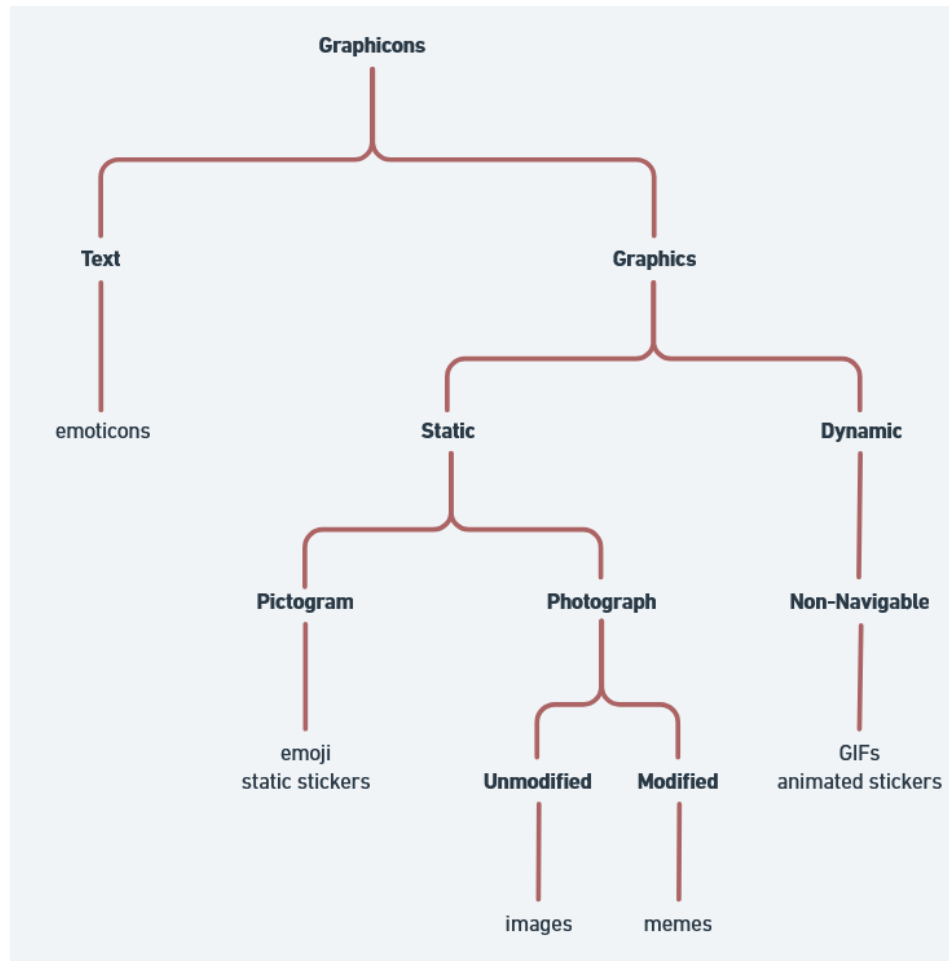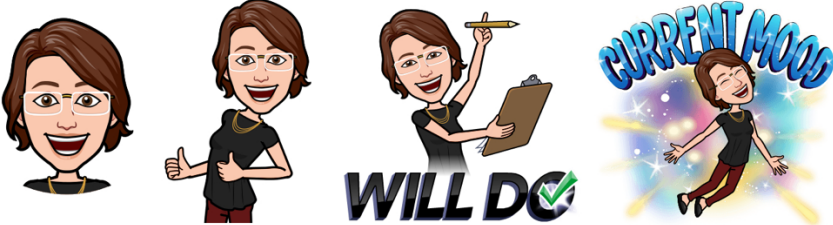
Figure 1. A conceptual map of graphicon modes (adapted from Herring, 2018b)

are part of a "larger ecology of visual communication devices" (Herring & Dainas, 2017, p. 2) that share discursive functions.

The three graphicon types that are reviewed in this article are stickers, images, and GIFs. Examples of each graphicon type that express the rough equivalent of the "Grinning Face with Big Eyes" emoji (U+1F603) or the "Grinning Squinting Face" emoji (U+1F606) are presented in Table 1.

Stickers are larger and more complex versions of emoji that, like emoji, express emotions and actions but offer a much wider variety of face types as well as bodies, multiple characters, and background imagery. Stickers tend to come in sets, where a single character or a group of characters are shown expressing a variety of emotions, actions, and situations (de Seta, 2018). Historically, Western stickers have not typically been editable by users, although this is changing. One older example of editable stickers is the Bitmoji app (and other similar apps) which allows users to create a cartoon version of themselves which can be further personalized with clothing, make up, and accessories and is shown expressing a variety of emotions and actions (Elder, 2018).

Graphicon Type	Examples
Sticker (Facebook)	
Sticker (Bitmoji)	
Image	
GIF	

[1] Source: https://tenor.com/bLmV4do2TlE.gif
[2] Source: https://tenor.com/H6Gk.gif

Table 1. Examples of stickers, images, and GIFs expressing happiness, a big smile, or a grin

In March 2024, the messaging platform WhatsApp released a sticker creation and editing feature into beta that allows users to alter existing stickers or create their own from their photo library (Shaw, 2024).

"Image" is a cover term used here to describe any still image file (.png, .jpeg, etc), including personal photographs (Vaterlaus et al., 2016), image-based internet memes (Shifman, 2013), media screenshots, and screenshots of phones or computer screens. Some common uses of images in graphical computer-mediated discourse (GCMD) include reactions, memes, jokes, and as screenshotted "quotes" of text from articles, books, social media posts, etc.

GIFs are dynamic, looping images typically cribbed from popular media and traditionally saved in the Graphics Interchange Format (Version 87a., 1987). The patented lossless data compression method supports dynamic loops which can be snippets of video or a series of images shown one after the other. A popular subtype of GIF is the reaction GIF, which is a GIF that portrays a physical or emotional response to someone or something.

Graphicons and graphical CMD (henceforth GCMD) raise many new questions, including: How are graphicons used in different kinds of online interactions? What is the relationship between graphicons and text in CMD? Do graphicons share functions at different levels of discourse (e.g., structure, meaning, interaction management, social phenomena)? If so, what functions do they share? If not, how do their functions differ? And can traditional textual CMD research methods be employed to study graphicons, or do the methods require adaptations and/or totally different approaches?

Framework

Computer-Mediated Discourse Analysis

There are currently no holistic approaches designed specifically to deal with the challenges raised by GCMD. However, there are existing frameworks that to varying extents could be applied and/or adapted for this purpose. One possibility is Yus's (2016) cyberpragmatics, which is a pragmatic, relevance focused approach to understanding how users make sense of CMD. This approach requires taking into account structural features of the medium of interaction (e.g., social media, SMS). However, cyberpragmatics deals with only a limited aspect of CMD, specifically, pragmatic meaning.

Herring's (2004) Computer-Mediated Discourse Analysis (CMDA) framework is an approach to researching online interactive human behavior through the lens of language and discourse. Unlike cyberpragmatics, CMDA was designed to study language and online communication at levels beyond just meaning-making, from micro to macro perspectives. Herring (2018b) argues that CMD is now inherently multimodal and that CMDA can be applied to graphical CMD. This review applies Herring's (2004) CMDA framework to the study of graphicons in GCMD. Historically, CMDA has been defined by its lens of language and discourse and its main object of study: logs of textual interaction. These records can be examined at multiple levels of granularity (e.g., as characters, words, utterances, messages, threads), and at each of these levels, a researcher can ask language-focused questions, such as how the phenomena of interest are structured, how they vary by CMC context, how they are learned, and how they change over time. These language-focused questions can be addressed with a wide range of methods, which collectively can be thought of as a toolkit. Following Herring (2018b), this article proposes that graphicons can be studied at similar levels to textual interaction (e.g., as visual components, the whole graphicon in isolation, in relation to the surrounding discourse elements, etc.). That is, this review presupposes that there is a continuity between CMD and GCMD. The review of the literature that follows will reveal to what extent this is the case.

CMDA is not intended as a theory, but rather as a toolkit to help researchers adapt discourse analysis methods from multiple disciplines to the study of CMD. The main methods of traditional CMDA are derived from the fields of linguistics and communication (e.g., discourse analysis, stylistics, pragmatics, conversation analysis, content analysis); however, the toolkit can be supplemented with methods such as surveys, interviews, and automated methods. CMDA includes both qualitative and quantitative approaches and can be applied to both micro and macro level linguistic phenomena (Herring, 2004).

Levels	Issues	Phenomena	Methods
Structure	Orality; formality; efficiency; expressivity; complexity; genre characteristics, etc.	Typography, orthography, morphology, syntax, discourse schemata, formatting conventions, etc.	Structural/Descriptive Statistics, Text Analysis, Corpus Linguistics, Stylistics
Meaning	What is intended What is communicated What is accomplished	Meaning of words, utterances (speech acts), exchanges, etc.	Semantics, Pragmatics
Interaction management	Interactivity; timing; coherence; repair; interactions as co-constructed, etc.	Turns, sequences, exchanges, threads, etc.	Conversation Analysis, Ethnomethodology
Social Phenomena	Social dynamics, power; influence; community; cultural differences, etc.	Linguistic expressions of status, conflict, negotiation, face-management, play; discourse styles/lects, etc.	Interactional Sociolinguistics, Critical Discourse Analysis, Ethnography of Communication

Table 2. The four levels of CMDA (Herring, 2004)

The CMDA framework or 'toolkit' consists of four linguistic levels (Herring, 2004), as summarized in Table 2: Structure, Meaning, Interaction Management, and Social Phenomena. At the level of structure, researchers may use methods such as descriptive linguistics, stylistics, and corpus linguistics to study issues such as formality and expressivity, focusing on phenomena such as syntax, discourse schemata, and formatting conventions. At the level of meaning, researchers use methods such as pragmatics to study what users intend, communicate, and achieve through their CMC exchanges. At the level of interaction management, they may use methods such as conversation analysis (e.g., Schegloff, 2007) to study phenomena such as coherence, repair, interactivity and the structure of computer-mediated conversations. At the level of social phenomena, methods such as Critical Discourse Analysis, Interactional Sociolinguistics, Virtual

Ethnography, and Sociology of Language may be used to study issues like social dynamics, politeness, identity construction, community, and gender and culture differences in discourse styles.

CMDA was initially developed in the 1990s, at a time when CMD was predominantly text based (Herring, 2004, 2018b); however, in the years since, CMD has become increasingly multimodal. Graphicons also have properties at all four linguistic levels of CMDA. Graphicons have structural features, convey semantic and pragmatic meaning, play roles in interaction management, and function within social systems, conveying identity and power dynamics. At the same time, the methods in Table 2 are based primarily on approaches to studying written and spoken discourse (Herring, 2004, 2018b). This article examines whether and to what extent CMDA can be applied to adequately describe ordinary uses of graphical computer-mediated discourse. It also investigates whether different graphicon types can be studied using the same or similar methods. If CMDA can be successfully adapted to GCMD, then it can be used to provide a more complete picture of what aspects of GCMC have been studied and which require more attention than can be seen from looking at individual strains of research. This is the first work to examine the literature in this light.

The majority of the articles gathered in this review were found by conducting English language searches through Google Scholar in the spring of 2019. The method employed was searching for the names of specific graphicon types and conceptual or method-related key words associated with each CMDA level. For example, 'stickers' and one of the following terms: 'meaning' / 'pragmatics' / 'discourse' / 'speech acts' was used to find relevant literature for stickers at the level of 'meaning. Additionally, the reference sections of these articles were searched for potentially relevant articles, and Google Scholar was used to identify articles that cited potential articles (cf. snowball sampling). Once potential articles were identified, they were read, and the author determined whether they 1) dealt substantially with stickers, images, or GIFs and 2) dealt with one or more of the issues or phenomena or employed one or more of the methods in Table 2.

It should be noted that although all articles included in this review touch on issues, phenomena, or methods related to CMDA, only a few researchers explicitly invoke CMDA in their methods and analysis. One study that does so is Lisecki (2011), who uses CMDA as an explicit framework to guide a broad qualitative analysis of the CMD (including image memes) on the image board 4chan. Herring and Dainas (2017) also explicitly invoke CMDA in their study of graphicons in public Facebook discussion threads. Other articles employ alternative approaches to discourse analysis (e.g., Tolins & Samermit, 2016; Vaterlaus et al., 2016) or different theoretical perspectives such as grounded theory (Lee et al., 2016) and mediatization theory (Petersen, 2014).

The present review is not intended to be exhaustive, but rather to illustrate the efficacy of applying CMDA to graphicons, finding shared features across graphicon types at each level, and highlighting potential avenues for future graphicon research.

Analysis of the Literature

Structure

This section explores research that has addressed stickers, images, and GIFs at the level of discourse structure. The research method most commonly employed at this level of GCMDA is content analysis (e.g., Alvarez et al., 2021; Fujiwara et at., 2022; Thelwall, 2015). Commonly analyzed features include the number (e.g., Dainas, 2023), apparent age grouping, gender, and apparent ethnicity/race of figures represented; the modality of the image (e.g., Bell, 2001); relations of figure/ground; layering; color and transparency; framing (e.g., Gürsimsek, 2016); duration (e.g., Dainas, 2023); and looping mechanism (e.g., Miltner & Highfield, 2017). Research has also been done on machine learning approaches to classifying the elements within graphicons (e.g., Bakhshi et al., 2016; Hu et al., 2014; Segalin et al., 2016), including sorting graphicons by content and categorizing them by features like color, composition, textural properties, or filter use. These approaches include computer vision techniques (e.g., Hu et al., 2014), automated content analysis (e.g., Bakhshi et al., 2016), and computational aesthetics (Segalin et al., 2016). An under-researched topic at the level of structure is how platform design and affordances shape the quantity and quality of graphicon use.

Figure 2. Example of an image being used in a sentence (Beyonslayed, 2015)

Unlike emoticons and emoji, larger graphicons such as stickers, images, and GIFs cannot typically be embedded within a message containing text (Cha et al., 2018; de Seta, 2018). Rather, they are sent as a single message or placed on a new line separate from surrounding text (e.g., Tolins & Samermit, 2016). In the latter case, the graphicon is sometimes intended to be a continuation of a sentence. Figure 2 illustrates this practice with the text "When my white friends invite me over for dinner," followed by an image of a large container of spice sticking out of the subject of the photo's sweatpants. The implication is that the second half of the sentence is something to the effect of "I have to bring my own seasoning because their food is too bland." Although a common practice in

some online spaces, this phenomenon has received little or no scholarly attention. GIFs have also been shown to be used to form sequences to tell extended narratives (e.g., Inel et al., 2018), although this sequential use has received little attention compared to emoji and images. Stickers, images, and GIFs may or may not include text that has been inserted into the graphicon (e.g., Ge-Stadnyk et al., in press; Petersen, 2014; Rintel, 2013; Zhou et al., 2017). That text may or may not be from the graphicon's source material, in cases where the graphicon is drawn from popular media (Petersen, 2014). New dialogue can be added to change the context of the scene to convey new meanings. Additionally, the text may or may not be a meme or a reference to a meme.

As an example, Rintel (2013) analyzes the "syntax" of a specific kind of internet meme, crisis memes. Crisis memes are a subgenre of internet meme that use other well-known memes to respond to and/or comment on current events. Rintel introduces the concept of 'templatability,' which is one of the features of memes that make them instantly identifiable to those familiar with the template being used. Crisis memes draw on the image macro format (an image with superimposed text), snowclones (partially filled linguistic constructions such as "I don't always X, but when I do, I Y"), and familiar characters or symbols to contextualize the sender's thoughts on world events. These features are not unique to crisis memes, but they offer an excellent case study for illustrating the structure of image memes. Internet memes are unique compared to other kinds of images (e.g., personal photos or reaction images) in that they have a fairly rigid grammar.

All three types of graphicons lack sound (e.g., Miltner & Highfield, 2017). Stickers can be either static images or animated (de Seta, 2018), while images are always static, and GIFs are always animated and looping continuously rather than having set ending points. Poulaki (2015) finds that there are two kinds of loops: background and foreground loops. Background loops are about "prolong[ing] the duration of non-action" (p. 93) (e.g., a fire burning, rain falling), while foreground loops depict a distinct action or event (e.g., a hug, a short movie clip).

One structural aspect of GIFs that is shared with only some types of images (e.g., memes [Rintel, 2013]) and custom stickers (e.g., custom WeChat stickers (Ge-Stadnyk et al., in press] is that they are typically cribbed from popular media. This has interesting implications for how these graphicons are created, understood, and used on all levels of CMDA. Gillan (2016) argues that GIFs operate by the associations viewers make between the visual content of the graphicon (i.e., the angle of the shot, the costume, the facial expression) and a certain look or feeling that the visual content evokes. In using a GIF, a user is saying that some aspect of the graphicon, from its mood to its appearance, is a representation or exaggeration of themselves. Gillan illustrates some of the issues that arise from this process of de-contextualization of iconic scenes, particularly the increased likelihood of misinterpretation. Gürsimsek's (2016) qualitative analysis of the Tumblr fan community's use of GIFs related to the TV Show *Lost* takes a slightly different approach, showing that animated GIFs are "short digitally compressed multimodal anecdotes that convey the designer's viewpoint" (p. 346), or at least their interpretation of the chosen scene. The designer remixes the original content, enhancing some modes while minimizing others to "realize the meaning potentials in the GIF" (p. 346). However, once the GIF leaves the hands of the designer,

it is shared throughout the network of fans and becomes "part of the vernacular expression of other bloggers" (p. 347).

Given that emoticons and emoji are typically used in conjunction with text and often in the position of punctuation (e.g, Sampietro, 2019), the difference between larger and smaller graphicons may have a variety of consequences for how different graphicon types function in CMD. At the same time, stickers, images, and GIFs are not subject to the cross-platform rendering issues associated with emoji (e.g., Miller Hillberg et al., 2018). Stickers often cannot be used across applications, but when they can, they appear the same regardless of what platform they were sent from, while images and GIFs appear the same on any platform that is capable of hosting them. All three graphicon types can potentially be edited by the user, although the degree to which this is possible varies based on the platforms involved and the individual user's level of technological skill, with stickers typically being harder to edit and images being quite easy to edit (e.g., de Seta, 2018). Greater attention has been paid to images and GIFs in the literature at this level of discourse in comparison to stickers (Ge-Stadnyk et al. [in press] is an exception).

Meaning

This section explores research that has addressed stickers, images, and GIFs at the level of discourse meaning. Research on graphicons at the CMDA level of meaning has employed interviews or focus groups (Bakhshi et al., 2016; Gürsimsek, 2016; Jiang et al., 2018; Lee et al., 2016; Vaterlaus et al., 2016), surveys (Jiang et al., 2017), content, thematic, or discourse analysis (Bourlai & Herring; 2014; Dainas, 2023; Herring & Dainas, 2017; Lisecki, 2011; Tolins & Samermit, 2016; Vaterlaus et al., 2016; Voida & Mynatt, 2005), grounded theory (Lee et al., 2016), semiotic analysis (Ballard, 2018), mediatization theory (Petersen, 2014), and automated methods (Jou et al., 2014).

One of the strongest findings at this level is that all three of the larger graphicons are used to express and intensify emotions (e.g., Bakhshi et al., 2016; Bourlai & Herring, 2014; Gillan, 2016; Jiang et al., 2018; Lee et al., 2016; Vaterlaus et al., 2016; Voida & Mynatt, 2005). In their sample of Facebook threads, Herring and Dainas (2017) found that emotional reaction was one of the most common pragmatic functions of stickers. They also found that stickers were commonly 'mentioned' as opposed to 'used,' meaning that the focus was on the sticker itself as a signifier rather than its contents. This often occurs when the sticker duplicates, illustrates, or otherwise refers to some aspect of the surrounding text. Vaterlaus et al.'s (2016) female young adult focus group participants reported that Snapchat was "texting with pictures" and allowed participants to better share their emotions (through facial expressions) than they could in text alone. GIFs have also been found to function often as emotional reactions, particularly in their codified role as "reaction GIFs" (Bakhshi et al., 2016; Bourlai & Herring, 2014; Tolins & Samermit, 2016). Cha et al. (2018) suggest that one of the main sources of ambiguities of stickers in conversation is the complexity of the emotions they express. GIFs, which are potentially more complex than stickers given their dynamic nature, have even been found to express multiple emotions at once, increasing their emotional complexity (e.g., Dainas, 2023; Jou et al., 2014). This may be one reason that Jiang

et al.'s (2018) participants reported that GIFs are better than emoji at expressing the exact feeling they wanted to share. More specifically, their participants reported that GIFs enhanced their interpersonal communication, particularly when they wanted to convey nuanced expressions of emotion or mood that would be difficult to capture in text, as well as when they wanted to add a playful or humorous tone to the conversation.

Stickers, image memes, and GIFs have been found to be ambiguous to varying degrees (e.g., Ballard, 2018; Cha et al., 2018; Dainas, 2023; Gillan, 2016; Gürsimsek, 2016; Hautsch, 2018; Jiang, Brubaker, et al., 2017; Jiang, Fiesler, et al., 2018; Miltner & Highfield, 2017; Petersen, 2014). One source of misconstrual may be differing interpretations of ambiguous facial or embodied expressions and varying levels of intensity in dynamic gestures (Cha et al., 2018). Another source of misconstrual may be the complexity of emotions expressed by the graphicon, as well as ambiguity about what the figures in the graphicon are meant to represent (Cha et al., 2018). Image memes can also be ambiguous, although there has been less work on identifying specific elements that increase or decrease ambiguity. Image meme ambiguity is caused by the fact that they can simultaneously have multiple (perhaps contradictory) meanings, particularly in the context of expressing humor and/or insincerity (Ballard, 2018). Jiang et al. (2017) found that the presence/absence of text in GIFs did not seem to impact interpretation, but that the duration of the GIF did have a significant influence on interpretation. Longer GIFs garnered more variance in sentiment ratings than shorter GIFs. Relatedly, some participants reported in their open-ended responses that longer GIFs were more difficult to understand. Further, positive GIFs garnered more variable interpretations than negative GIFs. In a study of GIFs exchanged between dyads, Dainas (2023) found that both dyad-related factors such as self-reported intimacy and GIF-related factors such as the meta-speech act (Herring, Das, & Penumarthy, 2005) and the emotion expressed, as well as the presence of text, the GIF modality, duration, and number of objects in the GIF, were associated with differences in agreement on the interpretation of the GIF.

While GIFs do not render differently across different platforms (unless they appear as still images (Jiang et al., 2018), GIFs contain complex scenes, actions, and expressions that may or may not require pop-cultural knowledge to interpret correctly. As Gillan (2016) notes, there is potential for miscommunication when creators, users, and receivers of GIFs have different experiences with the source text, such that the GIF creator may know the subtext of a scene, but GIF users and receivers may not. Given the existence of easily searchable GIF repositories, a GIF user may not know or care about the GIF's original source. The user may instead be focused on appropriating what is in front of them to signal their mood, state of mind, or facial expression. Gürsimsek (2016) also notes the potential variations in GIF interpretations once they enter the pool of GIFs utilized in everyday conversation. This ambiguity has been noted to be a strength rather than a weakness of GIFs (e.g., Dainas, 2023; Jiang et al., 2018). Miltner and Highfield (2017) assert that the communicative affordances of GIFs consist of their ability to perform affect, their polysemous nature, their repetitiveness, and how their use demonstrates cultural knowledge. Miltner and Highfield conclude that the diverse uses of GIFs are possible because their communicative affordances make them complex communicative tools.

Users are also not necessarily aware of misconstrual even in conversations with intimates (e.g., Cha et al., 2018; Dainas, 2023). In Cha et al.'s (2018) study, stickers were typically used as a supplement to text and did not play a central role in the content being conveyed by the sender. Also, it is important to reiterate Cha et al.'s (2018) caution that graphicon use can be intensely personal, which is a potential confound if researchers consult non-intended recipients, since such observers lack the necessary interpersonal knowledge shared by the original interlocutors.

Images, GIFs, and stickers have been found to convey information such as narratives (Inel et al., 2018; Petersen, 2014; Voida & Mynatt, 2005), intertextual references (Ge-Stadnyk et al., in press; Petersen, 2014), and specific messages or ideas (Bakhshi et al., 2016; Ballard, 2018; Inel et al., 2018; Lisecki, 2011; Petersen, 2014). Ballard (2018) asserts that internet memes on Reddit are representational creations, message carriers, and digital objects that *do* work on the world. Lisecki (2011) found that 4chan users employ specific memes to refer to particular words, phrases, or ideas. Vaterlaus et al.'s (2016) female young adult participants reported that they used the combination of text and images in Snapchat when they were "bored, needed to convey a quick message, or as tool to make plans."

Bakhshi et al.'s (2016) interviewees also reported using GIFs to express ideas, gesture, emotional reactions, hypothetical reactions, and to creatively play with a GIF's content by reinterpreting it in a new context, often humorously. According to Jiang et al.'s (2018) interviewees, GIFs do not merely function as simple replacements for text, but are also attention grabbing, interesting, humorous, and a way to show investment in a conversation (due to the effort needed to select an appropriate GIF). Tolins and Samermit (2016) argue that GIFs act as a "novel form of demonstration" (p. 87) in CMC that allows users to attribute the actions of others to themselves. They examined the use of 62 GIFs in private text message conversations between 18 college aged students. In addition to finding that GIFs are used primarily as emotional reactions and co-speech gestures, the researchers also discuss the ways in which GIFs function as quotative enactments similar to how changing vocal register in face-to-face (FtF) communication can indicate reported speech and zero quotatives. Petersen (2014) noted that GIFs can be presented in side-by-side sets or minimal narrative sequences (cf. Herring & Dainas, 2017) that can serve multiple purposes, including allowing users to tell complex stories or present fictional conversations between characters that rely heavily on intertextual references.

Interaction Management

This section explores research that has addressed stickers, images, and GIFs at the level of interaction management. Research on graphicons at this CMDA level has mainly relied on interviews or focus groups (Cha et al., 2018; Jiang et al., 2018; Lee et al, 2016; Vaterlaus et al., 2016; Venema & Lobinger, 2017); content, thematic, or discourse analysis (Tolins & Samermit, 2016); surveys (Cha et al., 2018); and experiments (Samermit, 2018).

Studies have found that stickers (Lee et al., 2016) and GIFs (Tolins & Samermit, 2016) can serve as turn construction units (TCUs), or complete turns. Lee et al. (2016) also found that stickers can

be used to signal the start or end of a conversation and are often used to maintain or manage text conversations. Tolins and Samermit (2016) suggest that GIFs are similar to co-speech gestures, but they also suggest that in a text messaging conversation a GIF may function as a demonstration of emotional expressions and physical actions. Although not analyzed from a conversation analysis perspective, photo sharing is often considered a kind of "visual texting" (Vaterlaus et al., 2016; Venema & Lobinger, 2017).

Stickers and images have both been associated in research with "communicative fluidity" (Lim, 2015) or similar concepts. These graphicons open multiple channels of communicative expression to conversants, which allows for more seamless and smooth communication. This lets us "strategically choose the best means by which to express our feelings, opinions, and intentions to attain communicative fluidity" (p. 2). Lim illustrates this affordance by describing an extended business conversation between herself and a tour guide and travel agent on the message app LINE. Although stickers have been characterized as very personal and only able to be understood when interlocutors know each other well (e.g., Cha et al., 2018), Lim and her interlocutors used a great many stickers to navigate through and soften the awkwardness involved in their business interactions, including changing plans and discussing money. Similarly, images allow for communicative flexibility in the chosen communication channel (Lisecki, 2011). For example, some users find sending photos or other images faster than texting (Vaterlaus et al., 2016).

It is likely that GIFs have similar benefits; however, before there were easily searchable GIF databases, finding the "right" GIF could be quite time consuming (Jiang et al., 2018). GIFs also used to appear as links that needed to be clicked rather than simply appearing as a full size moving image within the context of the conversation (Jiang et al., 2018). While GIF support has become more widespread with time, Jiang et al. (2018) found that this did not necessarily make finding appropriate GIFs easier. Their interviewees indicated that the results of these searchable GIF databases were of variable quality and that it took too long to find the correct GIF, which disrupted the flow and speed of the conversation. This could be such an issue that some participants would use text shorthand to describe the GIFs they were referencing if they knew that their conversation partner was familiar with that particular GIF.

The sheer number of GIFs that exist complicates their use at every level. The desire for the "perfect" (cf. Jiang et al., 2018) moment to deploy a particular GIF is as much about interaction management as it is about meaning. Particularly in fan communities, users of GIFs need to cultivate a knowledge of the source material, available GIFs, and know when (and how) to use them (Hautsch, 2018). In their investigation of GIF miscommunication, Jiang et al.'s (2018) interviewees talked at length about the importance of different kinds of context in how they chose to use or not use GIFs. Jiang et al. relate these contexts to Clark and Brennan's (1991) theory of common ground, which deals with how interlocutors establish shared knowledge and mutual understanding within a conversation. In reference to conversational GIF usage, there are two steps to successful use: sharing the GIF and receiving some kind of acknowledgment that the GIF was understood. In Jiang et al.'s (2018) study, four kinds of context impacted whether a GIF was understood: shared or lack of shared knowledge of the source material, the relationship between

communication partners, understanding or lack of understanding of media norms around GIF usage, and preferences for platform specific cultural practices around GIF usage.

Aside from these findings there is little consistency in research on stickers, images, and GIFs, particularly at the level of interaction management. This is likely due to the dearth of graphicon research that considers this level of discourse. It is an area that clearly needs more scholarly attention. Samermit's (2018) discovery that GIFs are an important backchannel device is an example of the kind of research needed. Samermit (2018) ran two experiments meant to draw out the effect of backchannel signals on humor ratings and found that participants raised or lowered their humor rating based on the valence of the GIFs shared in response to the provided joke.

Social Phenomena

This section reviews research that has examined stickers, images, and GIFs at the level of social phenomena. Research on graphicons at this CMDA level has employed methods such as experimental surveys (Wang, 2016); interviews or focus groups (Cha et al., 2018; Gürsimsek, 2016; Jiang et al., 2018; Lee et al, 2016; Vaterlaus et al., 2016; Venema & Lobinger, 2017); photo elicitation interviews (Gulotta et al., 2012); content, thematic, or discourse analysis (Dainas, 2023; Hautsch, 2018; Lisecki, 2011; Matamoros Fernandez, 2018; Orlova & Antonova, 2018; Venema & Lobinger, 2017); and mediatization theory (Petersen, 2014).

My review of works at this level of discourse identified four overarching findings that apply to all three graphicon types. The first finding is that stickers, images, and GIFs are often employed to express and curate the sender's identity (Gulotta et al., 2012; Lee et al., 2016; Petersen, 2014). This includes crafting idealized selves (Lee et al., 2016) and claiming group identities (Gürsimsek, 2016; Hautsch, 2018; Miltner & Highfield, 2017; Petersen, 2014). For example, Gulotta et al. (2012) conducted photo-elicitation interviews with 10 Flickr users who shared provocative photos of themselves online (including nudity, strong political/religious beliefs, criminal acts, etc.). While the interviewees knew that there could be negative consequences for sharing these photos, they had three main motivations for sharing them anyway: to express their own identities (i.e., to advocate for the right to be themselves), curate their identity (i.e., advocate for the right of others to be themselves through example), and maintain connections (i.e., protect others' right to choose how their identity is presented in online spaces).

The second overarching finding is that, as might be expected from research on emoji (e.g., Aull, 2019), stickers (Lee et al., 2016; Wang, 2016), images (Lisecki, 2011; Vaterlaus et al., 2016; Venema & Lobinger, 2017), and GIFs (Church et al., 2023; Dainas, 2023) are used for phatic communication or communication intended to primarily build and maintain social relationships. Wang (2016) used an experimental online survey to investigate how sticker use in the LINE app impacted users' perceptions of intimacy and relationship satisfaction. Respondents were randomly shown one of six possible LINE conversations between two users, where one user shared a positive or negative emotional situation and the other responded with encouragement in the form of text, a sticker, or text and a sticker. The respondent was meant to read the conversation as though they were the one sharing the news and then asked to rate their intimate experience and relationship

satisfaction with their interlocutor. The combination of text and sticker produced the highest level of intimacy, followed by text and sticker only responses. Further, stickers were better received in positive situations rather than in negative ones, suggesting that stickers are better at expressing positive emotions like happiness than negative emotions like sadness or anger. Venema and Lobinger's (2017) interviewees also reported that photo sharing was "very emotional, playful and enriching elements in their communication repertoire." According to the ratings of Dainas's (2023) GIF using participants, a common "background" function of the conversations they chose to share was to acknowledge the mood or topic of the conversation, even though they felt that the primary and secondary functions of GIFs were more often at the level of meaning (e.g., riffing and reaction) rather than phatic communication.

Personal photographs, a sub-type of images, pose unique challenges to users because they can be quite intimate, depending on the subject matter (and potentially whether the user has GPS tagging on their photos). The social norms around sharing personal photos thus become particularly important, especially in the context of phatic communication. These norms may vary from culture to culture, as well as according to participant age, subject matter, and relationship status. Venema and Lobinger (2017) conducted semi-structured qualitative interviews to investigate the norms around taking and sharing photographs of people in close romantic relationships or friendships in northern Germany. Three social norms of photo-sharing were derived: "1. personal photos received by others are not to be re-shared 2. Intimate photos are only exchanged within intimate relationships, and 3. The publication and wider circulation of photographs always requires explicit consent." Interviewees reported that their conversational partner needed to be trustworthy in order to share photos with them; however, in cases where photos (both intimate and otherwise) are shared against the maker's desire, the responsibility for "undesired consequences" of photo sharing goes to the originator of the image and "external and invisible structures or agents that threaten relationships from the outside." Agents within the relationship are not even brought up as possible actors in the process. Vaterlaus et al. (2016) examined social norms relating to photo sharing among Midwestern American undergraduates. The researchers' qualitative content analysis of their focus group data showed that their Snapchat using participants sometimes struggled with navigating norms around proper use or "snapping in moderation," jealousy over the best friends list, generational differences where parents were perceived as not using the app correctly, cyber bullying, sharing or saving snaps without permission, and opportunities to cheat and discover cheating in romantic relationships.

The third finding common to all three graphicon types is that there are generational differences in sticker, image, and GIF use. In their study of whether the LINE app would be accepted by students as an ESL learning tool, Van De Bogart and Wichadee (2015) suggest that stickers can be used to bridge the generation gap between teachers and students. This positive outlook is not supported by other research, however. For example, Vaterlaus et al. (2016) reported that parents are perceived as not sharing photos on Snapchat correctly. In a similar vein, Jiang et al.'s (2018) GIF-using interviewees reported being very careful about the kinds of GIFs they sent and who they sent them to. They were deeply concerned about older generations not understanding GIFs on multiple levels, including what the reference was, how to "read" it, and whether it was a legitimate form of

communication at all. Since GIFs are meant to facilitate conversation, rather than to derail it, interviewees reported that they often opted out of sharing GIFs with their parents.

The fourth common finding was that graphicons can be used in the context of trolling and other antisocial online behavior. While certain kinds of key words can be filtered for moderation purposes, graphicons, for better or worse, are much harder to police. This allows both abusive (e.g., Matamoros Fernandez, 2018) and subversive (Mina, 2019) uses of graphicons. Matamoros Fernandez (2018) found that supporters of the Belgian far-right political party Vlaams Belang used stickers that feature vomiting, anger, or pigs to express disgust and anger at Muslims, open borders, and multiculturalism. In a qualitative content analysis of trolling on Brazilian and Russian image boards, Orlova and Antonova (2018) found that trolls speaking both languages used reaction images and memes as part of a trolling strategy of ridicule. The researchers note that the combination of images and sarcasm was one of the more successful methods of trolling, since this approach often triggered flame wars and drew in uninvolved users. Fichman and Dainas (2019) found that images, GIFs, and other graphicons were used by Tumblr trolls most often as "bait" (i.e., a means to encourage other users to engage with the troll). Graphicons were also employed as tone modification to exaggerate and ridicule others as well as to appear sincere and blend in socially with local graphicon usage norms.

Discussion

This article set out to review research on understudied graphicon types and demonstrate that graphicons can be studied at all four levels of CMDA (Herring, 2004). Table 3 summarizes the findings at each CMDA level by graphicon type.

	Findings	Studies	Graphicon Types
Structure	Must Be Sent as a New Message	Cha et al. (2018); de Seta (2018); Tolins & Samermit (2016)	Stickers Images GIFs
	May Contain Text	Ge-Stadnyk et al. (in press); Petersen (2014); Rintel (2013); Zhou et al. (2017)	
	May Contain Multiple Characters	Alvarez et al. (2021); Dainas (2023); Bell (2001); Cha et al. (2018)	
	Lacks Sound	Miltner & Highfield (2017)	
	Not Platform Dependent	de Seta (2018)	
	Editable by User	Ge-Stadnyk et al. (in press); de Seta (2018)	
	Cribbed From Popular Media	Ge-Stadnyk et al. (in press); Gillan (2016); Gürsimsek (2016)	
	Animated	Dainas (2023); de Seta (2018); Poulaki (2015)	Stickers GIFs
	Not Animated	de Seta (2018)	Stickers Images

Meaning	Express and Intensify Emotion	Dainas (2023); Bakhshi et al. (2016); Bourlai & Herring (2014); Cha et al. (2018); Gillan (2016); Jiang et al. (2018); Jou et al. (2014); Lee et al. (2016); Tolins & Samermit (2016); Vaterlaus et al. (2016); Voida & Mynatt (2005)	Stickers Images GIFs
	Ambiguous	Dainas (2023); Ballard (2018); Cha et al. (2018); Gillan (2016); Gürsimsek (2016); Hautsch (2018); Jiang et al. (2017); Jiang et al. (2018); Miltner & Highfield (2017); Petersen (2014)	
	Convey Informational Content	Bakhshi et al. (2016); Ballard (2018); Ge-Stadnyk et al. (in press); Inel et al. (2018); Lisecki (2011); Petersen (2014); Tolins & Samermit (2016); Vaterlaus et al. (2016); Voida & Mynatt (2005)	
	Rhetorical Uses	Gürsimsek (2016); Hautsch (2018)	GIFs
Interaction Management	Can Serve as TCUs	Lee et al. (2016); Tolins & Samermit (2016); Vaterlaus et al. (2016); Venema & Lobinger (2017)	Stickers GIFs
	Communicative Fluidity or Flexibility	Cha et al. (2018); Lim (2015); Lisecki (2011); Vaterlaus et al. (2016)	Stickers Images
	Can Serve as Backchannel Devices	Samermit (2018)	GIFs
Social Phenomena	Identity Expression and Curation	Gulotta et al. (2012); Gürsimsek (2016); Hautsch (2018); Lee et al. (2016); Miltner & Highfield (2017); Petersen (2014)	Stickers Images GIFs
	Phatic Communication	Dainas (2023); Church et al. (2023); Lee et al. (2016); Lisecki (2011); Vaterlaus et al. (2016); Venema & Lobinger (2017); Wang (2016)	
	Generational Differences	Jiang et al. (2018); Van De Bogart & Wichadee (2015); Vaterlaus et al. (2016)	
	Trolling and Antisocial Uses	Fichman & Dainas (2019); Matamoros Fernandez (2018); Orlova & Antonova (2018)	

Table 3. Summary of common findings across graphicon types at all CMDA levels

Table 3 illustrates that research on each graphicon type at each CMDA level currently exists, and that based on this research graphicons share some (albeit not all) discursive functions across CMDA levels. This suggests that research on one graphicon type may be relevant to research on other types, regardless of the level of discourse being considered. It is likely that additional discursive functions are shared across all three graphicon types, although more research is required to discover them. In this regard, Table 3 can be considered a guide to gaps in the literature that could fruitfully be explored in future research. For example, there is less research on graphicons at the levels of structure and interaction management than at the levels of meaning and social phenomena. There is a need for descriptive studies of graphicon structure, as well as consideration of how graphicon structure interacts with other discourse levels. There is also a need to study

whether (and if so, how) images serve as turn construction units (TCUs), stickers and images serve as backchannel devices, and GIFs contribute communicative flexibility to conversations. Although the discursive functions of graphicons at the level of meaning have received more attention, gaps also exist at this level. All three graphicon types can be ambiguous, can convey information content, and can be used to express or intensify emotion, but more research is needed to identify the rhetorical functions, if any, of stickers and images in discourse.

One of the guiding questions posed at the beginning of this article was: Can traditional textual CMD research methods be employed to study graphicons, or do graphicons require different approaches? Based on this review, it appears that the traditional language-focused methods of CMDA (e.g., semantics, pragmatics, conversation analysis, discourse analysis) can be adapted to analyze GCMD, but they are not always sufficient. Depending on the objectives of the research, other methods (e.g., surveys, interviews, focus groups, content analysis, automated methods) may also be needed. Moreover, some CMDA methods have not yet been applied to graphicons (e.g., corpus linguistics, descriptive linguistics, stylistics, Critical Discourse Analysis, Interactional Sociolinguistics); that is potentially a gap that future research could fill. Another question posed was: Can different graphicon types be studied using the same methods, or do different types require different approaches? In general, it appears that most kinds of methodological approaches, broadly construed, can be applied to each graphicon type.

Moving forward, there are a few obvious gaps in the GCMDA literature. First and foremost, there is a need for additional research on how stickers, images, and GIFs operate at all CMDA levels. There is a parallel need for more research on how graphicons of all types operate at the level of interaction management. Future research should seek to answer questions such as: How are the larger graphicons used in discourse? What individual and demographic differences exist in graphicon use and interpretation? Another question that could be explored is how much of GCMD is meant to convey information and how much is meant to support phatic communication. Based on this review, it is likely that graphicons in fact perform both functions simultaneously to greater or lesser degrees depending on the context of use. Further research would help clarify the relationship between these functions. Alongside these gaps, there is an ongoing question of how similar the use of each graphicon type is to the others at each CMDA level, which can be best answered by comparing graphicon types in similar contexts.

Conclusions

This review has demonstrated that the CMDA toolkit can be expanded to allow for the analysis of GCMD and that graphicons share discursive functions across CMDA levels. At the level of structure, all three of the larger graphicon types must be sent on a separate line, lack sound, are not platform dependent, and are to some degree editable by users. They may also contain text and multiple figures. At the level of meaning, these graphicons are potentially ambiguous and are used to express and intensify emotion. However, there are as yet no findings at the level of interaction management common to stickers, GIFs, and images. At the level of social phenomena, these graphicons support phatic communication and serve as a form of self-expression for users. All

three types can be used for anti-social purposes, as well. Finally, the norms for using these graphicons are influenced particularly by generational differences.

Some challenges and limitations to the approach taken in this review must be acknowledged. To begin with, CMDA was originally envisioned for use with textual CMD and is primarily language focused. While CMDA can and should be adapted to accommodate graphicons, new theories will likely need to be developed to specifically describe GCMD. Also, while this review sought to sort the graphicon literature into CMDA levels, the studies reviewed examined many different kinds of GCMD from different countries and cultures, often using fairly small data sets, with some focusing on multiple CMDA levels at once. Many of the studies reviewed are also not language focused. These factors complicate comparison across studies. Further, due to limitations of space, this review is not exhaustive and focuses mostly on research published before 2020. This review aims to illustrate the efficacy of applying CMDA to graphicon research. For CMDA to assist graphicon researchers in the long term, however, it will be necessary to periodically revisit and revise the picture sketched here.

It is important to note that the present article does not present a full conception of what an adapted graphical CMDA framework would look like. Such an effort would require dealing with the fact that the relationship of graphical content to the four levels of CMDA is much less straightforward than in traditional text-only CMD. An explicit formulation of graphical CMDA is needed. In addition, there is a need for more research on stickers, images, and GIFs at each CMDA level. Ideally, some studies would consider all three at once, allowing for easier comparisons among graphicon types.

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