Examining the "Global" Language of Emojis: Designing for Cultural Representation

Extended Abstract

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ABSTRACT

Emojis are becoming an increasingly popular mode of communication between individuals worldwide, with researchers claiming them to be a type of "ubiquitous language" [30] that can span different languages due to its pictorial nature. Our study uses a combination of methods to examine how emojis are adopted and perceived by individuals from diverse cultural backgrounds and 45 countries. Our survey and interview findings point to the existence of a cultural gap between user perceptions and the current emoji standard. Using participatory design, we sought to address this gap by designing 40 emojis and conducted another survey to evaluate their acceptability compared to existing Japanese emojis. We also draw on participant observation from a Unicode Consortium meeting on emoji addition. Our analysis leads us to discuss how emojis might be made more inclusive, diverse, and representative of the populations that use them.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**;

KEYWORDS

emoji; non-verbal; multi-cultural; representation

1 INTRODUCTION

Non-verbal communication on messaging platforms has been studied extensively in Human-Computer Interaction (HCI) and related areas in recent years. Prior research has focused primarily on the use of animated GIFs, stickers, emoticons, and emojis. These studies have revealed that an animated GIF's playtime affects individuals' interpretations of its meaning [23] and that it provides more emotion than just text [3]. Stickers, emoticons, and emojis have been shown to compensate for the lack of non-verbal cues in pure textual conversation and convey gestures or facial expressions through their use [9, 14, 29, 63]. Recent emoji research has mostly evaluated interpretations of emojis across platforms and individuals [33, 51] or how emojis are adapted for personal use beyond their semantic meaning [26, 62]. The cultural facets of emojis remain less understood—a gap that we address by examining whether the current emoji standard is representative of the worldwide population using emojis.

Our research used a combination of methods—surveys, interviews, participatory design, and participant observation—to better understand the cultural gaps that exist in the current Unicode standard for emojis, and how they may be approached. We used surveys to involve a diverse and large group of participants worldwide (up to 45 countries), while interviews and a participatory design exercise provided us with a deeper understanding of existing use and potential new emojis. We also engaged in participant observation at a Unicode Consortium[1] meeting discussing emojis to understand their decision-making process for adding new emojis.

In this paper, we bring to attention the existence of a cultural gap in the emoji standard due to the heavy Western technology bias of the maintainers in the Unicode Consortium. Taken together, we find that such a gap does exist, from

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[1]The Unicode Consortium is an organization dedicated to defining the Unicode standard for character encodings on digital devices, such as Latin, Chinese, and emoji characters

both a quantitative and qualitative perspective, resulting in a participatory design exercise around creating 40 new and culturally diverse emojis. We then evaluate these emojis against existing Japanese emojis to understand how they perform against the current character set. We also augment these findings with participant observation data, aiming to highlight potential modifications that might be made to the Unicode submission process to make emojis more inclusive, diverse, and representative of the populations that use them.

2 BACKGROUND AND MOTIVATION

Emojis were first created in 1999 by Shigetaka Kurita, a designer for NTT DoCoMo (a Japanese cellular provider) to meet Japanese demand for image-based text messaging. The original set of 176 12x12 pixel images were inspired by weather symbols used on television, street signs, Japanese characters, and expressions from manga, as shown in Figure 1 [36]. These proved an immense success, and soon other cellular companies in Japan like KDDI and Softbank created their own emojis to compete with NTT DoCoMo, each with its own exclusive set to persuade customers to switch to its service [28].

Figure 1: The original emoji set

Emojis came to the West with the introduction of the iPhone in 2007. Apple, seeking to capitalize on the emoji craze in Japan, added an emoji keyboard for Japanese users. Consumers in the United States discovered that they could unlock this keyboard by downloading Japanese applications from the App Store, causing them to spread across technology circles [41].

In 2009, emojis were formally introduced into the Unicode standard [10], meaning that every computer should support rendering emojis on their platform, be it Windows, the Apple iOS, or Android. Apple iOS summarily introduced an international emoji keyboard in 2011, allowing anyone to use it without having to use the Japanese app download workaround, and Android introduced one in 2013. By 2015, nearly half of all text on Instagram contained an emoji [17] and the Oxford Dictionary announced 😂 ('Face with Tears of Joy' emoji) as the word of the year [13].

Although the term "emoji" is often used to refer to emoticons and stickers, there is a difference. Emoticons are series of Unicode characters arranged to appear like a face or object, such as *:)* or *;D*. Emojis are Unicode characters that depict an emotion or an object, like 🙂 or 🍕. To a computer, these symbols are the same as the letter 'a' or the number '1', and are rendered according to the device displaying them. Apple and Google emojis look different, because these characters are rendered in a different font between the two platforms. Finally, stickers are images or animations that are included natively in a messaging platform, like Facebook Messenger, that may be downloaded and exchanged between users on that particular platform [15].

	Format	Example
Emoticon	Text arranged to be seen as faces	:)
Emoji	Image mapped to a Unicode character	🙂
Sticker	Images or animated GIFs native to the messaging platform	

Table 1: Examples of emoticons, emojis, and stickers

The adoption of emojis has grown rapidly, such that they are now seen as a type of "ubiquitous language" [30]. However, the rise in emoji use has been accompanied by criticism against the lack of diversity across the available glyphs [6, 22], arguing that emojis did not appropriately represent the skin colors present across the world. In response, Apple introduced skin tone modifiers to the emoji standard in 2014 [19]. However, race was not the only diversity-related criticism emojis received; one journalist at Wired pointed out that geographic and cultural gaps existed along the emoji spectrum as well [42].
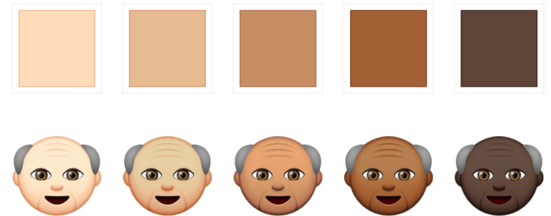

Figure 2: Emoji skin tones introduced in 2014

The cultural gaps that exist among emoji are not limited to race or disability (as recently noted by Apple's new emojis

[5]), but also touch upon international borders. Out of the 2,666 emojis in Emoji 5.0 (the most recent version of emoji), 94 are emojis of Japanese origin, or 4% of the total. Following Japan is the United States, with 31 emojis of American origin making up around 1% of all emojis. Trailing behind those two countries is the United Kingdom and China with 6 emojis (0.2%), and then France and Mexico with 2 emojis (essentially 0%) (see Figure 3). These origins were determined by looking at the design inspiration of the emoji and where it came from. The remaining 94% of emojis mostly consist of people-related emoji (professions 🕵️ and smileys 🙂), flags 🇸🇪, symbols 🈚, animals 🐹, travel ✈️, and tools 🔧.
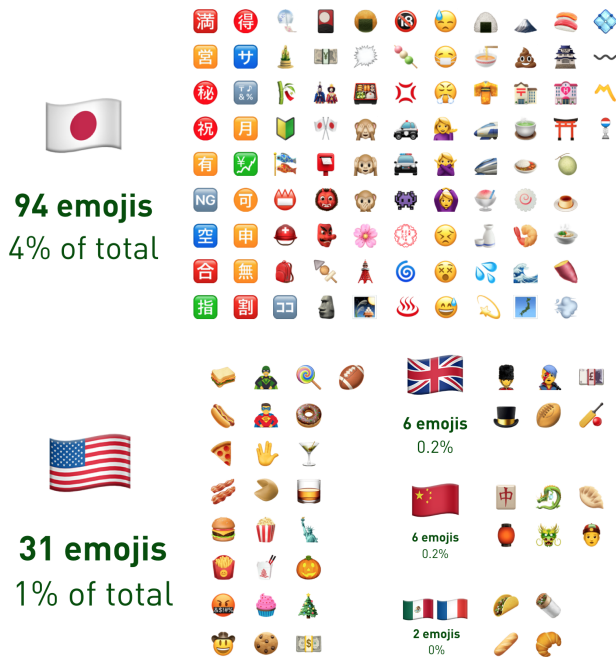

Figure 3: A national identity breakdown of the current emoji standard, highlighting the bias towards Japanese and American symbols

This imbalance of representation likely has to do with the fact that emojis originated in Japan, and are now maintained in the United States by technology companies such as Apple, Facebook, Microsoft, Google, and Adobe. In the twenty-first century, emojis act as a kind of universal language for messaging, but the current set does not cover all cultures of the world. Our paper seeks to determine whether the current emoji set is perceived to possess a cultural gap from the perspective of the global population using it, and if so, what kinds of emojis could be created to address this cultural gap, while ensuring that they are not too obscure or misunderstood by the global populace? Answers to these questions can allow us to uncover a cultural bias in existing emojis, and prompt users,

submitters, and the Unicode Consortium to better consider how cultures worldwide might be better represented through emojis.

To the best of our knowledge, ours is the only paper examining emojis themselves using a cultural lens, rather than looking at how they are used across cultures. We find that people from different backgrounds do feel that there are emojis missing from the available set that they might expect or desire to see, from their cultural backgrounds. Our findings reveal the role cultural bias can play in shaping the affordances of computer-mediated communication, and provides design guidelines on how to avoid that in the specific case of emojis.

3 RELATED WORK

Below we examine related research in the area of *(1)* representation of the self in computer-mediated communication (CMC) *(2)* understandibility of emojis, and *(3)* emoticons and emojis across cultures.

Representation of the Self in CMC

Early CMC research noted that there are weak social cues present in the medium, leading to less context of information and de-individualization of the person behind the computer [27, 44]. With time, further research has revealed that in the absence of social cues, other non-verbal cues present in CMC can provide important context, and can accrue to create an impression of an individual even without face-to-face cues [59], with longer discussions leading to more intimate and hyperpersonal conversation compared to face-to-face discussions [50].

The usage of emoticons, emojis, stickers, or animated GIFs in CMC has only enhanced the affordance of self-representation. Emoticons were seen as helping to add expression to messages as early as 2001 [60]. Derks et al. [12] and Lo [29] both found that emoticons serve to express the sender's emotions in messages, strengthening the meaning of the text itself and providing for "quasi-nonverbal cues" [29].

More recently, Sugiyama [46] found that emojis were used by Japanese teenagers to "construct and express their aesthetic self", while Zhou et al. [63] discovered that Chinese users of WeChat use stickers as "part of their personal identity, regardless of age and location". According to Wiseman and Gould [62], some people use certain emojis as "avatars" to represent themselves or their partners. Animated GIFs have been found to help users "let their feelings out" on Tumblr [1, 3]. All of these multimodal types of communication allow users to better convey their emotions and tone to the ones they are communicating to, revealing that emoticons, emojis, stickers, or GIFs all serve to represent a sense of self within CMC. Our research builds on the concept of self-representation presented

through these studies by examining how emojis serve to represent their users' cultural identities, not just their emotions or actions.

Understandability of Emoji

A major focus of previous work on emojis has been on understanding how individuals interpret emojis when they receive or send them. Although emojis are standardized by the Unicode Consortium that assigns each one a specific code, every platform gets to decide how to render an emoji. Even though every emoji has keywords associated with it and a description accompanying it to help visual designers create similar icons, these descriptions can and have been ignored by various companies, as seen in Apple's decision to change the rendering of the "Pistol" emoji 🔫 to a "Water Gun" 🔫 instead [25].

Emojipedia, an emoji encyclopedia, currently displays nine variations per emoji due to the many platforms that render emoji in their own style. In some cases, the website displays a warning, stating "Appearance differs greatly cross-platform. Use with caution". This has led to the term "emoji fragmentation" used to describe how differently emojis are rendered across platforms [4]. Miller et al. [33] looked at this problem and asked individuals to rate the sentiment of different emojis across five platforms. They found that an individual can misconstrue the sender's intended meaning just due to the difference in how the emoji is rendered on their platform, leading to upset or confused users. Tigwell and Flatla's research echoed these findings although they used a different emotional rating [51].

Rendering differences across platforms are not the only reason for people to interpret emojis differently; sometimes individuals can misinterpret emojis *within* platforms. This could be due to the illustration of an emoji not clearly conveying a singular emotion [33]. Pohl et al. [40] sought to address this by examining input methods that would automatically suggest the correct emoji according to the word or sentiment typed by the user, rather than having the user manually search for what they considered the appropriate emoji.

Personal meanings separate from literal rendering can also be ascribed to emojis by users [9, 26, 62], leading to greater variance in interpretation depending on the recipient. For example, Wiseman and Gould [62] and Kelly and Watts [26] both found that emojis were used for historical reasons (such as an inside joke), puns, or simply because they were typed randomly and now are used in the context of that conversation. The confusion that arises from individually interpreted sentiment is not limited to emojis, as the same phenomenon has been seen in animated GIFs [23] and gestures [7]. Our research examines how emojis might be misinterpreted on account of cultural differences, and provides guidelines and examples for the design of emojis in ways that might address this challenge.

Use of Emoji Across Cultures

Emojis are built into devices across the world and do not appear to have a language barrier, which has led researchers to call it a "ubiquitous language" that bridges cultures [30]. Lu et al. [30] examined the use of emojis across 212 countries and found that different countries used different emojis, but all of the top 10 uses were centered around facial expressions or affection. This mirrors findings from Swiftkey, who analyzed 1 billion emojis across their global platform and found that faces and hearts account for about 70% of emoji [48].

Barbieri et al. [2] found that the semantics of popular emojis across the USA, UK, Italy, and Spain are similar despite cultural and linguistic differences, while studies done in both the US and China have revealed identical usage patterns for sending an emoji, like using them to change the tone of a message or to end a conversation [9, 63]. This echoes findings done on emoticons, where despite looking different between Western and Eastern cultures, the usage patterns and underlying intent remained the same [38]. Even though the intent behind the two cultures are the same, the actual ASCII characters used by the two differ; Japanese are known to use *kaomoji*—characters arranged as vertical faces, rather than the emoticons used by Western speakers [38]. Markham and Oshima [31] found that Japanese users are not very likely to repeat kaomoji and instead use a large variety to represent a range of actions, while English users trended towards using variants of :-). Some differences still remain in emoji usage: Sugiyama [46] found that Japanese teenage girls would take care to send emojis of different colors to make the conversation "nicely color coordinated", a finding not yet replicated in Western-based research. Our work builds on these studies to look at how people from different cultural backgrounds use or desire to use emojis, sometimes expecting certain emojis from their country to be available on their devices.

4 METHODS

Our study took place between November 2017 to September 2018 and included four primary methods to collect research data: *(1)* an online survey, *(2)* semi-structured interviews *(3)* a participatory design exercise, and *(4)* participant observation. All participants (representing 45 countries overall) were recruited through a combination of purposive and snowball sampling [20, 24]. Our study was approved by the Institutional Review Board (IRB) of the Georgia Insitute of Technology.

Survey

We began our research by creating and distributing a survey across many channels (including Slack, Facebook, and Reddit) in December 2017, to better understand how individuals across the world use emojis and whether they had ever felt a "cultural gap" in their usage. The survey—created

using Qualtrics—consisted of 18 questions. These questions focused on participants' cultural backgrounds, asking them where they grew up, what their ethnicities were, and about their emoji usage, such as what emojis they commonly used or how often they used emojis in their messages. We also collected demographic information in the form of age ranges, gender, and current location.

We collected a total of 239 responses, with 150 proving valid after discarding for incomplete data. Of those, 50% of respondents identified as female ($n = 75$), 46.7% identified as male ($n = 70$), with the rest identifying as trans or not at all ($n = 5$). Age distribution skewed young, with 68% of respondents within the 18-29 year old range ($n = 102$). A total of 32 countries were represented in these responses, and 10 ethnicities, with Caucasian, South Asian, and East Asian being the most represented. Participants were asked to estimate how many messages they send that contain emojis: 59 said 0-20% of their messages, 33 said 20-39%, 41 said 40-59%, 14 said 60-79%, and 3 said 80-100%.

Survey responses were coded [32], assigning short phrases to answers to categorize them into themes. Examples of coded responses included "use emojis for special foods from certain countries", "use skin-toned emojis where applicable", and "expect more emojis for Indian food". Coded responses were organized into themes to better understand the overall concepts expressed; categories included "emojis desired: food", "emoji usage: euphemism", and "phrases as emojis: Korean". Our process of analysis was iterative; we revisited answers and categories to eliminate duplicate themes and to throughly examine all the data until distinct themes accurately representing the responses were developed.

Semi-Structured Interviews

Survey data revealed that participants wanted more emojis to be added to the Unicode standard so that their cultures were better represented. To follow up on this user need, we conducted semi-structured interviews with individuals from different cultures to better understand their backgrounds and what might be newly translated into emojis. Participants were recruited via those who indicated they wished to be interviewed on the online survey. In total, 17 individuals were interviewed, representing 14 different countries (see Table 2). Participants' ages ranged from 20 to 42. Interviews were held online—using Skype or Google Hangouts ($n = 4$)—or in person ($n = 13$). They ranged from 30 to 60 minutes in length, and were all conducted in English.

Our interviews included two sets of questions. The first set was aimed at understanding emoji usage patterns of the individuals, such as who they used emojis with, how often they sent emojis, and what prompted them to send an emoji. The second set of questions focused on understanding the facets to participants' cultures, and inspired by the official

Participant	Gender	Age	Nationality
IP1	F	26	Korea
IP2	F	24	France
IP3	M	35	Colombia
IP4	M	24	India
IP5	F	24	India, Iran
IP6	F	20	Canada
IP7	M	25	USA
IP8	M	27	Kuwait, India
IP9	M	24	China
IP10	F	24	China
IP11	M	25	Jamaica, USA
IP12	F	26	Taiwan, USA
IP13	M	25	China, USA
IP14	M	25	Philippines, USA
IP15	F	27	Vietnam, USA
IP16	M	42	Serbia
IP17	F	25	Nigeria

Table 2: Demographics of semi-structured interview participants

emoji categories from the Unicode Consortium—Smileys & People, Animals & Nature, Food & Drink, Activity, Travel & Places, Objects, and Symbols [54].

All individuals shared information and history about their cultural backgrounds, including questions regarding gestures, foods, landmarks, greetings or common words, mythology, fashion, and holidays. We consciously avoided asking questions such as "what in your culture could be an emoji" to avoid biasing answers based on what individuals thought could be best visually represented or understood by others as an emoji.
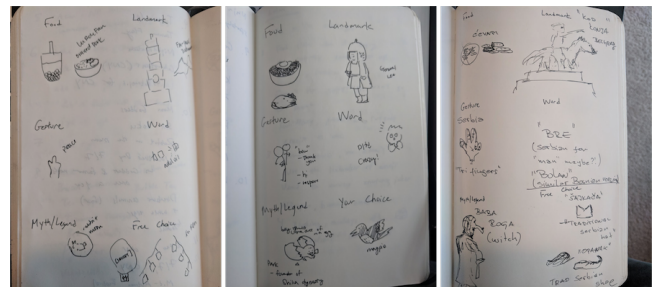

Figure 4: Sketches collected from interviews

After completing their interviews, participants were asked to illustrate six different drawings for six categories related to their cultures, loosely based on the existing Unicode categories for emojis [54]. The categories we provided included Food, Landmark, Gesture, Word (as in slang, abbreviations,

Participant	Gender	Age	Nationality
PD1	F	24	China
PD2	M	25	China
PD3	M	25	China, USA
PD4	M	35	Colombia
PD5	F	24	India
PD6	F	20	India, USA
PD7	M	24	Kenya
PD8	F	26	Korea
PD9	F	26	Singapore

Table 3: Demographics of participatory design participants

acronyms), Myth or Legend, and a Free Choice, where individuals could draw what they wanted (see Figure 4). These drawings provided us with visual representations of what was discussed in interviews, and pushed participants to narrow down to the key elements of their culture that could be represented using emojis.

Participatory Design

The survey and interviews we conducted were instrumental towards providing individuals' perspectives towards emoji use and their cultural inclusivity. To understand how such dynamics might play out in interactions beyond the individual, we chose to organize a participatory design exercise [34] to contrast what participants pictured around their own cultural contexts against people's perception of their culture from disparate nations.

We recruited our participants through our university's Slack and Facebook channels. In all, 9 individuals participated, representing 7 different countries. Participants consisted of 5 females and 4 males, and were 20-35 years old (see Table 3). Participants were asked to participate in an hour long exercise. In the first half of this hour, participants were given a sheet of paper with a rectangular border, where they drew the flag of their country and related cultural touchstones underneath. Participants were encouraged to think about their daily lives in their countries, referencing foods, clothing, places, conversation, and cultural exports. In the second half of this session, participants drew their flag on a whiteboard, and drew for each other's countries, putting on sticky notes what they knew of the other nations and placing these underneath the flags on the whiteboard. For example, one participant drew a *bao* (dumpling) underneath the Chinese flag, and another created a drawing of the Taj Mahal under India.

Participant Observation

In order to get an understanding of the emoji decision-making process of the Unicode Consortium the first author sat in on a meeting that discussed the potential emojis for Emojis 13.0, set to release in 2020. We saw that most of the members in the room were older, veterans of the tech industry, with little diversity among them. In addition, the consortium pays great attention to the Western world. For example, when discussing a new "Pickup Truck" emoji, the members questioned if the name carried over to the U.K., without considering whether or how pickup trucks were used in the rest of the world or if the concept carried over beyond English. Such discussion highlights the unconscious bias the Unicode Consortium has when thinking about new emojis to add to the standard.

Study Limitations

In all, 45 different countries were represented through our study. However, our survey was only distributed in English and thus left out the entire non-English-speaking population—a fairly significant bias. In addition, interviews were frequently conducted over video or voice chat, implying that our sample was further limited as we only included participants who were able to secure internet connectivity. Self-selection bias may have also played a part in the interview participants pool, as these respondents were asked to volunteer at the end of the survey. The age range of participants trended low, mostly consisting of young adults, which could limit generalizability, but previous studies has found that older generations use emojis and emoticons similarly to their younger counterparts [18, 37]. Overall, however, we believe we received input from a wide variety of individuals from across the world, and developed a reasonable understanding of how people use emojis across different cultures, in addition to drawing perspectives across several different cultures' values and day-to-day contextual living.

5 FINDINGS

Next we discuss three main findings regarding how our research participants leveraged (or sought to leverage) emojis to communicate within and across cultures. First, we found that emojis were helpful to our participants in establishing a personal connection—based on a shared understanding, whether between two people, within small groups, or among people with a shared cultural background. Emojis allowed people to overcome linguistic differences, and also served as stepping stones for individuals to establish greater closeness. Second, emojis were also seen as powerful in allowing participants to express their cultural identity, whether it was through the use or appropriation of existing emojis. Finally, a prominent fraction of our findings was devoted to food as a critical aspect

of participants' cultural identities that they frequently used emojis to indulge.

Communication Within and Across Cultures

Our survey and interview participants discussed their motivations for using emojis. One of the most common reasons for sending an emoji was to convey a sense of intimacy; 53% of survey respondents said that they used emojis in a non-literal sense, that is they used it beyond the semantic meaning of the emoji. For example, "🍍🍕. *My partner and I use pineapple pizza as a way of saying I love you."* These responses mirror previous findings regarding re-purposing emojis for personal use [26, 62]. However, romantic intimacy was not the only usage, many survey and interview participants also mentioned using emojis to refer to an inside joke: *"One group chat with science majors uses a scientist emoji ironically to make fun of anyone who says or does something dumb."* In general, there was a view that emojis could allow for communication that helped establish a personal connection on account of a shared understanding, whether it was shared between two people, a small group (as in the two examples above), or individuals from a shared cultural background.

Another common motivation for including emojis in messages was to clarify the tone of a message: *"I also use [emoji] when I'm trying to regulate emotion, like 'don't interpret it this way'."* (IP4) This sentiment findings by Cramer et al. [9], Zhou et al. [63], and Kelly and Watts [26] that emojis are used to provide additional emotional or situational information that words are sometimes unable to convey on their own. This affordance of emojis could be of particular value to users who found themselves communicating in languages that were not their native tongue which was true for many of our participants.

We also asked survey respondents to input their ten most recently used emoji from their keyboard to understand what type of emojis people are typically sending. The top 20 results are reflected in Figure 5. The results mirror previous studies [2, 30] which found that the most popular emojis used—regardless of country—were expression emojis, particularly faces and hearts.

An original finding from the interview participants is a majority (13/17) discussed a sort of spectrum along which they send emoticons and emojis. At first, participants did not send emoji to people they had just met. However, as they got closer to them, they began to use more emoticons or emoji: *"I hold off on emojis until we've established a communicative norm, the way it usually goes is full sentences to abbreviations to emoji."* (IP7). Interestingly, the native Chinese participants (IP9, IP10) mentioned that with the people they were closest to, they no longer used emoji as they felt that they could convey emotions truthfully without using them: *"When I get*

so close to them that they can understand me, I no longer use emoji... like with my parents I don't use any emoji." (IP9) An attempt to capture this spectrum can be seen in Figure 6, however this topic warrants more exploration. Emojis could thus also be seen as stepping stones to closeness and intimacy.

Communicating Cultures

Emojis emerged as a common method for individuals to convey their own cultural identity or to refer to others'. About 1 in 5 individuals (n = 28) in the survey reported sending an emoji that was culturally situated. However, among those who self-reported not using any culturally specific emoji, they did report using emojis such as taco 🌮 or sushi 🍣, which did fulfill our criteria for being culturally situated, and brought the percentage up to 30% (n = 43). Reasons mentioned for using cultural emojis included patriotic reasons (*"American and British flag emojis for patriotic things relevant to us or Scotland..."*) or for specific foods (*"food emojis that are specific to foods from certain regions (sushi, bento box, etc.)"*), which we discuss below.

Individuals also believed that there were opportunities for new emojis to be created from their native languages; 42% (n = 63) of survey respondents said there were words or phrases in their native language they believed could be represented through an emoji that they would want to see included into Unicode. Common greetings, slang, and foods were among those most mentioned. Some cultures have adapted existing emojis to fulfill these purposes. For example, one respondent replied that the Folded Hands emoji 🙏 was used to convey "Namaste" among Indian users. Emojipedia also lists "Namaste" under the section "Also Known As" for the Folded Hands emoji [16].

Participants also felt that there were "gaps" in the current emoji options. In the survey, 70% (n = 145) of respondents reported that they had encountered a situation where they wished an emoji had existed or thought one existed when in actuality, it did not. International landmarks, ethnic foods, and animals were most often sought after. As one participant put it: *"I don't remember now, but usually I look for an emoji that represents a specific culture and it doesn't have."*

Cultural Indulgence: "You are what you eat"

The most common topic that we came across any time culture was discussed was food. Food has been a common topic of study across the disciplines of anthropology, sociology, and cultural studies. There is also the emerging field of *food studies* that "examines the relationship between food and all aspects of the human experience, including culture and biology, individuals and society, global pathways and local contexts" [8]. Food has long been tied to one's identity, summed up in the phrase "you are what you eat" [11].
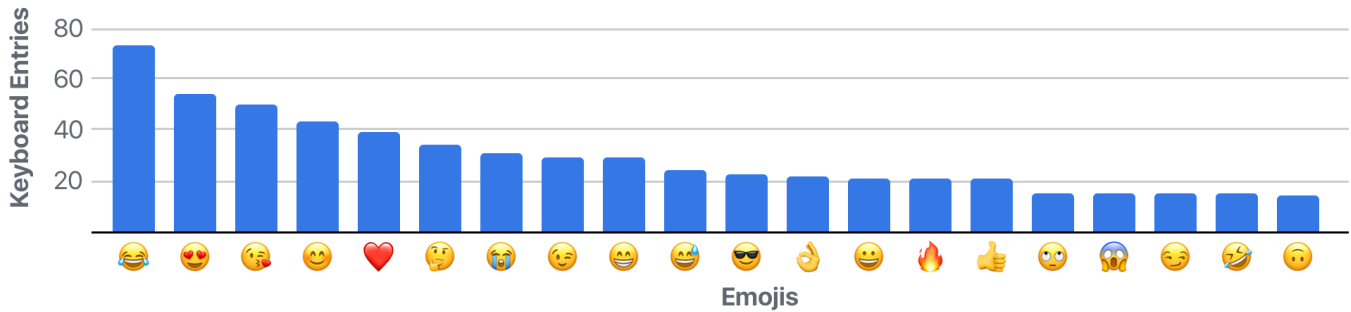
Figure 5: The top 20 emojis used by survey respondents, reflecting prior studies by Barbieri et al. [2] and Lu et al. [30] that facial emojis are most popular
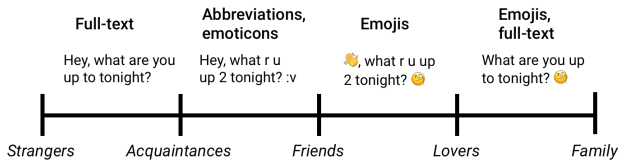

Figure 6: The spectrum of emoji usage reflecting interview participants' comments on who they send emojis to

Throughout our data collection, participants talked about food at length and with ease compared to other subjects. 32 out of 89 who left comments regarding emojis they expect to exist explicitly mentioned that they had looked for a food they were unable to find in their emoji keyboard. Interview participants all listed five or more native foods that could be included as emojis, and culturally specific foods took up the majority of the speaking time taken by most participants. As described below, in our follow-up exercise, multiple foods made a frequent appearance as participants had difficulty narrowing down their culture's food to just one dish. A third of all the post-it notes made in the participatory design exercise related to food, with the next closest category being landmarks (13%). All this importance placed on food seems appropriate, as food has been viewed as one of the primary mechanisms for communicating a culture [45].

6 DESIGN & EVALUATION

Based on the information gathered from our research, our next step was to design emojis that appropriately represented the cultures of the participants we had surveyed and interviewed. For this step of research, the drawings produced from the interviews and participatory design exercise gave us a starting point to create 40 emojis representing 16 different countries. The emojis were mostly inspired by food, which our findings suggested as the most critical place of disconnect, with

fashion and landmarks—chosen due to their easy graphical representation and general worldwide recognition.

Design Considerations

Unicode has five design factors for inclusion, and eight for exclusion, that are taken into account when an emoji is proposed to the standard [58]. Some key factors that guided and informed what emojis were designed included: image distinctiveness (is the emoji visually understandable?), completeness (does this emoji fill a gap in the current standard?), overly specific (can the emoji extend to other definitions?), already representable (can the emoji already be symbolized?), and specific buildings (is the emoji a specific building?). We discuss image distinctiveness and completeness in depth below.

Image Distinctiveness. An important factor for new emojis created is that they should look different from existing emojis. However, many foods like soups or meats look similar to one another, even across cultures, so they would not have been independently discernible at 24x24 pixels compared to existing emojis, like 🍲 ('Pot of Food') or 🥘 ('Shallow Pan of Food'). "Already representable" is another factor which discusses this issue; if the proposed emoji is already representable through an existing emoji, it is not considered. For example, the sushi emoji represents all sushi types such as Maguro, Saba, or Hamachi [57].

Figure 7: Visually similar soups from Serbia, China, and Nigeria

However, other foods that came up through research like bubble tea, crepe, waffle, bibimbap, and kebab all have a distinct shape and color such that no currently existing emoji

can really capture the essence of the food, thus enabling the creation of emojis for them specifically.

Completeness. For the Unicode Consortium, "Completeness" refers to whether a proposed emoji fills in gaps that exist in the current set. For example, emojis like 🗽 ('Statue of Liberty') and 🗼 ('Tokyo Tower') already exist, so why should there not be emojis of other major landmarks around the world? The emphasis on landmarks from participants and this factor of "completeness" led us to design emojis like the Eiffel Tower, Taj Mahal, or the Great Wall of China. However, the Unicode Consortium opposes this line of thinking stating that there should not be emojis of specific buildings, and that "the Tokyo Tower emoji does not justify adding the Eiffel Tower." [56] It is unclear on what basis, if any, the Consortium takes this stance to not be more inclusive regarding landmarks from the rest of the world.

Evaluating Designs

In order to evaluate potential emojis, we chose to evaluate them against current, existing emojis using two main metrics: comprehension and country of origin. Comprehension, as people must be able to understand what an emoji represents for it to be useful in communication, otherwise it is simply a meaningless glyph. Additionally, it is valuable (though not necessary) to see if people are able to recognize what countries' cultures these emojis are from, to understand if these cultures are identifiable beyond just their own nations, because emojis are used by a global audience.

There were five existing emojis selected to compare against as a control group:

- Tokyo Tower 🗼 as a landmark comparison to Big Ben, Great Wall, etc.
- Japanese Goblin 👺 as mythological comparison to Son Goku, the Lunar Rabbit, etc.
- Oden 🍢 and Narutomaki 🍥 as food comparisons to Macaron, Bubble Tea, etc.
- Tanabata Tree 🎋 as a tradition comparison to Sky Lanterns, Dragon Boats, etc.

The logic behind selecting Japanese emoji in particular was to avoid bias on account of the globalized nature of Western-based emoji. Thus they could provide good benchmarks for how familiar people people generally are with emojis of more specific cultural relevance.

Survey Design

An important factor for the design evaluation was reaching as many people as possible, as emojis come pre-installed on phones worldwide. We therefore distributed a survey consisting of 12 questions, randomly displaying 4 of the control emojis and our 8 proposed emojis (distributed so they would

all appear evenly)[2]. Under each emoji, survey respondents were asked to identify:

- what the emoji represents (short response)
- what the country of origin it belongs to (short response)
- which emoji category it would belong to (multiple choice)

To correctly identify an emoji, participants had to use the exact word or describe in enough detail to avoid confusion (e.g. swirly pink thing in ramen would be enough to accurately describe Narutomaki 🍥).

Results

We received 251 responses, of which 128 were complete. Each emoji appeared about roughly 30 times total within these complete responses, no emoji was over- or under- represented. Respondents again skewed young, this time with around 85% ($n = 110$) of the 128 respondents falling within the 18-29 age range. Caucasian, East Asian, and South Asian were once again the three most represented ethnicities and 25 countries were represented in total.

For the existing Japanese emojis, no single one received over a 50% comprehension rate. In descending order, Narutomaki 🍥 received 47%, Tanabata Tree 🎋 40%, , Tokyo Tower 🗼 31%, Oden 🍢 24%, and Japanese Goblin 👺 10%. Within the 69% of those who answered the Tokyo Tower incorrectly, 76% of them answered Eiffel Tower, and 30% of those Eiffel Tower responses also made mention of it looking like a traffic cone, or in one respondent's words: *"Meant to be Eiffel Tower but failed: looks like traffic rubber cone."* For the 40 proposed emojis, the results compared to the control proved more favorable, with 22 out of the 40 performing better than the Japanese emojis. The breakdown is pictured in Figure 9.

As seen in Figure 9, only 6 emojis scored below all of the Japanese emojis in terms of comprehension. UK, French, Canada, Germany, and Belgium all had strong placements, with all of their emojis ranking above the control emojis. Comparatively, countries like Nigeria, Serbia, and Colombia did not place as well, likely due to the lack of cultural exports on a global scale, especially to the Western world.

Some emojis also suffered due to confusing or similar graphical representation, such as Samosa often interpreted as a chip, or Sugarcane as bamboo. This could be remedied in the future by making graphical tweaks, such as giving the samosa a more 3D texture, and having participants select which looks most appropriate for the term.

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[2]For evaluation purposes the Google set of the Japanese emojis were used, as the emojis we designed were created with the same visual style influenced by Material Design, Google's design language [21].
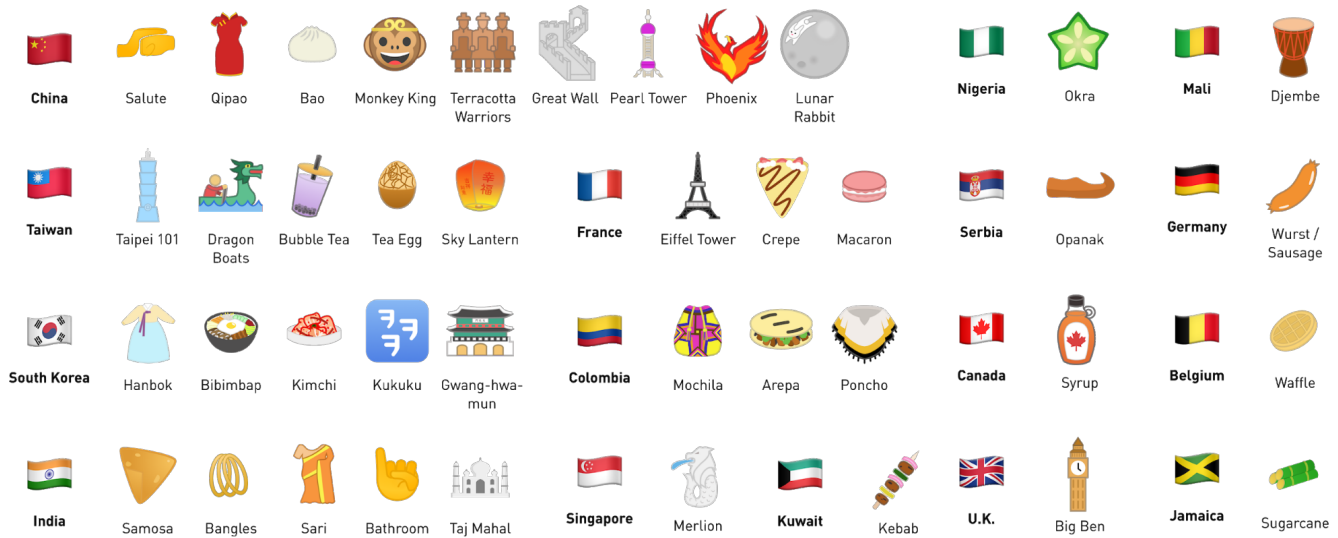
Figure 8: All 40 emojis (with country of origin) designed from interview sketches and participatory design exercise, evaluated against existing Japanese emojis for comprehension ©Philippe Kimura-Thollander
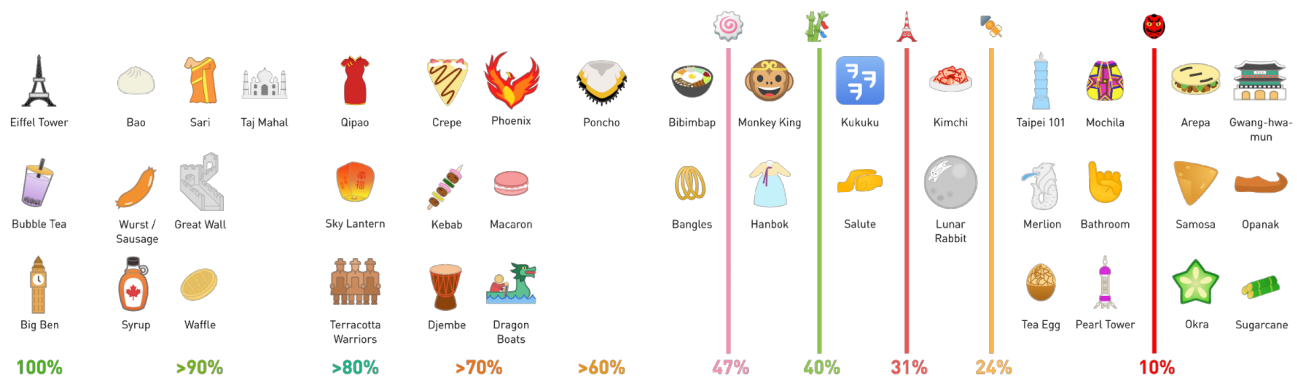

Figure 9: Recognition percentages of the designed emojis compared to the existing emojis evaluated

When we explained to participants that we intended to submit these emojis for consideration to the Unicode Consortium, they were surprised as they had always thought Apple or Google designed and dictated what emojis came into existence, leading their industry competitors to follow suit. There appeared to be a fundamental lack of understanding among most of our research participants regarding how emojis might be proposed or created. This illustrates how opaque the process of emoji design and development currently is, and that although technically it is possible for anyone to submit their designs, for all intents and purposes emojis are developed by technology companies in a top-down way.

7 DISCUSSION

Drawing on our findings, we discuss the political leanings of emojis and present implications for designing new emojis towards a fairer representation across cultures and geographies.

The Emoji Imbalance

Our findings revealed that there are already existing cultural emoji for which overall comprehension is low, so introducing new emoji from cultures other than Japan does not necessarily pose a risk of devaluing the meaning behind an emoji. Many other countries contain symbols that are generally understandable on a global scale and can further increase the diversity of representation of emoji beyond just Japanese and American cultures. This can help in closing the "gap" that 70% of survey respondents felt regarding the current emoji

standard. Introducing more diverse culutral emojis can foster greater personal connections among those who interact with those cultures, as they have a shared understanding to build a relationship upon, which our findings revealed was a key role emojis played in messaging.

Our design evaluation supported the idea that emojis do not necessarily have to be Western or Japanese-focused to be understood by the general public. Bao (*dumpling*), Bubble Tea, Sari, Qipao, Poncho, Djembe, and many others were recognized more than all the tested Japanese emojis that currently exist in Unicode. This begs the question that if there are widely recognizable foods, landmarks, and other elements from non-Western and non-Japanese cultures, why have they not become emoji yet?

The Barrier of the Unicode Consortium

One answer to the above question we posed is that although an emoji proposal can be submitted to the Unicode Consortium by anyone, the process for doing so is quite archaic and requires lots of research to be put together. And once an emoji proposal is accepted by the consortium, the process of how a proposal becomes an emoji or not is not at all transparent. The consortium states that "from time to time the Unicode Consortium seeks wide public review and feedback for certain proposed actions" [55], which at the time of writing stands at two issues, neither regarding emojis. The document page reads that it was last revised on August 6th, presumably when one of the two issues were open for review, but neither the official Unicode blog[3] nor the associated Twitter account[4] makes any mention of a public review being open, so that there is no way for the public to know that they can give any inputs. It is no surprise then that most study participants had no idea that anyone from the public could suggest an emoji, instead assuming it was a decision made by corporations such as Apple or Google.

In their research, Sutton and Lawson [47] found that recent public reviews of emojis reached a maximum of 25 participants (mostly due to a group email) [52] and sometimes as few as 3 [53]. These are hardly the types of engagement numbers that should be seen for a decision that affects a global population to communicate. In the end, those who are ultimately in charge of the decision of whether an emoji proposal becomes real or not include representatives from technology companies, who are already infamous for their lack of attention to diversity issues [35, 61].

Sutton and Lawson go on to propose that emoji submissions and review should take on a more democratic approach, to engage more individuals and communities in the selection process. We agree with this approach, but also propose that

the Unicode Consortium also make their submission system more accessible through the creation of an online platform for people to submit, discuss, and vote on new emojis. Even if more people are involved in examining emojis, it is also necessary to ensure that more culturally representative and diverse emojis are submitted in the first place.

Implications for Designing Emoji

The current system of submitting an emoji contains six sections, with each one containing subsections and sometimes even sub-subsectons. There is a long list of criteria an individual must address when writing their proposal, such as where in the emoji list it would be located, how far this emoji might be interpreted beyond its literal meaning, what are the Google Trends or social media usage of the term currently, and much more. Interested individuals are also required to submit a design with their proposal, at a strict 24x24 pixel size, and in black and white. Then the proposal must be sent with a .pdf and .zip extension, with specific file names in a specific submission email. This process of writing a proposal from start to finish can take about a full day if solely dedicated to it, without counting the potential edits that the Consortium might request post submission.

These requirements already serve to disadvantage those who do not read or write English well, those who do not have regular access to a computer, those who are not skilled at graphic design, and those who in general are not computer-savvy. It is not surprising that most new emojis that have been released since they were moved from Japan have been primarily U.S. centric.
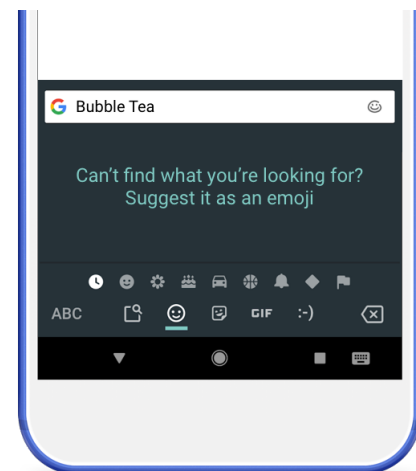

Figure 10: A potential call to action that could be provided when the user cannot find the emoji they want

We recommend that the Unicode Consortium provide a form online, or in an app, that would allow users to more

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[3]http://blog.unicode.org
[4]https://twitter.com/unicode

easily submit ideas, and in different languages. Imagine that a user opens their emoji keyboard searching for a Bubble Tea emoji, only to find that it does not exist. The emoji keyboard could have a message in the very last pane of the keyboard, or perhaps trigger one if a user is taking a long time looking in the keyboard without choosing an emoji, such as "Can't find what you're looking for? Suggest it as an emoji!" Tapping the message would then allow the user to fill out a form with basic submission information that would then be sent to Unicode (see Figure 10). If companies such as Apple, Google, Facebook (all Unicode members) incorporated this into their keyboards, emoji submissions would surely increase dramatically and submissions could be filtered by country, region, language, or a mix of all so that Unicode would be able to see what kinds of emojis are desired by cultures around the world.

Bridging the Emoji Culture Gap

By creating barriers to emoji submission and obfuscating the process from submission to acceptance, the Unicode Consortium essentially ensures that most emojis that are created year after year conform to their unconscious bias. The consequence of this is that cultures outside of Japan and the West are less able to convey their daily lives through emojis and cannot participate as well in this new universal language. Peltonen et al. [39] found that communication and social apps are popular regardles of country, and emojis are a key fabric in today's digital communications. Being unable to tell your coworkers that you had bibimbap for lunch when they are able to send you a burger emoji, or to send a sari when a friend asks what you are wearing, can be exclusionary. Emojis have expanded to become used by a global population, but still lag behind the population they are meant to represent: people as a whole around the world.

Literature on transational HCI seeks to resist this bias of seeing "other cultures" outside of the West as simply being "out there" in the world [49]. Instead, it prompts us to think about how technologies can be used to reproduce global boundaries or transcend them [43]. In this way emojis currently serve to reinforce the borders that exist in the world today, but might instead be used to provide for a global pictorial language that need not prioritize a country or creed. The facial expressions emojis do provide an example of this, but the Unicode standard has much ground to cover to become a truly universal standard.

8 CONCLUSION AND FUTURE WORK

In this paper, we investigated the existence of a cultural gap in the emoji standard due to the heavy Western tech bias of the maintainers in the Unicode Consortium. We distributed a survey and found that there was a "cultural gap" between what individuals thought or wished were emojis and what is in

the standard. Semi-structured interviews helped us better understand how individuals use emojis in their cultural contexts. Following that, a participatory design exercise contributed towards the design of 40 new emojis that were compared against existing Japanese emojis in terms of comprehension. Twenty-two of the new emojis performed better than the Japanese emojis and demonstrated that the addition of more culturally diverse emojis does not present any more confusion regarding their representation, compared to existing emojis. We propose that the Unicode Consortium take steps to increase public involvement in its decision making and discuss an alternative method to solicit emoji suggestions from a global public. Finally, we argue why it is important for more and different nationalities to find representation through emojis.

Our study represents an initial attempt to examine and address the idea of a cultural gap among emojis used globally. Building upon this work, researchers could consider tackling specific countries or other aspects of culture in society that may be underrepresented, such as disabilities, and examine how these cultures currently use emojis—what kind of gaps they find in communicating within that culture [2], or what kinds of workarounds they use [62]. Studies can also be done to examine how emojis relate to closeness and intimacy, touched upon in Figure 6. Future work can also be conducted to consider if there is a better method of creating emojis than the current "top-down" approach from the Unicode Consortium. Although public proposals are accepted, it is never published which emojis came about from public proposals versus within, or how members of the committee voted on each proposal. A more democratic approach [47] may be more representative and could be explored, or perhaps a better method to solicit suggestions from the public could be tested. We also encourage individuals to get more engaged with the Unicode Consortium—as the first author already is—to increase the diversity considerations of the committee.

9 ACKNOWLEDGMENTS

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