Research on Sticker Cognition for Older Adult Using Instant Messaging

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Abstract. The growing ubiquity of smartphones has changed how older people live and the advent of instant messaging apps has reshaped their communication methods. Stickers are arguably the most popular feature of LINE, an instant messaging app. In this study, in-depth interviews were conducted with elderly users of instant messaging apps to explore the effects of the emotional meanings behind stickers on their social connections and level of understanding of the other party's meaning in an online conversation. The findings suggested that using stickers improved the participants' social connections, made them happier, and enhanced their involvement in LINE chats. Moreover, stickers with perceived positive and negative connotations enhanced the participants' social connections; in this regard, no noticeable differences were observed between stickers with positive and negative connotations. However, the participants had difficultly accurately interpreting stickers featuring highly expressive facial expressions or diverse physical movements; some even found such stickers ambiguous and misunderstood the implied meanings.

Keywords: Sticker · Instant messaging · Older adult · User experiences

1 Older Adult and Instant Messaging

1.1 Motivation

Health and social wellbeing are common concerns among older adults. It is estimated that one in four people in Taiwan will spend the remainder of their life living alone. Across Taiwan, older adults with limited contact with their relatives have small social networks and are frequently neglected. They tend to idle away time watching TV at home or sitting in front of their homes watching passers-by and passing vehicles. Older adults who seldom participate in social activities or events of interest exhibit less positive emotions. However, the Internet that enables diverse communication methods can be a solution for the feeling of loneliness in older adults [1]. The Internet can be harnessed to prepare people mentally for a solitary life and expand their social circle in later life after their children have become too busy to come home and their friends have limited time for gatherings. Thus, "solitude" may not be a synonym of "loneliness". Communication technologies including telephones, mobile phones, and the Internet enable various methods of interpersonal communication and allow users to maintain

relationships with others without time or spatial constraints. Older adults engage in interpersonal communication in a variety of manners; for example, holding social gatherings, using the telephone, and writing letters. They can also socialize through Internet technology–enabled features such as mobile phones, email services, and instant messaging apps. Thus, older adults can reduce the feeling of loneliness and expand their social network by using smartphones to maintain contact with their family members and relatives and connect with their friends.

1.2   Older Adults' Social Connections

A sense of connection refers to the state in which a person is connected or acquainted with others; such a state may involve family bonding, friendship, or acquaintance with neighbors. Such social connections provide joy and support, enable a person to feel a sense of belonging, and assist a person in creating social capital, thereby enabling society as a whole to operate effectively. Moreover, people with more active social lives tend to be more physically and mentally robust and more capable of handling major life changes [2].

The sense of connection is a fundamental need for human beings, and it is the sense of belonging that a person feels in his or her community or social network [3]. Paying a personal visit, holding a social gathering, making a phone call, or initiating a conversation via the Internet can induces feelings of comfort and belonging in a person. Social connection can be measured based on six criteria: whether phone and Internet connections are available at home, interaction with family members and friends, interaction between young people and their parents, level of trust in others, loneliness, and participation in voluntary work. Fincham and Beach [4] used the construct "relationship flourishing" to describe a relationship characterized by happiness, intimacy, growth, and resilience, which further heightens feelings of happiness and wellbeing.

1.3   Role of Instant Messaging in Social Connections

Instant messages are pieces of textual information transmitted between electronic devices and typically sent in the form of short passages of text between users [5]. Advances in smartphones and wireless communication technologies have given rise to many instant messaging and social media apps that enable smartphone and computer users to send textual, graphical, and audio information, photos, videos, and electronic files, thereby enabling users to communicate in a convenient, rapid, and varied manner [6].

A 2015 survey conducted by Foreseeing Innovative New Digiservices—a research branch of the Institute for Information Industry (III)—revealed that older adults living in Taiwan (a) increasingly considered retirement as a transitional period of life, (b) enriched their retirement lives by using high-tech devices to pursue the goals they had set for themselves when they were young, and (c) expected to remain up to date with technological developments to meet their recreational, social, and learning needs. The survey results also indicated that elderly people (a) depended increasingly on technology, particularly smartphones, (b) expressed a strong preference for LINE, and (c) used technology to access health-related information, contact their relatives, follow new episodes

of soap operas, and listen to music. Overall, technology enables Taiwanese older adults to fulfill their expectations of daily living and live well-rounded and vibrant lives [7].

Statistics from SimilarWeb (2016) revealed that WhatsApp is the world's most popular instant messaging app, Facebook Messenger is the second most popular, and LINE has the highest degree of penetration of any messaging service in Taiwan. Both Facebook Messenger and LINE enable users to send text messages, pictures, audio, photos, and stickers, make phone calls, and deliver short messages to multiple users instantaneously. LINE accounts for as much as 91.9% of instant messaging app use in Taiwan because it helps to cement one's interpersonal relationships, facilitates communication, and is easy to use. In December 2016, the III [8] released a Report on 2017 Trends in New Media, which suggested that 4G Internet connection services had over 17 million subscribers in Taiwan, 90% of whom reported having a LINE account. Furthermore, the number of LINE users in Taiwan doubled within a 2-year period; the widespread use of smartphones for socializing and entertainment has contributed to the development of numerous commercial services and ample business opportunities.

1.4 Older Adults' Use of Instant Messaging Apps on Smartphones

Older adults differ somewhat from younger people in terms of lifestyle, technology use, and attitudes toward virtual commerce. The III's 2016 survey of older adults' needs for using 4G Internet found that 60.2% of respondents aged 55 years or older owned a smartphone; their smartphone use focused largely on making phone calls and they showed high preferences for LINE and Facebook. Additionally, approximately 60% of over-55-year-olds improved their interpersonal interactions through LINE; over 50% used the app to engage in video chats with their children or grandchildren, thereby strengthening their relationships [8].

2 Stickers

2.1 Stickers on Instant Messaging

Stickers are used extensively on instant messaging apps. The precursor of stickers is the *emoji*, which is designed by Shigetaka Kurita (a Japanese engineer) and etymologically consists of two Japanese language characters—*e* for "picture" and *moji* for "character." Just as languages evolve with social change, stickers have gradually influenced users' communication with each other and enriched instant messages.

A 2016 report released by Yahoo's Flurry Analytics described stickers on instant messaging apps as a contributing factor in the development of personalized mobile apps. Many existing instant messaging apps offer stickers as a means of nontextual communication. Sending stickers can facilitate communication via messaging apps by fostering understanding between users; in the workplace, using stickers judiciously can improve emotions involved in communication. Social factors are the primary factors in the use of instant messaging apps within a business organization; the more messaging app users in an organization and the more positively the management perceives use of the apps, the more frequently are the apps used. Thus, social factors affect the intention

to use instant messaging apps. Stickers are related to the message input method used, and some are intended to reflect ongoing social events and mainstream culture and subcultures. However, for old-age users, the diversity of stickers can hamper communication via instant messaging apps.

Therefore, this study discussed older adults' difficulties in using stickers on messaging apps; this paper proposes solutions to these difficulties to increase older people's sticker usage. Stickers appear not only as pictures but also as accentuated images with sound effect, and a diverse range of genres of stickers are currently available on the market. This study analyzed older adults' perceptions of stickers.

2.2   Line with Stickers

A 2016 Nielsen survey found that LINE had a usage rate of over 90% in Taiwan, with over 17 million users; more than 90% of people aged 20 to 65 years used the app, and nine out of ten LINE users had added official business accounts to their contact lists to obtain complimentary stickers. Evidently, stickers are popular among messaging app users in Taiwan. However, the survey did not include statistics of LINE usage among people aged 65 or above. LINE stickers used widely in Taiwan are classified under such genres as male and female characters, cute, sweet, comforting, funny/hilarious, dialect/buzzwords, animals, and food. All these sticker genres were adopted as cartoonistic stickers in the present study.

As an enhanced variant of their conventional equivalents, stickers are virtual images created in a personified manner designed to vividly convey the mood or tone of a sent message. Emoticons are akin to facial expressions and serve to express certain nonverbal behaviors [9].

The Shannon–Weaver model of communication suggests that the delivery of a message is subject to external noise, which influences how the recipient interprets the message [10]. Accordingly, stickers are characteristically open to interpretation and can create misunderstanding and confusion among older LINE users.

3   User Experiences

To analyze older adults' difficulties in using stickers on instant messaging apps, this study explored older adults' experiences of sticker use to address their problems with stickers. Older adults tend to have difficulty typing on mobile devices because of their slow movement and the insufficiently large keypads on such devices. Moreover, older adults tend to have an inadequate understanding of stickers for instant messaging apps and younger people's use of language, and rarely use such stickers to express their feelings. However, using stickers can enable older adults to interact more readily and conveniently with their younger relatives and friends.

This study used various methods to investigate older adults' experiences of using instant messaging apps with a view to elucidating their difficulties in sending textual and graphical messages and stickers. These methods are detailed as follows.

3.1   Focus Groups

As a qualitative research method, a focus group enables a researcher to develop an effective, timely, and thorough understanding of a topic and gather data that can actually reflect the said topic. Despite some implementation-related limitations, this method is more effective than are other qualitative techniques. A focus group interview should be planned by specifying the participant group, the moderator, the length of the questionnaire to be administered, and other questionnaire-related factors in accordance with the interview topic; formulated in such a manner, the interview can be flexibly implemented, and thus high-value data can be collected [11].

In this study, focus group interviews were conducted in a structured manner, each with six to eight representative older adults. The moderator asked the participants to share their experiences of using messaging apps. Guided by open-ended questions, they stated their opinions and needs regarding stickers and discussed what types of stickers met their preferences and needs and facilitated their communication and mutual understanding. Through such discussion, the participants were inspired to have new thoughts concerning the topic, and thus the collected data can reflect opinions from various perspectives. By conducting the in-depth interview, the researchers can comprehensively understand older adults' perceptions and evaluation of stickers and identify the difference between the older adults' previous experience and current perceptions.

3.2   Contextual Inquiry

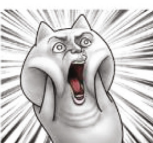Analyzing user experiences enables product designers or engineers to better understand users' needs for a specific product or difficulty using it. Contextual inquiry is a qualitative research method where a researcher interviews a participant to identify his or her problems, explore the causes of said problems, and address said problems. Through this method, a product designer can ask a user questions about his or her behaviors from using the product in question for the first time to experiencing problems with it. In so doing, the product designer can face-to-face communicate with users and comprehensively understand users' difficulties and product usage experience [12]. Therefore, contextual inquiry involves collecting primary data, which encompass a user's reported difficulties in using the product; the designer can then collate these data to improve the design and functionality of the product.

Regardless of whether they live alone, older adults tend to have fixed habits of use. This study observed how older adults used stickers to respond to positive and negative critical events in various representative scenarios, as well as how they interpreted and felt about the stickers they used. The findings are expected to improve older adults' understanding of stickers used in messaging apps.

3.3   Experimental Procedure

The experiment comprised two stages. In the first stage, a focus group of five participants aged 55–60 years held a discussion to select 16 stickers representing typical human emotions and feelings (as shown in the Table 1).

Table 1. The participants' interpretations of all 16 stickers

Sticker				
The participants' interpretations	1.My apologies 2.Sorry 3.Can't recall 4.Acting cute	1.I am cool 2.It's you 3.You get me 4.I am confident on myself	1.I love you 2.I like it 3.Blowing a kiss 4.Over the moon;	1.Cool, isn't it? 2.I'm awesome! 3.I'm smart 4.Things are going well 5.Let me think
Sticker				
The participants' interpretations	1.Thank you 2.I need a hand 3.Help me	1.Acting cute 2.I like it 3.Blowing a kiss 4.Annoying 5.Joking 6.Making a face	1.Delighted 2.Blissful 3.Satisfied	1.Mocking 2.Ha ha ha! This is hilarious! 3.Making fun of a person's stupidity
Sticker				
The participants' interpretations	1.Sigh 2.Anyway 3.It doesn't matter 4.Resigned 5My bad	1.Having a yearning 2.Fantasizing 3.In a good mood 4.I like it	1.Speechless 2.Dumbass 3.At a loss for words 4.Resigned	1.Stupefied 2.Sad 3.Surprised 4.Weeping 5.Stunned by an unexpected incident
Sticker				
The participants' interpretations	1.I won 2.I'm a champion 3.Proud 4.Happy	1.Furious 2.Holding my breath 3.Tsundere 4.Roll my eye	1. Let me see 2. Want a date? 3. Seducing	1.Surprised 2.How could this be? 3.Taken aback 4.Terrified 5.This is impossible

In the second stage, an in-depth contextual inquiry was conducted to ask eight 55–78-year-old participants (who know how to use LINE) about their interpretations of these 16 stickers and how they used the stickers on LINE. The Table 1 presents the participants' interpretations of all 16 stickers.

4   Discussions and Conclusions

During the individual interviews of contextual inquiry, the participants shared a view that using instant messaging apps significantly increased the frequency they contacted with relatives and friends and the time they spent on making contact with them. This strengthened their social connections with their relatives and prompted them to frequently check up on their relatives, thus feeling less lonely. Moreover, stickers, which contain contextual cues including facial expressions and physical movements, were more intelligible to the participants in terms of the emotional overtones indicated by their chatting partners than were messages composed of pure text. Thus, using stickers in a LINE chat can improve a sender and recipient's perceptions of each other's emotions and further cement their relationship. Facial expressions and physical movements are easy to identify; facial expressions are particularly highly expressive and the most crucial form of human communication after textual and spoken information. Because faces are readily observable, any change in facial expression becomes the focus of attention. Particularly, when people make crucial judgements, they typically depend on the messages conveyed from facial expressions. Stickers can serve as symbols of facial expressions, which are invariably subject to interpretation; therefore, the perceived emotions and symbolic meanings conveyed by the same stickers varied among the participants.

The participants reported that stickers effectively expressed senders' positive and negative emotions, LINE stickers were appealing, and stickers representing cartoon characters and nonhuman characters (e.g., dogs, cats, and monsters) were easier to understand than were other stickers. In addition, the participants stated that they often received replies in the form of stickers from their younger relatives and were often unclear about the meanings behind these stickers. For example, when interpreting a popular LINE sticker that features a cute character with a wide mouth producing a red facial expression and shedding tears, some participants remarked that the sender was laughing to tears, whereas others perceived the meaning to be weeping bitterly. The emotional ambiguity of such a sticker can lead to misunderstanding and poor communication. The participants' opinions on the influence of stickers on communication via instant messaging apps are summarized as follows.

(1) The more expressive a character sticker, the greater difficulty the participants had understanding its meaning and the more likely they were to attempt to guess it. Additionally, the participants reported that crucial matters must be discussed through text messages or over the telephone. Considering that older adults often misunderstood the meanings of stickers, young people are advised to use stickers sparingly when talking to their older relatives via instant messaging apps.

(2) Some participants opined that the purpose of sending stickers was to enable the other party to understand the meaning. They did not realize that some stickers may be used to brush others off by young people. The participants added that they worked hard to decipher the meanings of stickers that they received and that ambiguous stickers should not be used.

(3) Few participants ignored the meaning of stickers and perceived them simply as cute images.

(4) All participants stated that stickers were lifelike and interesting. Because their children and grandchildren often sent cartoon stickers, they often responded in kind and tried to understand more about the emotional meanings of stickers.

An effective image conveys its intended message in a straightforward and concrete manner, whereas an ineffective image leaves the receiver struggling for clarity. A user's attitudes and adhesion toward messaging app stickers strengthen if the stickers in question accurately convey the user's emotions and are understandable to the recipient. By contrast, ambiguous stickers tend to cause misunderstanding, which is why stickers should be designed to be self-evident in meaning to prevent confusion among elderly people. Moreover, the findings indicated that stickers had direct and significant effects on the extent to which emotions are expressed through stickers; however, highly expressive or exaggerated stickers can be confusing to older adults. Stickers on instant messaging apps in earlier times were mostly graphical; as the time went by, an increasing number of stickers were accompanied by simple words (e.g., "OK" and "Yes") to complete express the intended meaning and prevent misunderstanding. Stickers without textual information can be understood at first glance only if they convey explicit emotions. Therefore, stickers should be designed in an animated style together with features such as perceptible physical motion, words, sounds, or scenes. The increase of nonverbal cues can effectively enhance the extent to which emotions are expressed through stickers. Future research is suggested to analyze whether stickers with textual and audio elements increase older people's understanding of the intended meanings.

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