Christmas 2018: Heart of the Matter

Is it time to start using the emoji in biomedical literature?

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As the emoji continues to gain in popularity, Vikas O'Reilly-Shah and colleagues explore its potential role in scientific communication

The explosion of smartphone technology has brought with it a transformation of the English language. Using the original 256 character American Standard Code for Information Interchange (ASCII) set,[1] initial forays into digital communication were laborious at best, requiring complete sentences and actual punctuation to convey meaning. No longer.

In October 2010 the Unicode Consortium added emoji to its evolving standardised universal character set, allowing for vast swaths of the human experience to be communicated by a single character. Their use in the scientific literature has already begun: at least one paper has included emoji in the abstract,[2] and a brief piece on scientific emoji was featured in *Nature*.[3] (The plural of *emoji* is under some debate.[4] [5] In our view, "emoji" without the pluralising *s* is much more aesthetically appealing than "emojis.")

Given the potential for economy of language, an augmented range of expression, the need to study our contemporary lexicon, and the entry of a new generation of scientists into writing and publishing, the time is ripe to discuss the value and potential pitfalls associated with using emoji in the biomedical literature.

Great possibilities! 🎉 🐝 🎊

Emoji are single character images conveying stylised facial expressions, objects, animals, flags/signs, weather patterns, and activities. Originally developed in the 1990s, they have been adopted worldwide and are a core element of current electronic communications. As one author put it, emoji

"scaffold our electronic communications. Yes, they are cute and fun and kind of addictive, but they also improve our capacity to make our intended meaning known."[6] The position of emoji in popular culture is further demonstrated by the selection of the "face with tears of joy" (😂) emoji as the Oxford Dictionaries Word of the Year in 2015.[7]

Integrating emoji into the scientific literature would be advantageous in several obvious areas, such as modulating the emotional tone of communications. In editorials and letters to editors they may serve great purpose by introducing inflection and subtext in a manner not previously possible. For example:

"In this issue, Dr Superstar and colleagues report miniaturising themselves and repairing oncogenic DNA mutations by hand 😱🙏."

"It is with great interest that we read the article by Dr Doe and colleagues 🙄 👀 ."

"We wish to thank Dr Obtuse for her detailed response to our article. We performed the sensitivity analysis as requested, and the findings were essentially unchanged 💁 ."

Consider also the possibilities in peer review and editorial communications:

"This article has been retracted by the editor in chief on grounds of fraudulent reporting 🤐."

"We invite the authors to submit a revised version of their manuscript, although we cannot guarantee acceptance of a revision 😒 ."

"Regrettably, your submission did not receive a high enough priority rating to warrant its publication 💁 🚫 ."

More routinely, the standard denotation of significance with stars could be revised to use emoji (see table 1). These alternative scales would enliven the dry, statistical reporting

that can quash the excitement inherent in knowledge discovery.

Dangers 💀 💣 ⚡

We should also consider several important downsides. Firstly, the significant lack of standardisation in the specific artwork deployed for a particular emoji. For example, figure 1 shows the emoji for Santa Claus and Mrs Claus displayed on a variety of platforms, obtained from the Unicode Consortium website.[8] (A tangential point of criticism for the Unicode Consortium: why are the Claus family emoji categorised under "Person fantasy" 🤔?).

As should be clear from a cursory inspection, the mood of the characters ranges from jolly to somewhat sombre ("naughty list" Santa, perhaps?). Although variability in the underlying artwork for a given emoji may be easy to control when publishing in print or as a PDF, most publishers now also provide this content in web friendly formats. Readers may experience significant variability in emoji display if viewing on different platforms.

Secondly, two interrelated problems are the durability of an emoji's meaning over time and the potential variability in its meaning in different cultural and linguistic contexts. These authors generally use the venerated "face with tears of joy" (😂) to impart "laughing so hard I'm crying"—significantly different from its named intent. Similarly, consider the "call me hand":

🤙

This is likely to be interpreted very differently by Hawaiians, Southern Californians, and coastal Brazilians (ie, *shaka brah* 🤙).[9] And the "victory hand" (✌)

Table 1	Potential emoji based alternatives to denotation of statistical significance			
P-value	American Psychological Association style denotation	Emoji denotation 1	Emoji denotation 2
P>0.05	ns	☹	👎
P≤0.05	*	☺	👍
P≤0.01	**	😄	🤙
P≤0.001	***	😎	💯

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Fig 1 | Example of the lack of standardisation in emoji artwork that may cause ambiguity in interpretation. Claus family apparent age and jolliness are highly variable in this example.

may be viewed as either a token of peace or an offensive gesture.[10]

Contextual evolution in the meaning of emoji may convey a completely unintended message when the intended use was completely innocent[11]:

Clinical medicine is already fertile ground for potential miscommunication, and introducing emoji into the scientific literature may be a bridge too far.[12] If nothing else, it would call for a new type of editorial stewardship—the emoji editor: .

Apart from challenges in display and interpretation, researchers and clinicians are currently left to wonder how adding emoji to their scholarly communications may affect perceptions of their professionalism[13 14]:


Early work has found that consumers may associate emoji use with warmth rather than competence when used during online service encounters.[15] Emoji may ultimately be influential through subtle emotional manipulation, which could negatively colour recipients' opinions of early emoji adopters.[16]

New structures

What might happen to the structure of manuscripts? For example, going from 250 characters in an abstract to 250 emoji is a significant leap. Indeed, an entire abstract could conceivably be captured in emoji. Imagine a case report of a young child admitted by ambulance to an emergency department, in whom a rare disease is uncovered after unrevealing diagnostic studies and failed attempts at conventional treatment. She

undergoes a surgical procedure, is discharged home, and makes a full recovery. Such an abstract could be reimagined as follows:
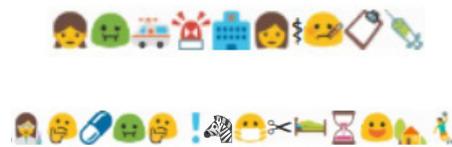
The mechanism of injury and the management of the patient are clearly stated, yet the number of characters is lower than in many complete sentences. The possibilities are numerous—shorter journals, longer journal articles (as measured by the time taken to read), and potentially higher acceptance rates into print journals, since they will have more space to publish.

A final potential concern is the ability of indexing services to handle emoji characters in titles and abstracts. PubMed and MEDLINE use 8 bit Unicode (UTF-8), which should handle most common emoji.[17] However, at least one publication with emoji in the abstract[2] does not seem to have had them rendered for indexing in PubMed, Scopus, or Web of Science. It's not clear whether other indexing services are capable of handling extended character sets. Attendant issues, such as searching by emoji and evaluating their use on social media platforms, are also concerns that will need to be tackled.[18]

Conclusions

We live in an exciting time of transformation in communication, in which new mechanisms to convey meaning and to modulate tone are rapidly evolving. The implications of using emoji are , and the power of this language is . The opportunities to expand

regardless of one's native language, are . While initially disruptive,

will need to

or else they will

Emoji represent an opportunity for the medical and scientific community to augment how scientific findings are described and discussed. Although logistical concerns remain, we look forward to the day when entire papers are cogently written using concise sets of emoji to convey new results.

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