

Was my message read?: Privacy and Signaling on Facebook Messenger

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ABSTRACT

Major online messaging services such as Facebook Messenger and WhatsApp are starting to provide users with real-time information about when people read their messages, while useful, the feature has the potential to negatively impact privacy as well as cause concern over access to self. We report on two surveys using Mechanical Turk which looked at senders' (N=402) use of and reactions to the 'message seen' feature, and recipients' (N=316) privacy and signaling behaviors in the face of such visibility. Our findings indicate that senders experience a range of emotions when their message is not read, or is read but not answered immediately. Recipients also engage in various signaling behaviors in the face of visibility by both replying or not replying immediately.

Author Keywords

Privacy; Social Networks; Anonymous Access

ACM Classification Keywords

K.4.1 Computers and Society: Public Policy Issues—*Privacy*

INTRODUCTION

Instant Messaging (IM) continues to be a highly popular form of real-time communication, particularly in the mobile market, with services such as Facebook Messenger and WhatsApp each boasting more than a billion active users every month [5, 17]. Users of IM applications generally expect attentiveness from other users, as well as feedback about their online availability. In turn, features such as when a user was 'last seen online' and whether they were 'typing now' offer various forms of real-time feedback about online status and whether a user can reasonably expect a response. In the age of mobile, the concern focuses more on whether the message was ever delivered or read [12]. For example, Facebook Messenger and WhatsApp offer senders feedback [4, 16] about

when a message has been (i) *sent* to the service, (ii) *delivered* to the recipient's device, and (iii) *read* by the recipient.

In general, status about one's availability can create social pressure to be attentive to received messages [13], and also raise privacy concerns about one's visibility [14]. Feedback about whether a message was received or read raises additional privacy concerns and increases social pressure and anxiety for instant messaging viewers. Qualitative studies on the broader use of WhatsApp [3, 11] note such concerns amongst some of their participants although a deeper study of privacy and social pressure is not their focus. More recently, Mai et al. conducted a quantitative study to test specific hypotheses related to how obligated people feel to respond when a message has been read (although they do not study the case where a message has been received but not read) [9]. They found that senders experience more anxiety than recipients. That is, although senders do feel that recipients are obligated to respond, recipients feel even more obligated to respond.

Knowing whether a recipient has read a sender's message, or has read the message but not responded can affect both the sender and recipient. This may have emotional and behavioral effects, and can raise privacy concerns for the recipient.¹ To date, these issues have not been adequately studied. In this paper, we seek to uncover quantitatively: (1) the privacy and signaling behaviors taken by recipients when they receive a message; (2) the emotions senders experience when recipients do not read or fail to immediately respond to their messages; and (3) the perceptions of senders as to why the recipient may not have read or replied to their message.

We surveyed 718 participants using Amazon Mechanical Turk (MTurk) across two surveys: one focused on 'senders' (N=402) and one on 'recipients' (N=316). Our findings suggest: (i) recipients of messages make conscious decisions to *not read* a message to signal their unavailability as well as to send social signals such as willful ignoring of the sender; (ii) recipients actively *read* messages to send positive signals such as they are not ignoring the sender or to acknowledge

¹We note that although WhatsApp and Apple's iMessage allow users to disable feedback ("read receipts") about when a message is read, notably Facebook Messenger does not offer such a privacy setting and WhatsApp does not offer this privacy option for group chats.

the message; (iii) senders actively observe message delivery status and experienced a range of emotions (such as anger, anxiety, and feelings of lowered self esteem) when a message is either not read, or read but not responded to in a timely fashion. Senders felt more negative emotions when their messages were read but not responded to, and instead were less angry and more concerned about the recipient’s safety when a message was not read. Our findings have implications for the design of IM services that aim to improve the privacy of recipients while also reducing anxiety felt by senders. Specifically, the study of tunable read receipts, mechanisms for facilitating quick-glance importance determinations, and context-based canned responses are motivated by our findings.

METHOD

Two online surveys were conducted through MTurk [1] for this study. The first focused on the privacy concerns of content *viewers* on social networking sites and message recipients of instant messaging; the other focused on the concerns of content *publishers* on social networking sites and message senders of instant messaging. The results for privacy concerns about publishers and viewers on social-networking sites such as LinkedIn were published separately [7]; in this Note we focus on the findings for Facebook Messenger.

Recruitment and compensation — There was no mention of privacy sensitive words like “privacy” or “security” in the recruitment to prevent respondent bias. Participants received \$2 in compensation for the survey which was estimated to take 20 minutes to complete.

Survey Instrument — The full survey instrument is included as supplementary material. The survey was advertised using Amazon Mechanical Turk and hosted on Qualtrics. We focus on the part of the survey related to Facebook Messenger.

The surveys started with standard demographic questions including: age, gender, nationality, household size, education, ethnicity, and how long they had been using Facebook. Respondents were then asked about possible setting choices and their own behaviors on Facebook Messenger as either a recipient or a sender, depending on the survey. The viewer survey asked about instances where they avoided viewing messages and when they deliberately viewed messages, and their reasons for doing so. The sender survey asked how message senders had used the ‘seen by’ feature. Respondents were provided with a set of options drawn from existing privacy management research [2, 6, 10, 15]. Senders were also asked free-text questions about instances when they felt uncomfortable about unresponsive recipients.

Responses and Validation — The responses were screened based on location (United States residents for five or more years), age (18 years or older), use of Facebook, and prior job approval rating on MTurk (95% or higher). Respondents who missed up to three attention check questions were compensated but their data was excluded. MTurk task batches were released at several times of day to get a range of participants. The recipient-focused survey was distributed from May 6–7, 2015, while the sender-focused survey was distributed from June 29–July 3, 2015.

Reason	Frequency
I wanted to pretend I never saw the message.	137 (68.2%)
I was too busy with other work and had no time to view the message.	92 (45.8%)
I hadn’t responded to a correspondence from this person and didn’t want to let them know I had logged into Facebook.	83 (41.3%)
I didn’t want people to know I am checking Facebook messages at that time of day, or day of week.	36 (17.9%)
I wanted the other person to know I am ignoring them.	16 (8.0%)
Other	8 (4.0%)
	<i>N</i> = 201

Table 1: Most selected reasons why respondents deliberately did not view a message because of the ‘seen by’ feature?

FINDINGS

Respondents

After validation, 519 recipient and 543 sender responses reduced to 316 and 402, respectively, for a total of 718 respondents in our sample. Respondents were relatively evenly balanced in gender in the two surveys (52.5% male and 47.7% male in the two surveys respectively), mostly White (77.5% and 80%), young (age 23–39, 73.7% and 65.1%), with some college or undergraduate education (73.7% and 76.3%).

Awareness

We first look at respondents’ awareness of their viewer-privacy options. Respondents were asked under what circumstances a generic person (Alice) could tell when someone had read their message sent using Facebook Messenger. Most respondents (662, 92.32%) were aware that Alice could potentially see who had viewed her message. However, a sizeable fraction of respondents (293, 40.86%) also thought, incorrectly, that visibility could be controlled via settings.

Facebook Messenger recipient behaviors

In the recipient survey, 294 respondents (93%) said they believed others were able to ‘sometimes’ or ‘always’ know when they viewed messages sent by others using Facebook Messenger. We asked these respondents whether they had ever deliberately *avoided* viewing such a message because of viewer-privacy concerns and provided a set of potential reasons (Table 1) to select from. 201 (68.4%) respondents reported that they had avoided viewing a message. Of note, 68% of our respondents indicated that they wanted to pretend that they never saw the message, and another 8% wanted senders to know that they were being ignored. Other reasons for not viewing messages were related to aspects of managing their availability to others: e.g., being too busy to engage in conversation, or wanting to avoid signaling that they were on Facebook at all. Additionally, we found that women were more likely to avoid viewing a message on Facebook because of the ‘seen by’ feature (76.4% vs. 60.8%, $\chi^2 = 7.55$, $df = 1$, $p = 0.0060$) and more likely to regret having viewed a message (32.9% vs. 20.2%, $\chi^2 = 5.35$, $df = 1$, $p = 0.021$).

We then asked respondents whether they had ever deliberately viewed a message *because of* the ‘seen by’ feature. 83 (28.2%) respondents reported that they had. Again we provided a set of potential reasons based on prior work (Table 2). The top reasons for using this feature reflect consideration of

Reason	Frequency
To show the other person that I saw his/her message.	72 (86.7%)
To show the other person that I am not ignoring them.	39 (47.0%)
To respond to something that the other person wants to know urgently (e.g. messages from family members about something really important).	29 (34.9%)
To let someone know that I have logged into Facebook.	12 (14.5%)
To show someone that I am not busy with other work and have time to respond.	11 (13.3%)
To show someone that I can check Facebook at that time of day or day of week.	5 (6.0%)
Other	0 (0.0%)
	<i>N</i> = 83

Table 2: Most selected reasons why respondents deliberately viewed a message on Facebook because of the ‘seen by’ feature?

the message sender’s needs, either in general (e.g., notifying the sender that their message was received) or in response to urgent inquiries.

Facebook Messenger sender behaviors

In the sender focused survey, 368 respondents answered ‘always’ or ‘sometimes’ when asked whether senders can see if the other person has read the message through the ‘seen by’ tag of Facebook messenger. 33 respondents said that publishers can ‘never’ see whether the other person has read their message and one participant did not answer this question.

Of the 368 respondents aware of the ‘seen by’ feature, 326 (88.58%) reported making use of the information to see who has received their message but not yet responded; 121 (32.88%) reported using the feature as a way to see if other chat members are paying attention to their conversation. A respondent used this feature as a way of confirming that the required information given by him/her is reaching the intended recipient: *“I had really bad Internet connection and service at one point and some of my messages weren’t sent. So out of habit now I like to see the seen check mark just so I can make sure they are getting the information I am giving them.”*

Facebook Messenger sender reactions

Respondents were asked to relate two prior experiences where they were uncomfortable after a recipient: 1) did not read their message right away, and 2) read their message but did not respond right away. Responses were detailed, with median 26 and 28 words per response, respectively.

To analyze the free-text, we used a qualitative coding methodology. Open coding on 8% of the data was used to identify two key topic concepts: (i) emotional response to the event, and (ii) speculation about why the message recipient was not reading/responding to the message. Open codes were converted into an initial code book, which was then iterated on. When the code definitions stabilized, two researchers coded a random set of 50 responses (8%) from both questions, resulting in an inter-rater reliability above 80%. They then coded the remaining data, meeting to resolve all conflicts.

Similar to prior work, we find that people have expectations about how quickly messages should be acknowledged by either reading (an implicit ‘seen by’ signal), or explicitly responding [3, 11]. From the sender’s perspective, these ex-

pectations can result in a range of emotions under these two circumstances as summarized in Table 3. In general, senders experience negative emotions in these circumstances, especially when a message was read but not responded to (they were more likely to feel upset or angry and more likely to feel slighted or ignored). There were statistically significant differences² between all of the values for which there was an emotion, with the “did not reply” response having a higher likelihood of having a negative emotional response. We also saw instances in which senders experienced concerns for the well-being of recipients as a result of a (presumably) atypical response time, especially when the message was not seen.

These expectations also lead to speculation as to *why* a message was not read or responded to, and what this lack of interaction meant. Table 4 summarizes a number of salient categories of speculation (here, too, all differences are statistically significant; see Supplementary Materials).

Busy: Many respondents ascribed delays in reading or response to situations in which the sender was busy or in some way indisposed. Being busy could be seen as either good or bad. Some people saw being busy as an understandable state, others saw it as a priority decision where they were being valued less than other activities or people. This was more often experienced if a message was never read (24.1%) as compared to when it was read but not responded to (11.7%).

Pointedly ignored: Many respondents felt that a lack of reading or responding indicated that the other person was purposely ignoring the message; this was particularly true in the case that a message was read but not responded to (27.9%).

Trouble: Several respondents felt that a lack of response could also mean that the recipient was in some sort of trouble. Examples ranged from people who stopped responding while in transit to people who were known to have suicidal tendencies. As with the ‘Busy’ explanation, this attribution was more common if the message had never been read.

Technology: Issues with the technical sending and receiving of the message itself were also mentioned as potential reasons for lack of response. Respondents theorized that the recipient might be somewhere with limited signal, or that they typically only checked Messenger on their PC instead of their phone.

Unintended interpretation: Some respondents described situations where they had sent a message, but after not receiving a reply they started second-guessing how the other person may have interpreted it. For example, sending a joke, and then later questioning whether it was potentially offensive.

Formulating: Several respondents also recognized that some responses simply took longer to ponder and formulate, perhaps due to a need to get more data, clarify a reply, or tactfully compose a “no” response.

Looking into whether gender played a role in the responses, we found a couple of statistically significant differences. Women were more likely to feel pointedly ignored than men when a message was read but not replied to (70 (33.5%) vs.

²Tables showing the statistical tests are included in Supp. Materials.

Emotion: 'I felt...'	Did not Read Count (%)	Did Not Reply Count (%)
upset or angry at the recipient	122 (30.3%)	172 (42.8%)
it was not a big deal	74 (18.4%)	37 (9.2%)
slighted or ignored	51 (12.7%)	108 (26.9%)
concerned about the recipient (never happened)	25 (6.2%)	6 (1.5%)
(no specific emotion given)	24 (6.0%)	17 (4.2%)
Total responses	(N=402)	(N=402)

Table 3: Emotions experienced by senders when their message wasn't read or they didn't receive a response.

Reason: 'The recipient probably...'	Did not Read Count (%)	Did Not Reply Count (%)
is busy	97 (24.1%)	47 (11.7%)
is pointedly ignoring me	62 (15.4%)	112 (27.9%)
may be in trouble	23 (5.7%)	5 (1.2%)
is having technical issues	13 (3.2%)	2 (0.5%)
may have misinterpreted me	4 (1.0%)	40 (10.0%)
is formulating a response (Never happened)	0 (0.0%)	8 (2.0%)
(No reason given)	23 (5.7%)	17 (4.2%)
Total responses	121 (30.1%)	130 (32.3%)
	(N=402)	(N=402)

Table 4: Explanations that senders speculated on when their message wasn't read or they didn't receive a response.

42 (21.9%), χ^2 test, dof = 1, $p = 0.008$, $r = 0.13$). Men were more likely to believe that a message was not read due to a technological problem than women (0 (0.0%) vs. 13 (6.8%) χ^2 test, dof = 1, $p = 0.0003$, $r = 0.18$). No other differences were significant after applying a Bonferroni correction.

DISCUSSION AND IMPLICATIONS

Our findings show that the 'seen by' feature of Facebook messenger is used by recipients to signal or reinforce both positive and negative relationship cues to message senders, and that senders experience a range of emotions in response to these signals. Further, recipients carefully consider their privacy and signaling enabled by this feature, putting thought and effort into balancing their desire to extract the importance of an incoming message with the signals that may be sent by their interactions (or lack thereof) with the Messenger app. This points to a number of design recommendations that could streamline interactions and minimize users' cognitive burdens, privacy concerns, and anxieties when using mobile messaging applications.

Tunable read receipts — Unintended signaling is unavoidable when individuals do not understand how read receipts are handled by Messenger. We found that 41% of respondents assumed that these notifications could be disabled, and 7.7% did not know that they existed. The most obvious way to clarify signaling using IM clients is to make read receipts configurable. Allowing 'delivered to device' notifications while disabling 'seen by user' notifications, e.g., could eliminate sender concerns related to technical issues in message delivery, while reducing recipient concerns related to privacy and the social pressure of timely replies for low-importance messages. More research is needed to determine whether differences in settings between senders and recipients could lead to additional confusion regarding message status.

Improved importance determinations — Table 1 shows that recipients often ignore messages because they were busy (45.8%) or behind in communications (41.3%). At the same time, Table 2 shows that recipients understand the importance of timely responses to acknowledge the sender (86.7%), convey that the sender is not being ignored (47%), or respond to urgent requests (34.9%). One way to balance this tension is to allow a quick 'peek' at incoming messages without exposing the message as read.³ These types of quick-glance determinations could facilitate responses to certain messages while minimizing the associated cognitive burdens. To our knowledge, the impact of these types of features on the social pressures associated with messaging has not been studied.

Streamlined responses — Our qualitative coding uncovered that sender concerns are often related to recipient context (e.g., positing that the recipient is busy, in trouble, etc.). Outfitting IM clients with better 'canned' responses could enable prompt replies with minimal cognitive overhead, thereby enabling better sender awareness of recipient context. These responses may take the form of recipient-specified 'away messages', context-dependent lists of common replies, or even auto-replies noting that the recipient is in a meeting or that their phone has not recently been unlocked. We leave an examination of the interplay between automatic responses and feelings of social pressure to respond to future work.

Limitations — Our findings are based on self-reported behaviors of Amazon Mechanical Turk workers, who have more privacy concerns than the US population on average [8]. One concern about our study may relate to order effects since the answer options were not presented in random order. We do not see evidence of order effects, e.g., in Table 1, the second most frequent item ('too busy'; 46%) was the last selectable item before 'Other'.

CONCLUSIONS

The ability for senders of a message to see the delivery status of their message (whether it was received or read) creates social pressure through heightened expectations of sending a response as well as receiving a response. We surveyed two samples of the adult U.S. population to study the privacy concerns and behaviors of people *receiving* (N=316) and *sending* (N=402) instant messages using the Facebook Messenger platform. We found that feedback about the delivery status of messages affects the behaviors of message recipients (how and when they respond to send specific signals), and lacking attention from the recipient, various emotions and speculation on the part of the sender. Our findings highlight several directions for improving the design of instant messaging applications to better manage the social pressures inherent in these types of communication platforms.

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³Some messenger apps allow peeking at partial messages via the notification tray. However, partial messages can limit the ability to fully discern message context.

REFERENCES

1. Amazon Mechanical Turk. *Amazon Mechanical Turk*. <https://www.mturk.com/mturk/welcome>.
2. Michael S. Bernstein, Eytan Bakshy, Moira Burke, and Brian Karrer. 2013. Quantifying the Invisible Audience in Social Networks. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13)*. 21–30.
3. Karen Church and Rodrigo de Oliveira. 2013. What's Up with WhatsApp?: Comparing Mobile Instant Messaging Behaviors with Traditional SMS. In *Proceedings of the 15th International Conference on Human-computer Interaction with Mobile Devices and Services (MobileHCI '13)*. ACM, New York, NY, USA, 352–361.
4. Facebook Messenger Delivery Feedback. *Facebook Messenger Delivery Feedback*. <https://www.facebook.com/help/messenger-app/iphone/926389207386625/?ref=u2u>.
5. Facebook Messenger Statistics. *Facebook Messenger Statistics*. <http://www.statista.com/statistics/417295/facebook-messenger-monthly-active-users/>.
6. Erving Goffman. 1959. *The presentation of self in everyday life*. Garden City, NY Double Day.
7. Roberto Hoyle, Srijita Das, Apu Kapadia, Adam Lee, and Kami Vaniea. 2017. Viewing the Viewers: Publishers' Desires and Viewers' Privacy Concerns in Social Networks. In *ACM Conference on Computer Supported Cooperative Work (CSCW '17)*, To appear.
8. Ruogu Kang, Stephanie Brown, Laura Dabbish, and Sara Kiesler. 2014. Privacy Attitudes of Mechanical Turk Workers and the U.S. Public. In *Symposium On Usable Privacy and Security (SOUPS '14)*. 37–49.
9. Lisa M. Mai, Rainer Freudenthaler, Frank M. Schneider, and Peter Vorderer. 2015. "I know you've seen it!" Individual and social factors for users' chatting behavior on Facebook. *Computers in Human Behavior* 49 (2015), 296–302.
10. Christena E. Nippert-Eng. 1996. *Home and Work*. The University of Chicago Press.
11. Kenton P. O'Hara, Michael Massimi, Richard Harper, Simon Rubens, and Jessica Morris. 2014. Everyday Dwelling with WhatsApp. In *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing (CSCW '14)*. ACM, New York, NY, USA, 1131–1143.
12. Sameer Patil and Alfred Kobsa. 2005. Uncovering Privacy Attitudes and Practices in Instant Messaging. In *Proceedings of the 2005 international ACM SIGGROUP conference on Supporting group work (GROUP '05)*. ACM, 109–112.
13. Martin Pielot, Rodrigo de Oliveira, Haewoon Kwak, and Nuria Oliver. 2014. Didn't You See My Message?: Predicting Attentiveness to Mobile Instant Messages. In *Proceedings of the 32Nd Annual ACM Conference on Human Factors in Computing Systems (CHI '14)*. ACM, New York, NY, USA, 3319–3328.
14. Yasmeen Rashidi, Kami Vaniea, and L Jean Camp. 2016. Understanding Saudis' Privacy Concerns When Using WhatsApp. In *Proceedings of the Workshop on Usable Security (USEC '16)*.
15. Blase Ur, Pedro G. Leon, Lorrie Faith Cranor, Richard Shay, and Yang Wang. 2012. Smart, Useful, Scary, Creepy: Perceptions of Online Behavioral Advertising. In *Proceedings of the 8th Symposium On Usable Privacy and Security (SOUPS '12)*.
16. WhatsApp Delivery Feedback. *WhatsApp Delivery Feedback*. <https://www.whatsapp.com/faq/en/general/20951546>.
17. WhatsApp Statistics. *WhatsApp Statistics*. <http://www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/>.